

Multihazard Loss Estimation Methodology

HAZUS®MH MR4

Software Requirements Specification

(Updated June 2009)

Developed by:

PBS&J

For:

Department of Homeland Security

Emergency Preparedness and Response Directorate

FEMA

Mitigation Division

Washington, D.C.

Under a contract with:

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Foreword

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1. Introduction

The purpose of this Software Requirements Specification (SRS) is to define the functionality, external interfaces, performance, attributes, and design constraints of the HAZUS-MH. The Product Requirements Document (PRD) focused on the major capabilities and features needed by the target users. This document will not define additional capabilities, but focuses on the provision of the capabilities as defined in the PRD. Because HAZUS-MH is distributed for free by the federal government, other topics, such as pricing, competition analysis, marketing issues, are not relevant and are not addressed. Section 2 provides an overall description of the software while Section 3 provides discusses specific software requirements.

1.1. Purpose

The purpose of this document is to collect, analyze and define high-level user needs and features of the HAZUS methodology. The focus is on providing those capabilities accepted in the PRD. This SRS is not intended to provide design or implementation details and should not impose additional constraints on the software.

Because the HAZUS-MH program already exists, the requirements in this SRS are described as provided by the existing HAZUS-MH software. Thus, specific requirements described in Chapter 3 are based on the existing HAZUS-MH capabilities.

The overall objective of the HAZUS project is to develop nationally applicable standardized multi-hazard methodologies for estimating potential wind, flood, and earthquake losses on a regional basis. HAZUS-MH is intended to be used by local, state, and regional officials for planning and simulating mitigation efforts to reduce losses from hurricanes, severe floods, and earthquakes and to prepare for emergency response and recovery after these events. Depending on the capability built in for each hazard, HAZUS-MH may also be used to prepare real-time (rapid loss) estimations after an event.

1.2. Scope

The HAZUS-MH software includes three models: earthquake, flood, and hurricane, and the application shell (the common code for all three models). This document forms the foundation from which the design, development, and testing of the three models was planned and conducted. It is expected that no major changes will occur after this SRS is completed;

however, HAZUS updates shall be documented through the maintenance release notes and updates to technical and user manuals. The software requirements described in this SRS include common components of the HAZUS presentation and data layers that will be shared by Hurricane, Earthquake, and Flood Models. Principle responsibility for meeting the software requirements of all common items as agreed by the software contractors and NIBS is that of PBS&J (who purchase the original developer Durham Technology Incorporated [DTI]).

HAZUS-MH will contain complete flood and earthquake models capable of the full range of loss estimation. The wind hazard will be addressed with a partial hurricane model (hurricane preview model) with limited capabilities that will be expanded following its initial release in 2002.

HAZUS-MH will be capable of integrated multihazard loss estimation and will have the following major features:

- An updated earthquake model that takes advantage of the new three-tier architecture
- An additional hurricane preview model and a completed flood model
- Integration within a new Geographic Information System (GIS) framework based on the Environmental Systems Research Institute (ESRI) ArcMap
- Common and shared inventory data sets for the three hazards
- A single, fully integrated set of functions for scenario creation, default inventory, and reporting functions for the three models
- Advanced GIS functions
- Capability to receive user-supplied input for all three models to generate more refined loss estimations
- Capability to run both deterministic and probabilistic scenarios
- Varying degrees of real-time analysis for each hazard
- State-of-the-art software, fully documented with metadata for all databases

Specific objectives of the multihazard loss estimation using the completed models are described below.

User-friendly for state and local emergency managers and planners. The HAZUS-MH must clearly meet user needs and be user friendly. The model contains appropriate terminology and definitions, facilitate application of the studies, and be coherently structured. The needs of user groups were met relative to what is desired and what is realistic. The methods used to produce loss estimations allow for the involvement potential users during the analysis process. The methodologies provide users with loss estimations that can be used to make decisions on mitigation planning and preparedness and disaster planning but should be limited in technical detail by the actual methodologies.

State-of-the-art. The HAZUS-MH represents a major improvement over current loss estimation models for each hazard.

Uniformity and modularity. The methodologies for each hazard provide uniformity on a national scale as well as within models (e.g., ground shaking, damage, and loss models). Actual loss estimations are typically prepared under the direction of local, state, or regional officials; therefore, the methodologies and procedures are adaptable to local needs and allow for the application of different models and resources while providing the desired uniformity. It is possible to update HAZUS as new data and methods of analysis become available.

Balance in degree of accuracy generated by different model parts. The objective of a loss estimation is to provide a credible evaluation and description of the economic and social costs for hurricane, flood, and earthquake events. Techniques to estimate hazards and the damage they may cause are means to the end, not the ends themselves. Accuracy in the analysis is not justified if other steps can be performed only crudely.

Flexibility in the hazard events that can be modeled. It is anticipated, but by no means firmly established for regional usage, that loss estimations should be based on scenario events or annualized assessments. Appropriate guidelines and procedures for selecting scenario events are provided in the User Manual. The capability to perform a nationwide risk has been developed using the annualized capability. The only real constraint is the complexity of the hazard relative to man-made protection measures that may not be discernable in the NED. Uncertainty was considered as something to provide thereby giving an indication of uncertainty

for the best estimate loss for a given scenario. The decision was made not to include this in the HZUS-MH models at this time.

Accommodate modest budgets to perform loss estimations. Because fiscal support for studies may vary widely across the country, loss estimation with the HAZUS-MH should be performed to a meaningful level of detail within a modest budget. For example, each hazard model has three levels of analysis using default databases, user-supplied databases, and user-supplied loss estimation methods.

Non-proprietary. All computerized and non-computerized loss estimation methods, either newly developed as part of this project or appropriated from existing methods, should be non-proprietary so that state and local users can access the completed methodology without restriction.

This SRS is intended to specify requirements for all models (earthquake, flood, and hurricane). While some software requirements and components are shared among the models, others are hazard-specific. This document clearly identifies when requirements and/or components are shared and when they are not.

1.3. Definitions, Acronyms, and Abbreviations

1.3.1. Definitions

The definitions below (from the Institute of Electrical and Electronics Engineers [IEEE] Standard 830-1998, Section 4.3.5.2) are used to characterize requirements as presented in this SRS.

Essential—Implies that the software shall not be acceptable unless the requirements are provided in the agreed manner.

Conditional—Implies that these are requirements that would enhance the software product, but would not make it unacceptable if they are absent.

Optional—Implies a class of functions that may or may not be worthwhile. This gives the supplier the opportunity to propose something that exceeds the SRS.

A fourth category is also used in this SRS to track enhancements desired for future releases of the hurricane model:

Deferred—Implies a class of functions that will not be implemented in the hurricane preview model, but may be implemented in a future version of the hurricane model.

Unless otherwise specified, all requirements in this SRS shall be treated as essential requirements.

1.3.2. Acronyms and Abbreviations

A short definition of all the abbreviations and acronyms referenced by the SRS are included below. The glossary of terms will be provided in the technical documentation and user's manual. HAZUS occupancy definitions (RES1, RES2, ..., EDU) can be found in Reference 10 (HAZUS Users Manual) Table Appendix A-3 Building Occupancy Classes (Page A-3).

Acronym/Abbreviation	Definition
ADO	ActiveX Data Objects
AEBM	Advanced Engineering Building Model
ANSI	American National Standards Institute
API	Application Programming Interfaces
ARA	Applied Research Associates, Inc.
BFE	Base Flood Elevation
BIT	Building Import Tool
BMP	Bitmap (file name extension)
CD	Compact Disk (also see CD-ROM)
CD-ROM	Compact Disk – Read Only Memory
CFR	Code of Federal Regulations
cfs	Cubic Feet per Second
CPU	Central Processing Unit
DDS	Detailed Design Specification
DEM	Digital Elevation Model
DFIRM	Digital Flood Insurance Rate Map
DSP	Damage State Probability
DTI	Durham Technologies Incorporated
EDNA	Elevation Derivatives for National Applications
EIA	Electronic Industries Association
EQE	EQE International, Inc.
ESRI	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
FIA	Federal Insurance Administration
FIRM	Flood Insurance Rate Map
FIT	Flood Information Tool

Acronym/Abbreviation	Definition
GB	Gigabyte
GHz	Gigahertz
GIS	Geographic Information Systems
GUI	Graphical User Interface
HAZUS	Hazards U.S. (natural hazards loss estimation software program)
HAZUS-MH	Multihazard HAZUS
HEC	Hydrological Engineering Center
HEC-FDA	HEC- Flood Damage Analysis
HEC-RAS	HEC- River Analysis System
HPM	Hurricane Preview Model
HUC	Hydrologic Unit Code
IEEE	Institute of Electrical and Electronics Engineers
InCAST	Inventory Collection and Survey Tool
IWR	Institute of Water Resources
jpg	Graphics file type/extension
km	Kilometer
m	Meter
MapInfo	MapInfo Corporation
MB	Megabyte
mbar	Millibar
MHz	Megahertz
mph	Miles per Hour
m/s	Meters per Second
MSDE	Microsoft Database Engine
NED	National Elevation Dataset
NED-H	National Elevation Database – Hydrologic Derivatives
NIBS	National Institute of Building Sciences
OCX	ActiveX File Extension
PC	Personal Computer
PESH	Potential Earth Sciences Hazards
PGA	Peak Ground Acceleration
PGD	Peak Ground Velocity
PRD	Product Requirements Document
Q3	A digitized flood boundary from the Flood Insurance Rate Maps
RAM	Random Access Memory
RDBMS	Relational Data Base Management System
SDD	Software Design Descriptions
SHP	SHP or shape file is the file extension (.shp) for ArcView GIS Software
SQL	Structured Query Language (database query language)

Acronym/Abbreviation	Definition
SRS	Software Requirements Specification
SWL	Stillwater Level
SWEL	Stillwater Elevation Level
SVGA	Super Video Graphics Display
TAB	TAB is the file extension (.tab) for MapInfo's GIS software table control file
TBD	To Be Determined
U.S.C.	United States Code
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey

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1.5. Overview

As with the software builds, the SRS has a version number on the cover page. This number provides traceability for modifications and updates. This SRS is structured based on compliance with IEEE Standard 830-1998 and contains the following sections:

- Chapter 1 provides an overall background of the HAZUS-MH software, describes the purpose and objectives of the SRS, and includes definitions, acronyms, abbreviations, and references.
- Chapter 2 describes the interfaces of HAZUS-MH, product functions, user characteristics, constraints, assumptions, and software dependencies.
- Chapter 3 is a high-level overview of HAZUS-MH-specific requirements: system features and attributes, performance, and software documentation.

2. Overall Description

This chapter describes the environment in which the HAZUS-MH software shall operate. Specifically, it addresses product perspective, product functions, user characteristics, general constraints, assumptions, dependencies, and the apportioning of requirements.

2.1. Product Perspective

The HAZUS released in late 2002, called HAZUS-MH, is a standalone application consisting of a three-tiered framework:

- A presentation layer which consists of a common application startup, creation of study regions that is shared across all three hazards and a common menu to select hazard-specific sets of windows for hazard characterization, analysis and results generation. Study region generation is available for any combination of states (limited by database size and processing time), counties, and census blocks (Flood Model only) with aggregation up to the census tract level for earthquake and wind analysis. The purpose of the Presentation Layer is to allow the user to manipulate Levels 1, 2, or 3 data to assess and manage losses due flooding. Mapping and reporting capabilities are provided to help the user visualize and understand the results of the flood analysis.
- An application layer that contains the hurricane preview, flood, and earthquake loss estimation computational engines each with the following common features:
 - Hazard analysis capabilities for modeling deterministic and probabilistic (both default and user-determined) events. Please refer to the Hurricane Preview Model PRD for limitations related to that model.
 - Analysis capabilities for calculating damage and loss.

The model has hazard outputs and hazard-specific damage and loss outputs described in this section. The calculations to determine the depth of flooding and loss estimates are performed within the Application Layer. Flood hazard specific engines are called to perform the necessary calculations. The flood hazard engines accesses the capabilities of ArcGIS and associated Spatial Analyst extension thereby requiring that the appropriate ARCGIS release be installed on the user's computer.

- A data access layer with common and hazard-specific databases and input/editing features including:
 - A Relational Database Management System (RDBMS) with a common low-level RDBMS access to tables via ADO (ActiveX Data Objects) interface layer to permit independent changes to the RDBMS and the ADO itself.
 - Common underlying inventory and demographic data with additional tables for hazard specific data.
 - Inventory data import and editing capabilities for common data.
 - Common integrated multi-hazard BIT and InCAST.

This section contains a listing and description of the HAZUS data including hazard-specific data, national inventory data including demographic data, general building stock data, essential facilities data, high potential loss facilities data, hazardous materials sites, transportation lifelines data, utilities lifelines data, agricultural products data, and vehicles data.

Figure 2-1 shows the major HAZUS-MH components and their interconnections.

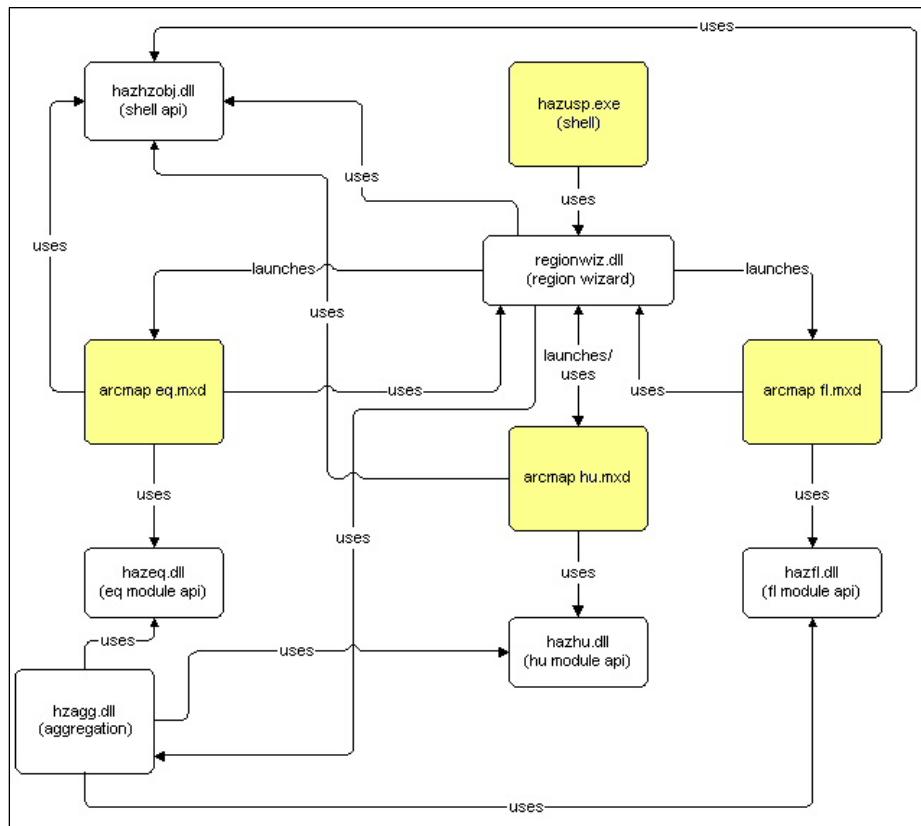


Figure 2-1: HAZUS-MH Components and Overall Flow

2.1.1. System Interfaces

HAZUS is a standalone, personal computer (PC)-based application. Specific interface requirements for the three models (earthquake, flood, and hurricane) and the HAZUS application shell are documented in Section 3.2, System Features.

Conversely, the earthquake, flood, and hurricane models are not standalone products; they are packaged as part of the full HAZUS-MH program and are installed as part of a setup program distributed via DVDs.

Table 2-1 lists the HAZUS-MH software packaging.

Table 2-1: HAZUS-MH Packaging Description

Data DVD Nos.	Content	Description
Application DVD	Setup	This DVD contains Setup, User and Technical Manuals, and Shake Map Utility for Earthquakes. The Setup includes FIT, BIT, and InCAST
1-8	Data DVDs	Data DVDs are distributed by contiguous regions and by state. Each state shall include the inventory data for all three hazards. Eight data DVDs are available.

2.1.2. User Interfaces

The HAZUS software shall be graphical user-interface (GUI)-driven and conform to Windows user interface guidelines. Similar styles of controls and control locations shall be used for windows serving similar functions. Interaction with software will occur through dialogs that allow input of data and output of results in textual or graphical (map-based) formats.

HAZUS utilizes ESRI's ArcGIS and Spatial Analyst extension to provide Geographic Information System (GIS) functionality within the model. This functionality includes the capability of viewing different types of GIS data including vector and raster data models. The flood model accepts and performs mathematical operations on raster data. The model takes advantage of ArcGIS functionality to ensure that data is in the projection necessary for the flood model to properly analyze the data. Users can query, map and create thematic maps within the model. There is potential for future web enablement.

Overall, the models are implemented as a regular Windows application with horizontal pull-down menus, right-click menus, and toolbars. At some places, the menus are also supported by wizards that guide users through different tasks. The wizard interface shall adhere to Wizard97 specifications (see Section 1.4, References).

Summary reporting is provided through the use of Crystal Reports. Report formats are predefined, and information from the user's analysis run automatically and is loaded for viewing depending on the study case that the user has opened. No custom reporting functionality shall be provided.

As a result of the methodology and product requirements, the software was developed using ESRI's ArcGIS product. For the Flood Model user, this requires the users to have licenses for ArcView and Spatial Analyst. ESRI updates ArcGIS products on a regular basis. Users will need to refer to the current HAZUS release documentation for the latest ArcGIS version compatibility

The Flood Model shares common overall software architecture and some modules with the Earthquake and Wind Models. The user interface screens vary to some degree for each model, but have a common look and feel. An overview of the HAZUS-MH architecture and the various hazard components is in Figure 2-2.

Note: In a typical SRS, implementation is never discussed. However, because the HAZUS Earthquake Model already exists and the fact the overall software architecture has been determined and agreed to by ARA, PBS&J (formerly DTI), ABS Consulting, and the Software Committee, the Key Features and Functionality need to be discussed within the context of the Software Architecture.

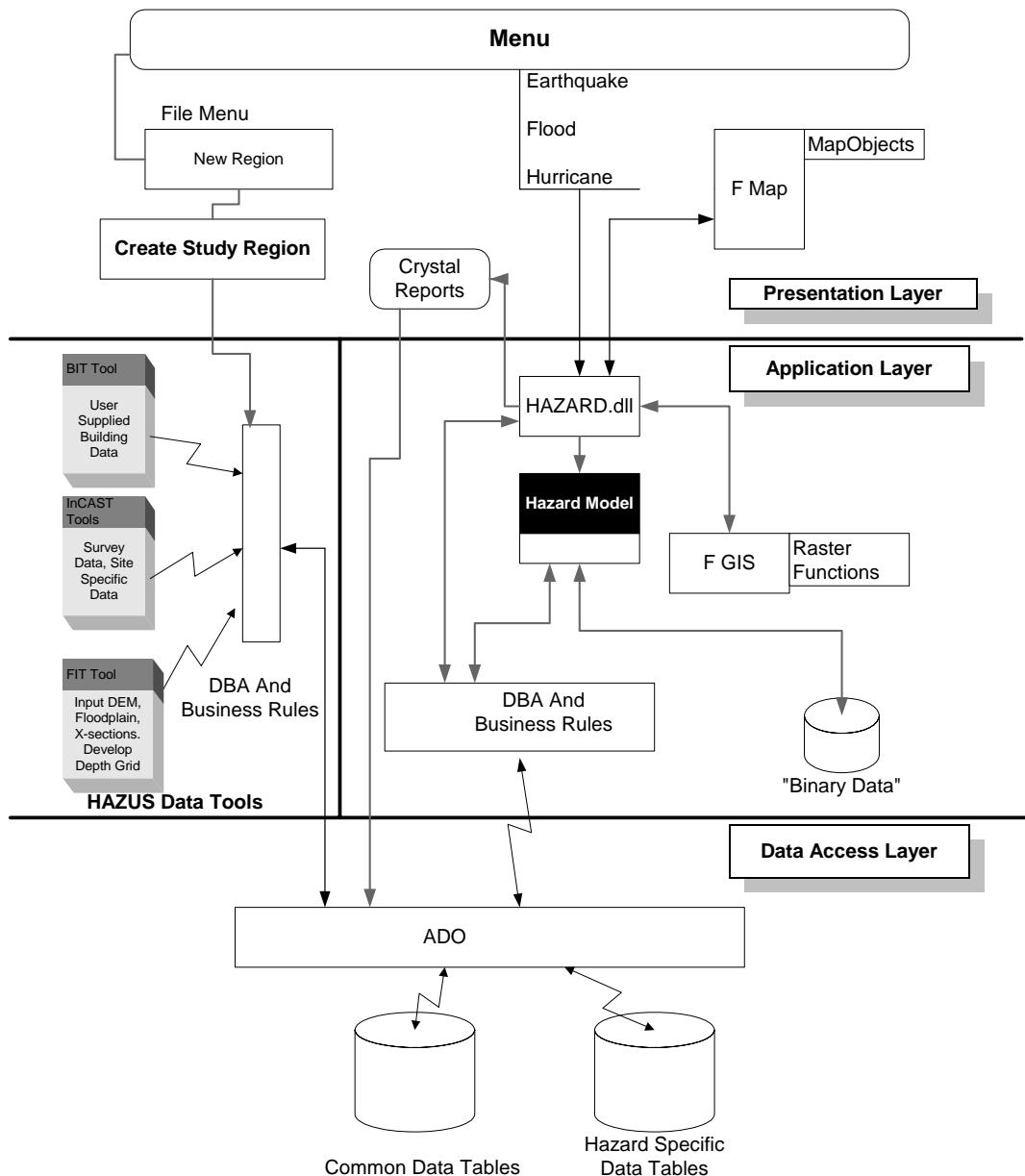


Figure 2-2: HAZUS Software Architecture with HAZUS Data Tools

2.1.3. Hardware Interfaces

HAZUS-MH shall run on IBM-compatible PCs. At the time of installation, the software shall ensure the predefined minimum configuration is available. It shall also check for adequate disk space. A mouse, keyboard, and a DVD-ROM reader with 12x minimum read speed are required. Drivers supplied with the operating system shall support a printer.

The hardware interface requirements shown below have been identified.

- Pentium-Class PC with a minimum 1.6 GHz processor. ESRI recommends a 1.6 GHz or higher processor.
- The ESRI ArcGIS requirements are a 2.4 GB RAM minimum, with 80 GB RAM recommended.
- Software shall be able to execute on an SVGA video card with 32 MB of video RAM (64 MB RAM or higher is recommended).
- Software shall run in a minimum of 1,024 by 768 pixels at 65,536 colors. Higher resolutions or color depths are recommended.
- Software shall be installed from a DVD-ROM.

2.1.4. Software Interfaces

HAZUS-MH will require WindowsXP or Windows Vista as the operating system of choice.

The software interface requirements shown below have been identified.

- The software requires WindowsXP or Windows Vista.
- HAZUS-MH requires ESRI's ArcGIS. As a result of the methodology and product requirements, the software will be developed using ESRI's ArcGIS product; this will require users to have licenses for ArcView version 9.3 and Spatial Analyst version 9.3. ESRI will regularly update ArcObjects and other ArcGIS-related products. Users must refer to the current HAZUS release documentation for the latest ArcGIS version compatibility.
- Written in Microsoft Visual C++, Visual Basic and VBA.

- Documented to industry standards.
- Supported by metadata describing default hazard and inventory databases.
- The software will interface with FarPoint's Spread 7.0 control to display inventory data.
- The software will interface with the Flood Data Standard Browser control to display inventory data.
- Output interface will be provided with Crystal Reports OCX control in the form of charts, tables, and graphs.

2.1.5. Communication Interfaces

HAZUS-MH is a standalone application. No special communication interfaces are required.

Internet connectivity is not required for the HAZUS earthquake model unless the “File | Add Data from Geography Network” command is used. Adding layers from ESRI’s geography network is not required to access the full functionality of the earthquake model.

Table 2-2 summarizes the major feature attributes related to the HAZUS interfaces. For a complete description of the attributes, see Appendix A.

Table 2-2: HAZUS Interfaces Ranking by Feature

Reference	Status	Benefit	Effort	Risk
Hardware Requirements	A	C	N/A	N/A
Operating System Requirements	A	C	N/A	N/A
Internet Connectivity	N/A	N/A	N/A	N/A

2.1.6. Memory Constraints

Microsoft Windows-based PCs use a virtual memory caching algorithm that manages physical RAM. If more memory than is available is required, the hard drive is used to simulate additional memory at the cost of speed. Because hard drive access is currently several orders of magnitude slower than RAM access, having sufficient RAM is imperative for reasonable access times.

HAZUS-MH will run in as little memory as WindowsXP or Windows Vista itself requires for operation; however, software performance will be degraded in this environment. For this reason, the recommend RAM is larger than the minimum. The system requirements are also governed by the GIS package that HAZUS uses. Other minimum and recommended requirements for installing and running HAZUS-MH are shown in Table 2-3.

Table 2-3: Minimum and Recommended Requirements for Running HAZUS-MH

Platform	Minimum	Recommended
OS Service Pack/Patch	WindowsXP or Windows Vista	WindowsXP
Memory	512 MB	2.4 GB
ArcView Version 9.3	SP1	SP1
Disk Space (after ArcView installation)	10 GB free space	40 GB free space
CPU	1 GHz	1.6 or higher GHz

2.1.7. Operations

Not applicable to HAZUS-MH.

2.1.8. Site Adaptation Requirements

For proper installation on WindowsXP PCs, HAZUS-MH requires that the administrative account be used for installation.

The system has no other site-specific requirements for installing or operating HAZUS.

2.1.9. User-Supplied Inputs and Resulting Outputs

HAZUS-MH has been designed with editable tables and analysis parameters that allow users working with the default data to modify the data. A Level 1 user who believes the default data does not properly capture local variations in building trends, demographics, economics or design level can edit the default data to create local “customized” tables that the model will utilize in the estimation of losses.

HAZUS-MH maintains the capability to perform more refined levels of loss estimation based on user-supplied inventory and hazard input in the Data Access Layer and modification of analysis parameters in the three hazard engines in the Application Layer.

The flood model requires users to input information in English units and raster data shall be projected in Albers Equal Area. This is the baseline projection of the National Elevation Dataset (NED) and the future NED with hydrologic derivatives (NED-H).

2.1.10. Real-Time Analysis Capability

Real time analysis means the user can produce results for a specific scenario within a short period of time. The flood model user can run deterministic scenarios and produce results in time to enact precautionary or preemptive measures. Note: The size of the study region, and the quality (higher resolution) of the digital terrain data will impact the time required to process a scenario event because of the intensity of the raster calculations. The flood model is highly dependent on the ArcGIS analysis tools and much of the analysis time is predicated on the speed of those tools.

2.2. Product Functions

HAZUS is designed to work with a common architecture for all models (earthquake, hurricane, and flood) known as the HAZUS application shell. The following are general requirements of the Shell:

- The HAZUS-MH shell allows the user to select the hazard or hazards for which loss estimation analysis shall be performed. Options include Earthquake, Wind, and Flood.
- The user can select one or more of the hazards discussed above, however once the study area has been created, the user cannot add a hazard. The user is required to create a study region. This limitation is required because the supporting baseline information is aggregated from the CD-ROM for each hazard during this process.
- If the user does not select the flood hazard, the shell only aggregates the study region data at the census tract level.
- Selection of the flood hazard causes the shell to aggregate the data at the census block level. When selected with the wind and/or earthquake hazards, data is aggregated at both the census block and census tract.

- The shell provides the user with the capability of creating a new study region, opening an existing study region, importing and/or exporting a study region, archiving a study region, or deleting a study region.
- The user has the capability of selecting the study region either by specifying the county, census tracts, or census blocks (Note: census blocks are flood model specific). The user can also create their study region by performing a map based selection of the county, census tracts, or census blocks.

The application shell shall support the following operations:

- Study region definition and aggregation of all data common to all three hazards
- Hazard selection
- Management of data common to the three hazards
- Programming interfaces for all GIS functionality

In addition to the application shell, several system features are customized to each hazard. The sections below describe all menus available in HAZUS. A schematic of the HAZUS-MH menu is shown in Figure 2-3. The menu item labeled “Common” will be identical for all three models, while those labeled “Hazard Specific” will depend upon the specific hazard being analyzed.

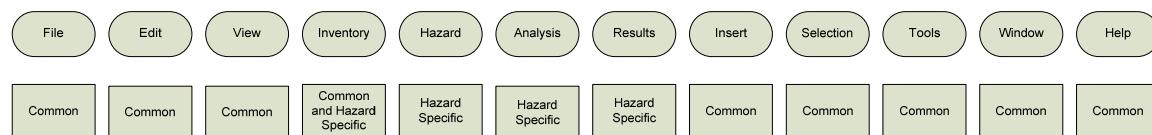


Figure 2-3: HAZUS-MH Menu

The HAZUS-MH hazard-specific models will support the following major operations:

- Hazard-specific building stock definition
- Database aggregation
- Scenario definition
- Building damage and loss function display

- Loss category selection
- Loss estimation
- Results display

Generally, the HAZUS menus shall maintain much of the integrity and “feel” from the current earthquake model. While many menu items shall remain the same, the underlying models for flood and hurricane shall have substantial hazard-specific processing and aggregation.

Common and hazard-specific product functions of HAZUS-MH are described below.

2.2.1. Hazard Selection

HAZUS-MH contains three hazard models: earthquake, flood, and hurricane. Because of the unique data requirements for each model that will be downloaded from the DVD-ROM, the user shall select one or more of these hazards when creating the study region. Based on the user selection, HAZUS will aggregate and import the necessary baseline data to perform a Level 1 analysis. After specifying the study region, the user can select a hazard type. Sub-menus will reflect hazard-specific functionality for each model as opened by the user. A hazard cannot be added to a study region after it has been created; this will require the user to create a new study region.

2.2.2. Study Region Definition

The next step in the multihazard analysis is to choose a study region. A study region is defined as an area of analysis interest based on specific boundaries, typically a jurisdiction (state or county) or analysis unit (census block, census tract). Generally, the user can choose from the following options:

- Create new region
- Open already existing region
- Import region

After the user selects an option, HAZUS will either step the user through a wizard to create a new region or load the pre-defined study region. A copy of the default database for that region

will also be stored with the geo-data (stored as personal geodatabases with attributes in SQL Server data tables) for the study region. HAZUS will prompt the user to aggregate any additional data available for the region.

The level of aggregation can be at the state, county, tract, or census block, depending on the hazard selected. For the flood hazard, the limit size of the region is four counties, and users can make their selections at the census block level.

2.2.3. Building Stock Definition

HAZUS will have two data types: common (region-specific) and hazard (hazard-specific). Selecting common will also select the default data from the database. Selecting hazard will aggregate hazard-specific data for that region. Choosing the aggregate data option can aggregate additional data required by the user.

2.2.4. Hazard Scenario Definition

To run a loss analysis, a hazard scenario must be defined. The model will support user-defined scenarios or probabilistic events, or annualized analysis. Unlike the other models, the flood model allows the user to select smaller “study cases” within their study region. The design feature was provided because of the localized nature of flooding as compared to earthquake ground shaking and hurricane winds. The list below summarizes the major requirements for hazard scenario definition.

- The user will be able to define a new scenario or open a pre-defined scenario.
- The user will be allowed to set up the scenario.
- The user will be able to select and define a scenario (discharge, return period or annualized).
- The user will be able to save the scenario.
- The user will be required to provide a scenario name.
- The user can set up multiple scenarios (called case studies) during a single analysis session; however, only one scenario can be run at a time.

Subsection 3.2.6., Hazard Menu, details how to develop scenarios for hazard analysis.

Subsection 3.2.7., Analysis Menu, describes the analysis parameters the user can adjust to estimate losses for the selected hazard scenarios.

2.2.4.1. Scenario Definition (Flood Model)

The HAZUS Flood Model requires the user to perform part of the hazard assessment on the entire study region, but then allows the user to define specific areas of interest for more detailed analysis. This was done for a variety of reasons including:

- Terrain data and the development of the stream network are required at the study region level defining the overall areas that a user can analyze their flood hazard.
- The user must select the river reaches or shorelines of interest within the study region. These make up the study cases. The user has the option to select every reach or shoreline within the study region, or select individual segments or reaches.
- Study cases allow the user to perform different types of analyses within their study region. They can also perform multiple types of analysis on a given area within their study region. This flexibility is provided because of the local constraints of the flood hazard.

2.2.5. Building Damage and Loss Function Displays and Loss Estimation

To develop estimates of loss to manmade structures (e.g., buildings, roads, and treatment plants), it is necessary to have an algorithm that relates the damage forces of the hazard to the impact on the structure. This is typically handled through damage functions, which provide a mathematical relationship between the hazard and the extent of damage to a structure. All three models provide hazard-specific functions that allow the user to characterize building response to the hazard of choice.

For the flood model, a series of functions shall be available to the user so that losses can be provided using current Federal Insurance Administration (FIA) curves or regionally applicable curves from the U.S. Army Corps of Engineers (USACE).

Subsection 3.2.7., Analysis Menu, describes the flood model damage functions and the ability of the user to interface and modify those functions.

2.2.6. Loss Category Selection

HAZUS-MH shall provide the user with the capability to perform a variety of loss estimates such as annualized losses or losses for specific return periods or discharges (riverine)/storm surge (coastal). The process by which the user selects parameters and estimate losses for inventory features is discussed in Subsection 3.2.7., Analysis Menu.

2.2.7. Results Display

HAZUS-MH shall provide the users with the capability to view their results. Crystal Reports will allow the user to view standard printable reports for analysis. The specific types and availability of reports will depend on the specific analysis features selected by the user and the open study case.

Users shall also have the capability to display results using GIS functionality. As with written reports, the types and availability of GIS mapping features will vary depending on the analysis performed and the study case that is open.

The sections below describe specific product functions of the earthquake, flood, and hurricane models.

2.2.8. Earthquake Model

The earthquake model shall provide the following general categories of functionality for analyzing any earthquake event across the entire United States:

- Functions to aggregate earthquake-specific data into the study region
- Tools to define the earthquake hazard
- Tools to view and edit earthquake-specific features of the building inventory
- Tools to view and edit building damage, loss and restoration functions, and other earthquake-specific analysis parameters
- Tools to calculate building damage and loss by census tract, building damage, restoration for essential facilities and damage, and restoration and loss for lifelines and military installations

- Tools to calculate debris, shelter, casualties, and indirect economic loss estimates
- Tools to display and print results of the above calculations as maps or tabular reports

Detailed requirements for these functions are described in Chapter 3, Specific Requirements.

2.2.9. Flood Model

The HAZUS Flood Model was developed primarily for use by floodplain managers and other users who have the responsibility of protecting citizens and property from the damaging affects of flooding. It is an integrated system for identifying and quantifying flood risks based on advanced science and engineering technology. It is meant to provide an analytic, decision support tool to help communities make informed decisions regarding land use within flood prone areas.

The overall features and functionality of the flood model are, to a large extent, based upon capabilities found in the HAZUS earthquake model. Thus, the same general approach to applying the overall methodology was used to develop the flood model. An overall schematic of the HAZUS Flood Model methodology is presented in Figure 2-4.

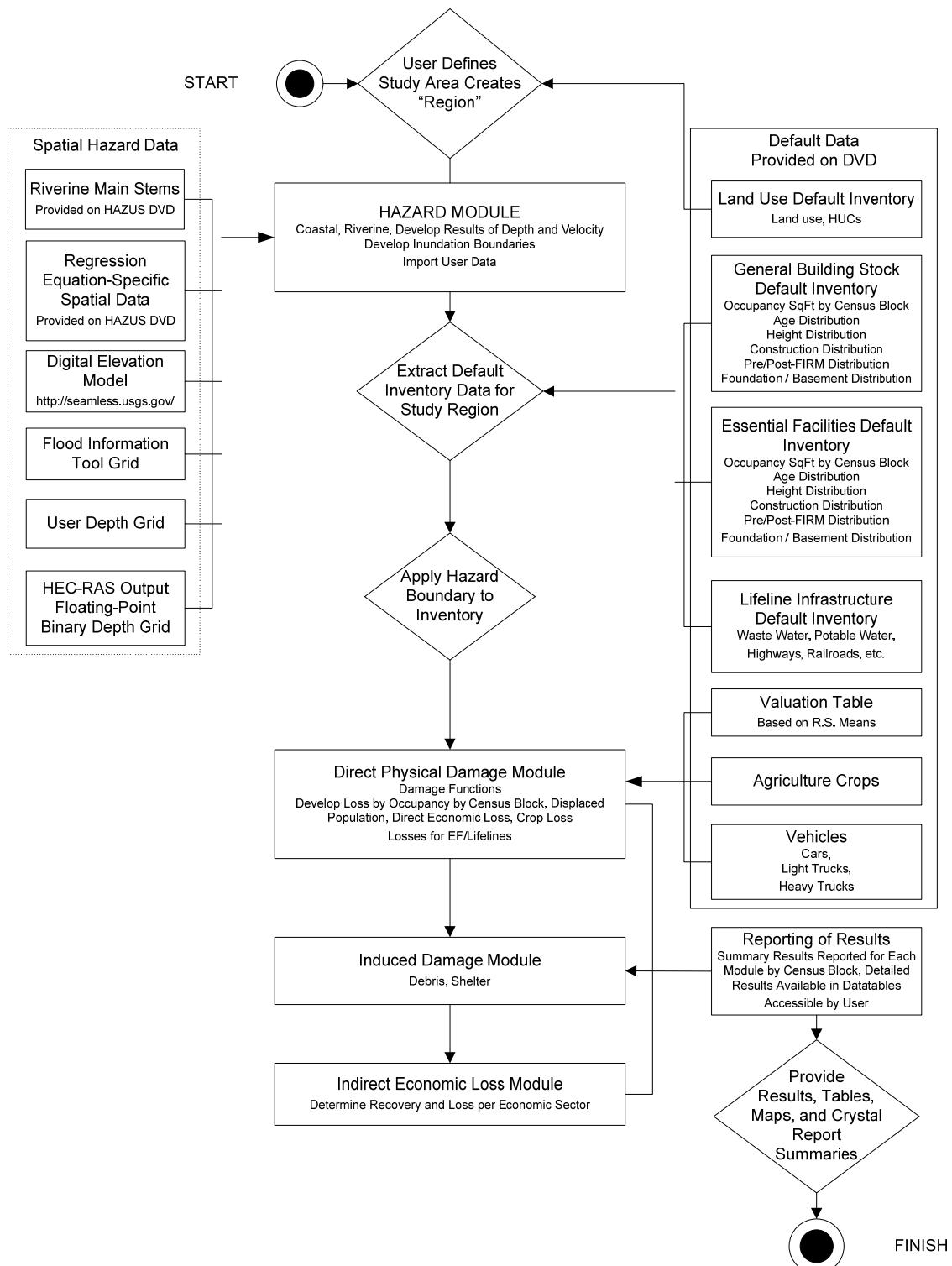


Figure 2-4: Flood Model Schematic

As shown in this figure, the flood model methodology consists of two basic analytical processes: flood hazard analysis and flood loss estimation analysis. In the hazard analysis phase, characteristics such as frequency, discharge, and ground elevation are used to model the spatial variation in flood depth and velocity. During the loss estimation phase, structural and economic damage is calculated based on the results of the hazard analysis throughout the use of vulnerability curves. Model results can then be conveyed to the user via a series of reports and maps.

The flood model supports three levels of analysis:

- Level 1 – All of the information needed to produce a basic estimate of flood losses is included as default data, based on standardized nationally applicable databases and methods.
- Level 2 – More accurate estimates that require more detailed information regarding local conditions. Modification of default databases is required, along with the inclusion of local data and analyses.
- Level 3 – Detailed and site-specific input data are used to create state-of-the-art damage estimates and situation assessment profiles. Level 3 is intended for the expert user.

As shown in Table 2-4, the level of analysis and the results available are dependent on the quality of the input data provided by the user. For example, if a user utilizes the default data throughout the process, the results will be provided at an aggregation level of census blocks (CB). This approach offsets some of the uncertainty associated with the default data. As the quality of the user input increases (Level 2 and 3) the user can increase the resolution of the results down to the point level (PT).

Table 2-4: HAZUS Flood User Level and Results Aggregation by User Input Data Quality

Hazard Definition	Default Inventory		User Improved Inventory		Point Data Inventory	
	Default Topography	User Supplied Topography	Default Topography	User Supplied Topography	Default Topography	User Supplied Topography
Default Flood Data	1 (CB)	1 (CB)	1 (CB)	1 (CB)	1 (PT)	1 (PT)
FIS or FIRM Data	1 (CB)	2 (CB)	1 (CB)	2 (CB)	1 (PT)	3 (PT)
DFIRM Data	2 (CB)	2 (CB)	2 (CB)	2 (CB)	3 (PT)	3 (PT)

CB - Census Block

PT – Point or Site Specific

A summary of the key features and functionality of the HAZUS flood model is in Table 2-5.

Table 2-5: Summary of Key Features and Functionality Provided by the HAZUS Flood Model

User Functionality	Supporting Features
Supportive of various user capabilities	Default data and “plug and play” (i.e., the user can create a study region and perform loss estimation without additional effort except as noted below) capabilities allow users with little GIS or loss estimation experience to successfully run an analysis. At a minimum, users must download digital terrain information from the U.S. Geological Survey (USGS). FIT, BIT, and InCAST allow users to input locally available data of higher quality to achieve increased detail in analysis and increased accuracy and benefit.
Processing of locally available data	Import of data processed through the FIT, BIT, and InCAST. Ability to replace existing HAZUS default data (e.g., lifelines) with local GIS data layers.
Improved resolution on HAZUS default data	Incorporation of U.S. Census and Dun & Bradstreet data at the census block level with regional modifiers for flood hazard analysis.
Comprehensive analysis capabilities	Loss estimation for buildings, agriculture, and vehicles. Provides social impacts, economic impacts, and physical losses.
Reduction of losses through comprehensive land use planning	Allows user to perform analysis for existing and future conditions allowing for effective land use planning. Provides a consistent state-of-the-art ability, within the confines of the chosen Windows and ESRI platforms, to perform comparative analysis.

2.2.9.1. Standard Data Browser

ABS Consulting has designed a standard data browser that is utilized throughout the majority of the Flood Model (the Hazard Menu is the major exception). This section describes the basic functions of the data browser. This section applies to all browsers unless noted. Exceptions to functionality are described within the applicable sections.

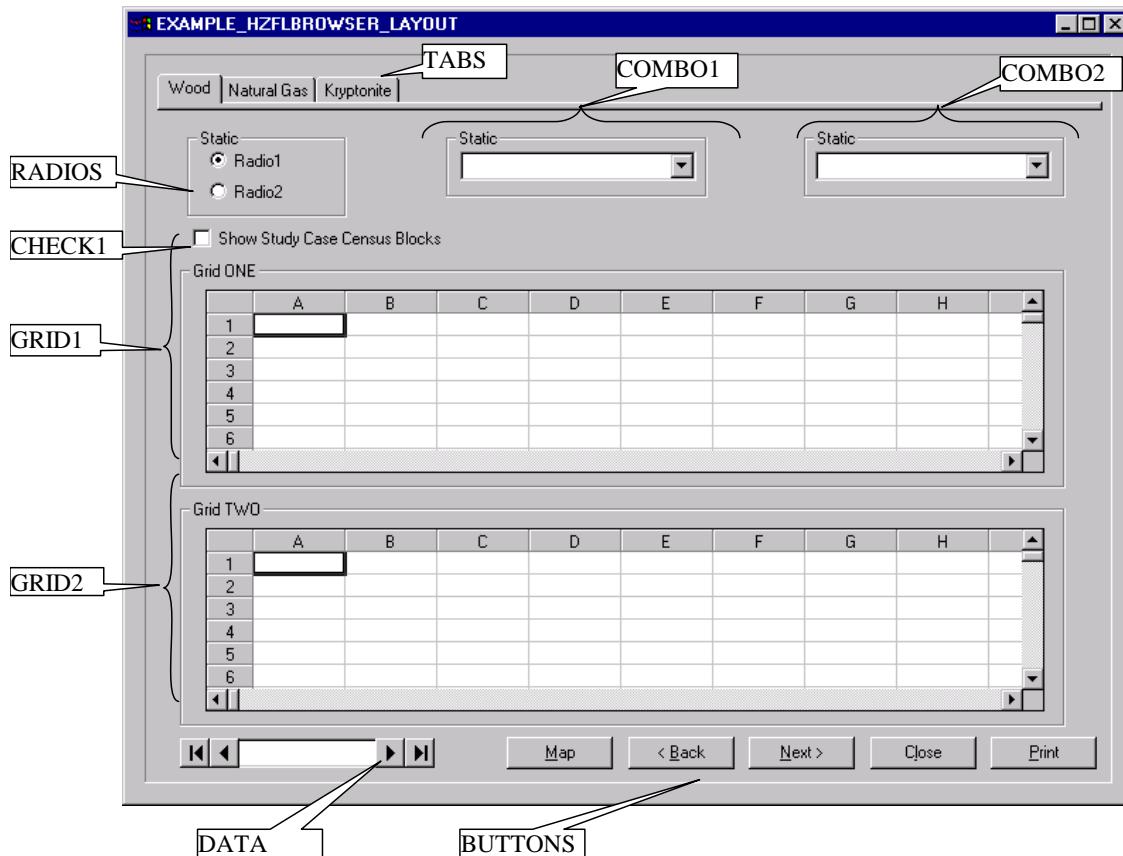


Figure 2-5: HAZUS Flood Model Standard Browser

The standard Browser is shown in Figure 2-5 above. For a more detailed functional description, please see the HAZUS Dynamic Browser Detail Design Specification noted in the references.

The standard data browser has a vertical scroll bar to allow the user to scroll up and down through their records. Scroll Bar also allows the user to go to First or Last record quickly.

Displayed text values in the Grids are displayed in Blue color when the grid is not editable.

On any dialog grid, the user can use the right mouse click functionality to bring up a submenu with specific data control options. An example of the dialog is seen in Figure 4-2 below.



Figure 2-6: HAZUS Flood Model Data Management Dialog
(Access Via Right Mouse Click on Data Grids)

On any dialog where the user can make and save edits, a standard windows dialog will be used to allow the user the make their changes.

Throughout this document, the dialog will be referenced and a table showing which components are enabled or disabled is presented.

2.2.10. Hurricane Model

The hurricane model will produce damage and loss estimates for hurricanes occurring along the Atlantic and Gulf coasts of the continental United States. The hurricane model will provide the following general categories of functionality:

- Tools to define the hurricane hazard
- Tools to view and edit hurricane-specific features of the building inventory
- Tools to view building damage and loss functions
- Tools to calculate building damage, loss, and debris estimates and display the results as maps or tabular reports

Detailed requirements for these functions are in Section 3.2, System Features.

2.3. User Characteristics

HAZUS is designed for use by federal, state, and local emergency planners, and hazard mitigation officers. These planners will use the tool for both long-range and short-term emergency response planning. The typical HAZUS user shall be familiar with the hosting operating system (WindowsXP or Windows Vista) and the host GIS application (ESRI's ArcGIS version 9.3). Flood model user characteristics are described below.

2.3.1. User Descriptions for the Flood Model

This section profiles intended users of the HAZUS flood model and their operating environment. These profiles are based primarily on interviews conducted with potential users and input received from a user group that was established to work with the software development team.

2.3.1.1. User Profiles

At the local level, the HAZUS flood model will be used to address floodplain management issues such as land use planning, buy-out programs, and building code development and enforcement. As users replace default data with accurate locally available data, additional applications, such as performing benefit/cost analyses for proposed flood mitigation measures, will emerge. It is anticipated that users at the state and federal levels will use the program to meet their programmatic needs and policy decisions.

Each user profile is discussed below.

2.3.1.2. Local Floodplain Coordinators/Managers

The majority of potential users of the HAZUS flood model are local floodplain coordinators who may be at the city, township, or county levels. These users are interested in identifying areas in their jurisdictions that are subject to flooding for a variety of return periods and the inventory (all types) that are subject to that inundation. Specific application requirements will vary, depending on the size and technical sophistication of the jurisdiction, but user interviews conducted as part of this project indicate these to be key foreseen applications.

For example, local users are interested in identifying flood-prone areas, assessing the implications of existing land uses, and evaluating the effectiveness of potential mitigation measures to prevent future losses. Some mitigation measures mentioned include development regulation, acquisition and relocation programs, and elevating vulnerable structures.

These users are also interested in the ability to effectively communicate flood risk issues to the general public and disseminate information about floodplain management and the existing threat to the community.

The general conclusion drawn from the interviews was that local users will likely replace at least some default data with their own. Most claimed to have better elevation models and building inventories and are interested in having a portfolio capability for their repetitive loss structures.

2.3.1.3. State Users

At the state level, likely users will be state floodplain managers and hazard mitigation officers. These users are more interested in performing regional flood vulnerability assessments of watersheds in states where repetitive losses are a continuing problem. These users are also likely to be interested in conducting benefit/cost analyses of proposed land uses and zoning regulations to reduce the impact of flooding losses to their states. Because state users are likely to perform the analysis on larger areas, they will be less likely to replace the default data because of the cost involved in data collection, although a possible exception may be elevation data. State users may also perform the HAZUS flood analysis for local users who cannot perform their own analysis (most likely small communities or unincorporated areas).

2.3.1.4. Federal Users

Federal user requirements vary greatly from agency to agency. Currently, the project team has identified the Federal Emergency Management Agency (FEMA) and the US Army Core of Engineers (USACE) as the primary federal users.

FEMA has identified the need to develop national flood loss estimates to meet their obligations to Congress. Developing a loss estimation tool that uses a consistent default inventory and methodology will solve this problem. Using Level 1 data supplemented with other flood-related studies should ensure a continual and consistent capability for FEMA.

USACE has identified the need for a software model with a default building inventory that would satisfy the need for preliminary loss estimation associated with flood projects (structural and non-structural). USACE has expressed interest in the inventory and watershed capabilities of the HAZUS flood model.

Other potential federal users include the U.S. Bureau of Land Management, the U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture. No effort to establish requirements for them has been made because their level of usage is expected to be minimal.

2.3.1.5. Special District Users

Special districts, including flood control districts and stormwater services, are part of the HAZUS Flood User Group. Their requirements have paralleled other users at the local and regional levels.

2.3.1.6. Consultants and Private Sector Users

A special set of users include the consultant and private sector users who perform project analysis for local, state and federal clients or are supporting other organizations and other private clients. The cottage industry for flood loss estimation has expanded following the HAZUS Flood Model release. Specific application requirements vary greatly depending on the goals of the user, but generally they closely reflect those of the local floodplain coordinator discussed in Section 2.3.1.2 above.

The private sector users may fall into the following classifications:

- Consultants hired by government agencies to define potential flood losses for the development of mitigation programs or other policy related decisions. This includes consultants assisting agencies in examining the impact of land use planning decisions.
- Companies investigating their exposure to local flood hazards. This includes national companies that use the model to examine their facilities over the entire US.
- Risk managers assisting national or local companies in their Business Continuity Planning.
- Corporations assisting FEMA with floodplain mapping and other floodplain management activities.

This list is not meant to be an exhaustive examination of potential uses within the private sector, but should give some idea of potential applications.

2.3.1.7. Key User Features

During development of the methodology, it became clear that user input would significantly increase acceptance of the flood model specifically. Interviews of users covering all levels and functions identified key features that would facilitate the user's job and help identify how they would define success in the flood model. The sections below provide an overview of key points identified by users; however, no products currently exist that will meet these needs.

Identification of Flood-prone Areas: Many floodplain managers stated that identifying areas subject to flooding is a key concern. Most felt their existing Flood Insurance Rate Maps (FIRM) (including the Q3s) were out of date or did not reflect recent development that leads to increased urban runoff and subsequent increases in flood elevations.

Floodplain managers want a tool that uses a consistent methodology to allow them to compare new flood studies with existing studies to project changes or areas of concern. They also want a tool to allow them to perform "what if?" analyses to determine the impact of scenario events or increased water volumes above the 100-year or design flood levels.

Prioritization of Repetitive Loss Structures for Future Mitigation Projects: A high priority of both FEMA and the FIA is to identify structures that have suffered repetitive losses. Because this responsibility will likely fall on local officials, interviewed users ranked this capability very high. Currently, no tool exists to allow users to conduct a spatial analysis of the cause of these losses and to identify and prioritize cost-effective mitigation measures. A tool that can provide this capability is deemed highly desirable by interviewed users.

Building Standards and Floodplain Management Regulations: Associated with the prioritization of repetitive loss structures is the requirement to manage existing and future development within and near the floodplain. Closely associated with proper land use planning, developing building standards and regulations to control and restrict development in and near floodplains is a key concern.

Providing a methodology to identify the effects of standards and regulations is a key benefit. Most users felt that a scientific approach would help them approach local elected officials when requesting approval of standards and regulations. Additionally, users felt that tools such as HAZUS would provide officials with back-up information to assist in their effective decision making.

Flood Warning: While this requirement is self explanatory, no tools currently exist that can be used in real time or near real time to identify the potential impacts for projected flood elevations. Users want a tool that can help the emergency management community project areas of inundation and provide warning so that residents can perform flood prevention/proofing, remove or move contents, and evacuate as necessary.

Flood Loss Estimation Analysis and Benefit/Cost Analysis: Existing tools to estimate flood losses (such as USACE-HEC) are complex and require a minimum level of technical expertise to use. The application of such tools is most often related to demonstrating the benefit/cost of specific flood control projects.

Users have identified the need for a tool to conduct a lower-level analysis that can assist them in rapidly demonstrating the benefit/cost of various project mitigation measures in order to prioritize them. It is important that the tool produce loss estimates at resolutions smaller than census tract (i.e., the census block). For users with better local elevation and flood and building information, the ability to import such data into the model was also deemed important.

Prioritization of Census Blocks/Watersheds for Future Mitigation Outreach and Projects: Floodplain managers need a tool that allows them to view the entire watershed of concern and identify areas that should be targeted for public outreach campaigns. These campaigns usually include promoting residential mitigation efforts, purchasing flood insurance, and, in some cases, participating in voluntary buy-out programs.

Flood Protection Measures: Many jurisdictions nationwide have either levees or upstream storage basins as flood protection, and other jurisdictions regularly consider the installation of these protective measures. These jurisdictions need a simple tool to allow them to examine the benefits of such measures and to identify or highlight potential impacts throughout the watershed. Those communities already protected by such measures may wish to examine potential impacts resulting from the failure of the protection. Some may even wish to examine the impact of removing the protective measures.

Private corporations could perform an analysis to determine if the installation of flood protection measures at various critical sites is cost effective or whether relocation may be a better flood protection approach.

2.3.1.8. User Environment

The user environment will vary depending on the size, structure, and function of the jurisdictions for which they work. In some agencies, floodplain management, land use planning, and the enforcement of building codes and regulations are highly centralized and managed by only a few people. In other agencies, these functions are decentralized and extensive coordination is required to effectively manage them. Still other agencies rely on consulting companies to provide these services.

Local jurisdictions have primary responsibility for managing development within the floodplain and complying with state and federal regulations; however, it is difficult to specifically identify the number of people involved in completing a task. The numbers vary with specific projects and the political nature of land use planning and management decisions. Regulations require each jurisdiction to assign the responsibility of floodplain management to a single person.

Whether this person will actually perform a HAZUS flood analysis will depend on the jurisdiction's organizational structure. In the HAZUS training programs, FEMA has taken the approach of recommending that loss estimation be handled by a team of people within an agency. This type of coordination is designed to bring all resources necessary to modify databases, review development patterns and trends, general planning, etc.

The flood model supports a wide variety of project cycles. Users interested in flood estimation during an event will obviously prefer fast, accurate results, but the more typical application will allow the user to obtain locally specific data, input that data into the model, and produce results. A typical analysis—including the compiling of data (e.g., digital elevation models, flood study cross sections and elevations, and surveys of structures)—may take several months.

Users currently have several models that help them analyze floodplains. Examples include HEC-2, HEC-RAS, and SLOSH. Most of these software packages identify stream or coastal inundation, flow direction, rates, and other physical flooding characteristics. None help the user develop direct estimates of losses to the exposed building inventory, vehicles, or agriculture products. While the HEC-FDA allows some functionality in this area, it does not have a comprehensive graphical (GIS) component.

2.3.1.9. Model Development Environment

The flood model project team developed a shortlist of concerns and constraints in which the model development would need to occur. Section 2.4, Constraints, describes the constraint related to the existing earthquake model and the impact on data and user interface development. This constraint also extends to the wind preview model. Coordination and discussions are ongoing, and the three contractors namely PBS&J—in-charge of the application shell and earthquake model, ARA—working with the hurricane model, and ABS—in-charge of the flood model are all working with the National Institute of Building Sciences (NIBS) to ensure that the resulting models maximize the sharing of common data and have the same general GUI.

The flood model will include messages that clearly inform users that the Q3 boundaries included in the supplemental data and the HAZUS results are not to be used to assess regulatory compliance. The FEMA requirement is that the FIRMs and the newer Digital Flood Insurance Rate Maps (DFIRM) are the only sources for such determinations.

HAZUS-MH shall comply with the metadata standards established by the Federal Geographic Data Committee Standards; however, it is not required to comply with the Electronic and Information Technology Accessibility Standards (36 CFR Part 1194) and Section 508 of the Rehabilitation Act of 1973 (found at 29 U.S.C 794d). Many features and the functionality of HAZUS-MH are being drawn from third-party commercial software packages developed by Microsoft and ESRI, which are not required to comply with the noted regulations.

2.4. Constraints

There are several types of constraints affecting HAZUS-MH. In general the HAZUS-MH hazard model design constraints include:

- Be implemented in the prescribed three-tier architectural framework.
- Operate with ESRI ArcGIS and Spatial Analyst for GIS functions.
- Operate within a common application startup.
- Operate with newly released Comprehensive Data Management System (CDMS).

- Operate with a Relational Database Management System (RDBMS).
- Operate with a common low-level RDBMS access via ADO interface.
- Operate with common underlying inventory and census data.

Other constraints are discussed in the subsequent sections.

2.4.1. Regulatory Policies

Table 2-6 lists applicable regulatory policies and standards affecting HAZUS-MH.

Table 2-6: Applicability of Regulatory Policies and Standards Affecting HAZUS-MH

Item	Applicability
IEEE Standard 830-1998	Software documentation
IEEE/EIA Standard—Software Life Cycle Processes	Software development process
Microsoft Wizard97 Specifications	Wizards programming guidelines
DTI C++ Source Code Guidelines	Source implementation/design guidelines
Microsoft Official Guidelines for User Interface Developers and Designers	GUI design guidelines
The Windows Interface: Guidelines for Software Design	GUI programming guidelines

2.4.2. Hardware Limitations

The system has no special hardware limitations. The system is non-real-time and self-contained. All hardware is expected to be commercial off-the-shelf.

2.4.3. Interfaces to Other Applications

The earthquake, hurricane, and flood models shall interface with the HAZUS application shell, as described in Section 3.1, External Interface Requirements.

2.4.4. Parallel Operations

HAZUS shall operate in a single-user/single-access environment. While the N-tier architecture allows the implementation of a distributed environment, this shall neither be tested nor supported.

2.4.5. Audit Functions

The system has no audit function requirements.

2.4.6. Control Functions

The HAZUS application shell is the controlling application.

2.4.7. High-order Language Requirements

C/C++ is the main high-order language; however, users are not precluded from using other languages if warranted.

2.4.8. Signal Handshake Protocols

No custom signal handshake protocols are required.

2.4.9. Reliability Requirements

Users shall be advised if a processing error is detected.

Known work-arounds necessary to prevent failures shall be documented in the User's Manual.

System reliability shall not be less than TBD%. System reliability is measured as follows:

$$\text{System Reliability} = (1.000 - \text{failures}/\text{attempts}) * 100.0\%$$

(Due to lack of historical data, it is not possible to determine the date or entity responsible for this TBD. Therefore, this SRS is not compliant with Section 4.3.3.1 of IEEE Standard 830-1998, Recommended Practice for Software Requirements Specifications.)

Where attempts are the number of times that a user attempts to calculate a solution, and failures are the number of times that an attempt to calculate a solution results in inadvertent termination of the program, incorrect results, or failure to calculate a result (typically accompanied by an error message).

2.4.10. Criticality of the Application

HAZUS features vary in criticality. Those features required to produce loss estimates and reports for a given study region and hazard are the most critical. The criticality of these features is a function of whether the software is being used in a long-range and short-term emergency response-planning mode. Incorrect or low accuracy results are always considered critical if the user is not made aware of the deficiencies.

The mapping features of the software are somewhat less critical because they serve as a means of understanding system inputs and outputs that can be viewed in non-graphical formats, if necessary. Other less critical system features are BIT and InCAST.

2.4.11. Safety and Security Considerations

No special safety or security considerations are associated with the HAZUS application.

2.5. Assumptions and Dependencies

Requirements of this SRS are affected by the following:

- Project funding and schedule
- Changes in project requirements
- Availability of U.S. Census 2000 data
- Availability of required features in ArcGIS version 8.1, specifically the support for MSDE/SQL Server 2000 links
- Availability of required features in the HAZUS application shell
- Availability of building stock data, damage functions, and loss modeling functions required to perform the loss estimations

Key assumptions behind this SRS are described below.

- Proposed HAZUS software architecture supports the GIS requirements for the HAZUS-MH earthquake, flood, and hurricane models.
- Common interface items such as the menu, study region builder, BIT, and InCAST are completed as required to support the release date of HAZUS-MH.
- PBS&J is responsible for system integration and shall coordinate and support all tasks associated with integrating the hazard models with the overall HAZUS application shell and issuing the software.

Specific assumptions of the flood model are described below.

- PBS&J successfully completes the common interface items such as the menu, study region builder, BIT, and InCAST tools to support the release date.
- Requirements developed by this SRS for incorporation by PBS&J is assumed accepted unless written notification has been received by PBS&J. It is assumed that a resolution paper will result from discussions on any issues and shall be referenced in Section 1.4, References.
- PBS&J is responsible for all system integration and will coordinate and support all tasks associated with integrating the flood model with the overall HAZUS application shell and issuing software.
- Requirements developed by the PRD and not commented on in writing by the NIBS, FEMA, or the Committees will be considered accepted. Any written resolutions to issues shall be referenced in Section 1.4, References.
- Any functions and data deferred to later releases do not require large modifications to the existing philosophy or code of the HAZUS flood model.
- The FIT will allow users to preprocess their hazard data for import into the HAZUS flood model in a format usable to the functions provided by the model.
 - This requirement has been resolved by incorporating a lot of the FIT functions directly into HAZUS. Additionally, the FIT continues to be used by the user community for data manipulation efforts.
- All user-supplied hazard information will have the necessary HAZUS flood datum and projection.
 - This requirement was resolved using the automatic projection capability within HAZUS. Additionally, initial concerns about DEM data were resolved through the use of the NED.

If any of these assumptions and dependencies prove to be inaccurate, the SRS and other documents based upon the SRS will require revision.

2.6. Apportioning of Requirements

The following requirements may be considered in future versions of the system:

- Allowing users to define their own custom building types.
- Revising damage functions.
- Optimizing average annualized loss.
- Enabling HAZUS on newer versions of ArcGIS as well as Windows Operating Systems.
- Optimizing Fire Following Earthquake.
- Data updates when available.

3. Specific Requirements

3.1. External Interface Requirements

3.1.1. User Interfaces

The following user interface requirements are generally applicable to HAZUS-MH overall and are not specific to any hazard model.

- a. The software shall be GUI-driven.
- b. The software shall conform to Windows user interface guidelines.
- c. All user-selectable capabilities shall be accessible by both pointing device and keyboard.
- d. Shortcut, or “hot” key, selections shall be available to the user in all menus and dialogs.
- e. The software shall display an icon toolbar to facilitate the selection of features.
- f. All fields shall be sized to allow the user to enter and view the maximum number of characters.
- g. All dialogs shall have Ok and Cancel buttons.
- h. All data browsers that contain spatial data shall have the Map button.
- i. All data browsers shall have a Print button
- j. All windows shall have font sizes no smaller than 10 points.
- k. All windows shall be viewable at 1,024 x 768 pixels video resolution with 65,536 colors.
- l. Methods of data access and entry shall be consistent throughout each GUI screen.
- m. The software shall display an icon toolbar to facilitate the selection of features. Ideally, the toolbar of the host application (ArcGIS) shall preserve, where applicable, to allow easy transition between ArcGIS and HAZUS-MH.

- n. Similar styles of controls and control locations shall be used for windows serving similar functions.
- o. The system shall display comprehensive error messages when errors are detected.
- p. Error dialogs/windows shall contain the Error Code, Description of Error, and Stop icons.
- q. Any function listed in a window, menu, or list box that cannot be performed at the time shall be hidden or disabled.

3.1.2. Hardware Interfaces

- a. The software shall be able to execute on a Pentium-class PC (Pentium 3 recommended) with a minimum 1.6 GHz processor.
- b. The software shall be able to execute with 128 MB RAM (256 MB RAM recommended). The ESRI ArcGIS requirements are 2.4 GB RAM minimum with 80GB RAM recommended.
- c. The software shall be able to execute on an SVGA video card with 32 MB video RAM (accelerated SVGA video card with at least 64 MB RAM recommended).
- d. The software shall run in a minimum of 1024 x 768 pixels video resolution with 65,536 colors
- e. The software shall be compatible with an SVGA monitor (17-inch SVGA monitor recommended).
- f. The software shall be installed from a DVD-ROM.
- g. The system shall ensure sufficient main memory upon initialization to perform all functions.
- h. All memory used by the application shall be released to the resident operating system upon exit from the application.

3.1.3. Software Interfaces

- a. The software shall be Windows XP Professional and Windows Vista compatible.
- b. The software shall interface with ESRI's ArcGIS for GIS and mapping capabilities and requires an ArcGIS and Spatial Analyst license.

- c. The software shall use FarPoint's Spread 7.0 OCX control to display inventory data.
- d. Output interface shall be provided with Crystal Reports OCX control in the form of charts, tables, and graphs.

3.1.4. Communication Interfaces

- a. The HAZUS application shell shall communicate with the Inventory Collection and Survey Tool (InCAST).
- b. The HAZUS application shell shall communicate with the Building Import Tool (BIT).

3.2. System Features

3.2.1. Study Region Wizard

When HAZUS-MH is launched, the region wizard is the first component in the application shell that the user sees.

- a. Through this wizard, the user shall be able to open, create, delete, import/export, and archive a region.

Details are in the subsections below.

3.2.1.1. Open

- a. The user shall be able to open the most recently used study region.
 - b. The user shall be able to open an existing study region that was previously created.
 - c. Once the region has been selected, the dialog shall also provide the user with hazard information that is available for the study region.
-
- d. The user shall be prompted to select the hazard to be analyzed in the session.

3.2.1.2. Create

- a. The user shall be able to create additional study regions; the number of regions that can be created is limited only by disk space.

- b. The user shall be able to create a new region by aggregating data from the HAZUS-MH CD or by duplicating a previously created region.
- c. Because of model-specific limitations, the user must identify the hazard(s) to be analyzed in the study region.
- d. To create a new study region, the user shall define the study region boundaries, either through a map-based or data table-based selection.
- e. For the map-based boundary definition, selection shall be facilitated by the use of marquee selection and/or mouse pointer selection of regions.
- f. The map selection shall allow the user to select regions smaller than a single county; the study region shall be any combination of states, counties, and census tracts (for example, the maximum size of the study region for the earthquake model is eight states).

All regions created by a given user are accessible and available to any user accessing the same machine. In other words, no security enforcement in HAZUS-MH makes regions private.

3.2.1.3. Delete

- a. The user shall be able to delete previously created regions. After confirmation, the region is deleted permanently; there is no Undo function.

3.2.1.4. Import

- a. The user shall be able to import a study region previously exported by HAZUS-MH.
- b. Any user with HAZUS installed shall be able to import the exported database. The import is straightforward if the region imported has the same version number as the installed HAZUS-MH. If the region imported has an older version than the installed HAZUS-MH, an update is performed on the region to make it compatible.
- c. HAZUS-MH shall not import HAZUS99 regions.

3.2.1.5. Export

- a. The user shall be able to export a study region for later importation into HAZUS-MH.

3.2.1.6. Archive

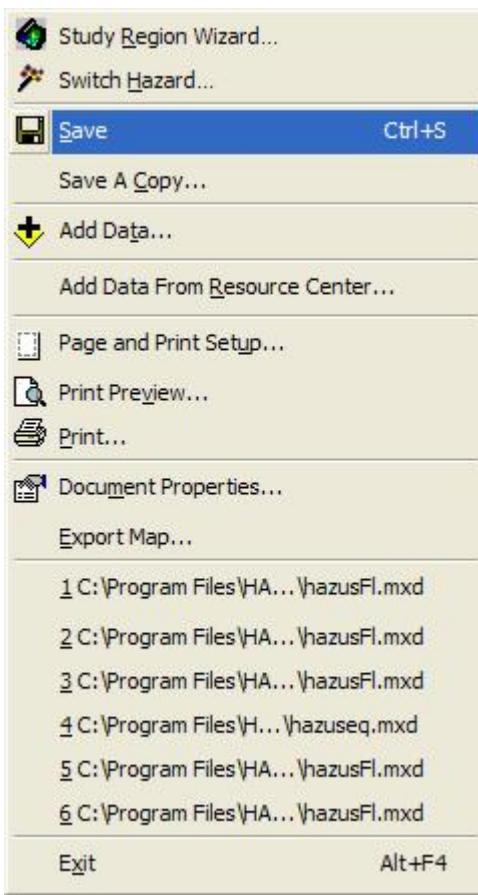
- a. The user shall be able to archive an existing study region. The archived region shall still be shown through the Open:Pre-built Region option, although it shall be identified as “archived.”
- b. To “unarchive” the region, the user shall select the region from the menu and HAZUS shall automatically uncompress and open the study region.

Table 3-1 shows the region wizard attributes by feature. For more information, see Appendix A.

Table 3-1: Region Wizard Attributes Ranking by Feature

Reference No.	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Open	A	C	M	L	
Create	A	C	H	L	
Delete	A	C	M	L	
Import/Export	A	C	M	L	
Archive	A	C	M	L	

3.2.2. File Menu



The file menu (as typical in most Windows programs) allows the user to manipulate files in the region. This menu is a combination of custom menus and generic ArcMap menus (see Appendix B for the full menu structure).

- a. The user shall be able to save the customization done to the region, add data layers, access the Internet to retrieve additional data layers¹, save a map as a bitmap, export a map, print, set up printing, and exit the program.
- b. With only a couple of exceptions, the File Menu shall mirror that of ESRI's ArcGIS.

¹ Internet access relies on a native ArcGIS feature: "Geography Network." Pending implementation and integration, this feature might be removed if it does not fit perfectly in the overall HAZUS+ framework.

- c. The ArcGIS menu items include Save, Save A Copy, Add Data, Add Data From Resource Center, Page and Print Setup, Print Preview, Print, Document Properties, Export Map, and Exit.
- d. The File Menu includes the HAZUS-MH unique menu item of Study Region Wizard, which allows the user to return to the HAZUS-MH Shell to create or manipulate study regions.
- e. The File Menu includes the HAZUS-MH unique menu item Switch Hazard, which is active only if the user has created a study region with multiple hazards (earthquake/wind, earthquake/flood, wind/flood, or earthquake/wind/flood). This menu item allows the user to switch between the hazard models.

Details are in the subsections below.

3.2.2.1. Region Wizard

Region wizard is the interface by which the earthquake, flood, and hurricane models interact with the application shell to provide the user with all study region management functions. This interface invokes the region wizard as seen by the user when HAZUS-MH is launched the first time.

- a. The region wizard shall allow the user to select one of the following options:
 - Create a new region
 - Open a new region
 - Delete a region
 - Duplicate a region
 - Export/back up a region
 - Import a region

3.2.2.2. Save

- a. The user shall be able to save the ArcMap document that represents the selected model (earthquake, flood, or hurricane) in the study region.

- b. The user shall be able to save changes made to the study region layers including the styles, colors, and thematic shading types and attributes.

All saved attributes are re-loaded the next time the user opens the same region (handled by the HAZUS application shell).

Note: The Save feature is a standard ArcGIS feature that is convenient but not required for proper HAZUS functionality. As of this version of the SRS, all standard ArcGIS features are kept. Pending implementation, integration, and testing, if these standard features do not integrate correctly within HAZUS-MH, they shall be removed or fixed. Removal or fixing shall be pending budget approval and at the discretion of NIBS/FEMA.

See Appendix A for the full list of standard features.

3.2.2.3. Save As

- a. The user shall be able to save the earthquake, flood, or hurricane project as a separate ArcMap document; this feature replaces the Save Workspace feature of HAZUS99.
- b. The user must use the Save As option to rename the map document that shall be opened for further customization in ArcMap (handled by the HAZUS application shell).

The attributes saved via the Save option cannot be loaded outside HAZUS-MH (e.g., in standalone ArcMap).

3.2.2.4. Add Data from Geography Network

- a. The user shall be able to add ArcMap-compatible data to the HAZUS project, (e.g., shape files, table data, grid or raster data) (handled by the HAZUS application shell API).

3.2.2.5. Page/Print Setup

- a. The user shall be able to customize the print setting via this standard Windows dialog (handled by the HAZUS application shell API).

3.2.2.6. Print Preview

- a. The user shall be able to view the map document with the page settings before printing the map.

3.2.2.7. Print

- a. The user shall be able to print the map document as it appears in the layout view.
- b. The user shall be able to print the active map layout that has been created or customized (handled by the HAZUS application shell API).

3.2.2.8. Map Properties

- a. The user shall be able to view the properties of the active map.

3.2.2.9. Export Map (Earthquake Model Exclusively)

- a. The user shall be able to export the current/active map to a bitmap file. Supported formats are JPG, BMP, and others as implemented by ArcMap.

3.2.2.10. Close Region

- a. The user shall be able to close the current study region without exiting the program.

3.2.2.11. Exit

- a. The HAZUS application shall shut down closing all HAZUS-specific windows and libraries.
- b. This menu item shall allow the user to exit the HAZUS program.

Table 3-2 summarizes the major feature attributes related to the HAZUS file menu. See Appendix A for a complete description of attributes.

Table 3-2: File Menu Attributes Ranking by Feature

Feature	Feature Attributes			
	Status	Benefit	Effort	Risk
Region Wizard	A	C	H	L
Switch Hazard	A	C	M	L
Save	A	U	M	L
Save As	IP	U	H	L
Add Data	A	C	L	L
Add Data from Geography network	A	U	L	L
Print Setup	A	C	L	L
Print Preview	IP	I	L	L
Print	A	C	L	L
Map Properties	IP	U	L	L
Export Map	A	U	L	L
Exit	A	C	L	L

3.2.3. Edit Menu

- a. The complete menu is the same as the edit menu in ArcMap. All edit menu options are standard ArcMap functions and include the following options:
 - Undo
 - Redo
 - Cut
 - Copy
 - Paste
 - Paste Special
 - Delete
 - Copy Map to Clipboard
 - Find
 - Go to XY
 - Select All Elements
 - Unselect All Elements
 - Zoom to Selected Elements

3.2.4. View Menu

- a. The View Menu mirrors that of ESRI's ArcGIS.
- b. The ArcGIS menu items include Data View, Layout View, Zoom Data, Zoom Layout, Toolbars, Status Bar, Overflow Annotation, Scrollbars, Rulers, Guides, and Grid.
- c. The menu items Zoom Data, Zoom Layout, Toolbars, have the ArcGIS submenu items available.
- d. Zoom Data submenu items include Fixed Zoom In, Fixed Zoom Out, Full Extent, Go Back to Previous Extent, Go to Next Extent, Zoom to Selected Features.
- e. Zoom Layout submenu items include Zoom to Whole Page, Zoom to 25%, Zoom to 50%, Zoom to 75%, Zoom to 100%, Zoom to 200%, and Zoom to 400%.
- f. Toolbars submenu includes Main Menu, Advanced Editing, Animation, Annotation, ArcPad, COGO, Data Frame Tools, Dimensioning, Distributed Geodatabase, Draw, Editor, Effects, GPS, Geocoding, Geodatabase History, Geometric Network Editing, Georeference, Geostatistical Analyst, Graphics, Labeling, Layout, Cache, Representation, Route Editing, Spatial Adjustment, Spatial Analyst, Standard, Streetmap, Tablet, Tools, Topology, Utility Network Analyst, Versioning, Customize, and View Source.
- g. HAZUS enables the Main Menu, Layout, Spatial Analyst, Standard, and Tools toolbars for the HAZUS user. The Spatial Analyst enabling is flood model specific as the Spatial Analyst extension is not required for the other HAZUS models.

3.2.5. Inventory Menu

This menu provides all inventory management capabilities.

- a. At the highest level, the user shall be able to view and edit data for the general building stock, essential facilities, high potential loss facilities, user-defined structures (inventory/facilities), transportation systems, utility systems, hazardous materials, Advanced Engineering Building Model (AEBM) profiles (for earthquake model only), and demographics. For the flood model, the categories of Agricultural Land Use and Vehicles are also included in the Inventory menu.

- b. The user shall be able to view the definitions of the classification schemes via the view Classification menu.
- c. If the user selected more than one hazard for a study region, changes to some inventory tables shall require exporting the changes to the other model.
- d. If the user has imported data developed using the BIT, HAZUS shall display BIT general building stock data whenever the user reopens the study region.

The sections below describe the Inventory menu contents for each hazard.

3.2.5.1. Inventory Menu Available in the Earthquake Model

3.2.5.1.1. General Building Stock

- a. The user shall be able to view and edit data for the general building stock through the sub-menus.
- b. This functionality shall be supported through sub-menus for the square footage, building count, occupancy mapping, dollar exposure, foundation type, and BIT.

3.2.5.1.1.1. Square Footage

- a. The user shall be able to view and/or edit the square footage data for the study region by census tract (census block if the region is defined for flood) and specific occupancy.
- b. Square footage data shall be viewable in thousands of square feet or in percentage of total.
- c. The square footage data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.
- d. The user shall be able to View, Edit, and Map data through this selection.
- e. Data shall be provided by specific occupancy for each census tract.
- f. The table shall present the data at census tract level for the entire study region.

- g. The square footage table shall have buttons to Close the window, Map data, or Print data.
The import option allows the user to import BIT-generated output.
- h. A context menu accessible via a right mouse click shall allow the user to activate a context menu with the following sub-options: Start editing, Stop editing, Add new record, Delete selected record, Import, Export, Data Dictionary, and Metadata.

3.2.5.1.1.2. Building Count

- a. The user shall be able to view and/or edit the building count data for the study region by occupancy—general and specific—(common to all three hazards) and by building type for each census tract. The By Occupancy tab has a pull-down menu that allows the user to view building count by general (e.g., residential, commercial, industrial) and specific (e.g., RES1, RES2) occupancies. The By Building Type tab also has a pull-down menu that allows the user to view the building count by general building type (e.g., wood, brick) and specific building type (e.g., W1, W2).
- b. The building count data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.
- c. The sub-menu provides two tab selections that shall allow the user to view the general building stock count by occupancy and by building type. Data in these windows are not editable as they are calculated tables.
- d. The By Occupancy and By Building Type tabs shall have buttons to Close the window, Map data, or Print data.
- e. A context menu accessible via a right mouse click shall allow the user to activate a context menu with the following sub-options: Start editing, Stop editing, Add new record, Delete selected record, Import, Export, Data Dictionary, and Metadata.

3.2.5.1.1.3. Occupancy Mapping

- a. The user shall be able to view and/or edit the distribution of general building types (e.g., wood, masonry, concrete, steel, and mobile homes) in each specific occupancy class by census tract.

- b. The user shall be able to view and/or edit the distribution of earthquake-specific building types (e.g., W1, W2) within each general building type for each specific occupancy class and each census tract. The user can create a new mapping scheme from an existing mapping scheme.
- c. The earthquake database shall include at least one complete set of default distributions for every state. The user shall be able to name and save different distributions of earthquake-specific mapping schemes.
- d. This sub-menu provides the user with two menu selections: Specific/Building Type and Census/Mapping Scheme. The Specific/Building Type tab provides the ability to view a specific occupancy by specific building type mapping scheme.
- e. The user shall be able to view a context menu by right clicking over the editable area of the Specific/Building Type tab. This tab shall enable the user to modify default parameters for the occupancy-mapping scheme. Options include New, Open, Save, Save as, and Print. The options are described below.
 - New: This feature allows the user to modify general distributions that affect the overall distribution of structures throughout the mapping scheme. This menu selection brings up a screen showing the current age distribution, height (number of floors) of structures, building quality (bias), and design level.
 - Open: This feature allows the user to open custom mapping schemes for use within the model. This feature looks to a specific directory for the existence of mapping scheme files. An import action button is available.
 - Save: This feature allows the user to save any modifications made to the mapping scheme.
 - Save as: This feature allows the user to save modifications under a different file name.
 - Print: This feature allows the user to print the currently displayed table.
- f. The Specific/Building Type and Census/Mapping Scheme tabs shall have buttons to Close the window, Map data, or Print data.

- g. The Census/Mapping Scheme tab shall allow the user to view the application of default or custom mapping schemes to each census tract. There is no context menu associated with this tab dialog.

Note: Features of the occupancy mapping dialog shall likely change pending agreement of the three contractors on the implementation of the “common attributes.”

3.2.5.1.1.4. Dollar Exposure

- a. The user shall be able to view the dollar exposure data for the study region in thousands of dollars by census tract (census block if the region is defined for flood) and by general occupancy, specific occupancy, general building type, and specific building type.
- b. The dollar exposure data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.
- c. The sub-menu shall provide the user with three tab selections.
- d. The tabs shall allow the user to view the general building stock valuation by occupancy and by building type. Data in these windows are not editable as they are calculated tables.

The Exposure by Occupancy tab has a pull-down menu that allows the user to view general (e.g., residential, commercial, industrial) and specific (e.g., RES1, RES2) occupancies.

The Exposure by Building Type tab shall also have a pull-down menu that allows the user to view general building type (e.g., wood, brick) and specific building type (e.g., W1, W2).

- e. The By Occupancy and By Building Type tabs shall have buttons to Close the window, Map data, or Print data.
- f. Right clicking while the cursor is within the data table shall allow the user to activate a context menu with the following sub-options: Start editing, Stop editing, Add new record, Delete selected record, Import, Export, and Data Dictionary.

3.2.5.1.1.5. Foundation Type

- a. The user shall be able to view and/or edit the percentage of buildings on deep foundations by specific building type and by census tract.

- b. The user shall be able to name and save different distributions.
- c. The sub-menu shall provide the user with two tab selections. The first tab shall allow the user to view the foundation type ratios; the second allows the user to view the mapping by census tract.
- d. The Foundation Type Ratios table provides the proportion of foundation types by specific building type. The user shall be able to access a context menu by right clicking the mouse. Menu options include Open, Save, Save as, and Print.

The Mapping by Census Tract tab allows the user to map the foundation scheme type to an individual census tract. The functionality of this dialog is the same as the one within the Occupancy Mapping dialog. There is no context menu for this tab.

- e. The Foundation Type Ratios and Mapping by Census Tract tabs shall have buttons to close the window or print data.

3.2.5.1.1.6. Building Import Tool (BIT)

- a. The BIT has the same features and functionality as that in HAZUS99; however, the implementation shall be modified to adhere to the three-tier architecture being followed in the development of HAZUS-MH. This shall involve a complete overhaul of the existing BIT.
- b. The user shall be able to use the BIT to replace the existing default general building stock data for the earthquake model. The earthquake SRS shall address only the need for the HAZUS earthquake model to have the capability to import data using the BIT.
- c. A separate SRS shall be written for the BIT. This option shall allow the user to launch the BIT.

3.2.5.1.2. Essential Facilities

- a. The user shall be able to view, edit, import, and print data for essential facilities within the HAZUS earthquake model.
- b. Selection of this menu shall bring up a secondary menu with the Inventory Data and Occupancy Mapping Options.

3.2.5.1.2.1. Essential Facilities Inventory Data

- a. The user shall be able to view and/or edit the essential facilities inventory.
- b. The user shall be able to assign an essential facility occupancy class or earthquake-specific building type to each essential facility.
- c. Each essential facility type shall be shown by a unique symbol when displayed on a map.
- d. The inventory data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.
- e. Selection of this menu shall give the user the opportunity to view the High Potential Loss Facilities through pull-down tab options. These options include Medical Care Facilities, Emergency Response, and Schools.
- f. All Essential Facilities tables contain objects that are represented as GIS point objects.
- g. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- h. Right clicking while the cursor is within the data table shall allow the user to activate a context menu with the options described below. The Add records, Delete records, Import database, Calculate statistics, Metadata, and Data Dictionary selections are available when viewing the Medical Care Facilities, Emergency Response, and Schools tables.

The sections below describe each option.

3.2.5.1.2.1.1. Add Record

- a. The user shall be able to add individual records through this selection.
- b. The selection shall add a row to the table and allow the user to manually input data.

3.2.5.1.2.1.2. Delete Selected Record(s)

- a. The user shall be able to select a record to delete.
- b. The user shall be required to select a record, or an error message shall be provided.

- c. If the user selects a record to delete, the user shall be given the option to save the modified inventory file under a separate name to preserve the capability to restore the original file.
- d. The user shall have the option to ignore this request and delete the record immediately.

3.2.5.1.2.1.2.1. Import Database

- a. The user shall have the option to import a locally available database.
- b. When this option is selected, the user shall receive a standard Explorer-style window for the selection of the file with the data the user desires to import.

3.2.5.1.2.1.3. Data Dictionary

- a. The user shall be able to view the Data Dictionary for the menu item.

3.2.5.1.2.1.4. Metadata

- a. The user shall be able to view the metadata for the menu item.

3.2.5.1.2.1.5. Calculate Statistics

This feature shall automatically calculate statistics for any highlighted numeric column in the data. The context information panel shows the table name, the column that was selected for the map, and relevant statistics such as Count, Minimum, Maximum, Range, Sum, and Mean. If a numeric field is not highlighted, the option is inactive.

3.2.5.1.2.2. Essential Facilities Occupancy Mapping

- a. The user shall be able to view and/or edit the distribution of specific building types in each essential facility occupancy class.
- b. Selection of this menu item allows the user to view the occupancy-mapping scheme for Essential Facilities.
- c. The Occupancy Mapping table shall have buttons to close the window or print data.
- d. The dialog shall have two pull-down menus for Design Level and Building Quality.

- e. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The options in the menu include Start editing, Stop editing, Add new record, Delete selected records, Import, Export, Data Dictionary, and Metadata.
- f. Menu options include Open, Save, Save as, and Print.

3.2.5.1.3. High Potential Loss Facilities

- a. The user shall be able to View, Edit, Import, and Print data for high potential loss facilities within the HAZUS earthquake model.
- b. Selection of this menu shall bring up a secondary menu with the Inventory Data and Occupancy Mapping Options.

3.2.5.1.3.1. High Potential Loss Facilities Inventory Data

- a. The user shall be able to view and/or edit the high potential loss facilities inventory.
- b. The user shall be able to assign a facility occupancy class or earthquake-specific building type to each high potential loss facility.
- c. Each high potential loss facility type shall be shown by a unique symbol when displayed on a map.
- d. The inventory data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.
- e. Selection of this menu shall give the user the opportunity to view the High Potential Loss Facilities through pull-down tab options. These options include Dams and Levees, Nuclear Power Facilities and Military Installations. The Dams, Nuclear Power Facilities, and Military Installation tables contain objects that are represented as GIS point objects. The Levee table is composed of segments represented as GIS polylines.
- f. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- g. Right clicking while the cursor is within the data table shall allow the user to activate a context menu that offers the Add new records, Delete records, Import, Export, Metadata,

and Data Dictionary selections when viewing the dam tables. For the Levee table, the Data Dictionary and Metadata options are available.

3.2.5.1.3.2. High Potential Loss Facilities Occupancy Mapping

- a. The user shall be able to view and/or edit the distribution of specific building types in each high potential loss facility occupancy class.
- b. Selection of this menu item allows the user to view the occupancy-mapping scheme for Military Installations.
- c. The dialog shall have two pull-down menu items for Design Level and Building Quality. The Occupancy Mapping table shall have buttons to close the window or print data.
- d. Right clicking while the cursor is within the data table shall allow the user to activate a context menu similar to that discussed in Subsection 3.2.5.1.1.3, Occupancy Mapping. The options in the menu include Open, Save, Save as, and Print.

3.2.5.1.4. Advanced Engineering Building Model (AEBM)

This menu is available only in the earthquake model and contains the sub-menus described below.

3.2.5.1.4.1. AEBM Inventory

- a. The user shall be able to view and/or edit the AEBM inventory.
- b. The user shall be able to assign an AEBM profile to each AEBM facility.
- c. AEBM shall be shown by a unique symbol when displayed on a map.
- d. The inventory data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.
- e. The dialog shall have buttons to Close the window, Map data, or Print data.
- f. Right clicking while the cursor is within the data table shall allow the user to activate a context menu that provides the Add records, Delete records, Import database, Synchronize to map, Calculate statistics, Metadata, and Data Dictionary selections.

3.2.5.1.4.2. AEBM Profiles

- a. The user shall be able to view and/or edit the AEBM profile based on specific occupancy class, specific building type, and seismic design level.
- b. The AEBM Profiles dialog shall allow the user to define as many profiles as needed. A profile is a list of analysis parameters that can be assigned to the profile. Once a profile has been created, it can be assigned to AEBM inventory. AEBM inventory belonging to the same profile shall have the same characteristics in terms of analysis.
- c. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. For both tabs, the Add profile, Delete profile, Duplicate profile, Assign to default capacity and Fragility curves, and Data Dictionary are the available options.

3.2.5.1.5. User-Defined Structures

- a. The current HAZUS allows the user to import a user-defined database of specific structures of interest. These features shall have typically been collected using InCAST, which is currently being modified to support the earthquake, wind, and flood models.

3.2.5.1.5.1. User-Defined Inventory Data

- a. The user shall be able to view and/or edit the User-Defined Structures inventory.
- b. The user shall be able to assign a facility occupancy class or earthquake-specific building type to each user-defined structure.
- c. All User-Defined Structures types shall be shown by one symbol when displayed on a map.
- d. The inventory data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.
- e. Selection of this tab shall allow the user to view site-specific building data that have been supplied by the user.

The table contains facilities that are represented as GIS point objects.

- a. The tables shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

- b. Right clicking while the cursor is within the data table shall allow the user to activate a context menu that provides the Add new record, Delete records, Import database, Calculate statistics, Metadata, and Data Dictionary selections.

3.2.5.1.5.2. User-Defined Occupancy Mapping

- a. The user shall be able to view and/or edit the distribution of specific building types in each user-defined structures occupancy class.
- b. Selection of this menu item shall allow the user to view the occupancy-mapping scheme for user-defined mapping.
- c. The Occupancy Mapping table shall have buttons to close the window or print data.
- d. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The options in the menu include Open, Save, Save as, and Print.

The dialog has two pull-down menus for Design Level and Building Quality.

3.2.5.1.6. Transportation Systems

- a. Selection of this menu shall bring up a sub-menu with selections for Inventory Data and Dollar Exposure.
- b. Each transportation system type shall be shown by a unique symbol when displayed on a map.
- c. The inventory data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.

3.2.5.1.6.1. Transportation Systems Inventory Data

- a. The user shall be able to view and/or edit the Transportation Systems inventory. Each Transportation System type shall be shown by a unique symbol when displayed on a map.
- b. The inventory data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.

- c. Selection of this menu item shall allow the user to view the Transportation Systems inventory data. The user shall see a table with seven tabs: Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport.

3.2.5.1.6.1.1. Transportation Systems Highway Tab

- a. Selection of this tab shall allow the user to view the highway system through pull-down menu options including Highway Segments, Highway Bridges, and Highway Tunnels.

The Highway Segments table is composed of highway segments represented as GIS polylines. The Highway Bridges and Highway Tunnels tables contain objects that are represented as GIS point objects.

- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The Add new record, Delete selected records, Import database, Calculate Statistics, Metadata, and Data Dictionary selections are available when viewing the Highway Bridges, Highway Segments, and Highway Tunnels tables.

3.2.5.1.6.1.2. Transportation Systems Railway Tab

- a. Selection of this tab shall give the user the opportunity to view the light rail system through pull-down menu options that include Railway Track Segments, Railway Bridges, Railway Tunnels, and Railway Facilities.

The Railway Track Segments table is composed of track segments represented as GIS polylines. The Railway Bridges, Railway Tunnels and Railway Facilities tables contain objects that are represented as GIS point objects.

- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The Add records, Delete records, Import database, Data Dictionary, Metadata, and Calculate statistics selections are available when viewing the Railway

Bridges, Railway Tunnels, and Railway Facilities tables. For the Railway Track Segments table, the Data Dictionary, Metadata, and Calculate statistics are the available options.

3.2.5.1.6.1.3. Transportation Systems Light Rail Tab

- a. Selection of this tab shall give the user the opportunity to view the light rail system through pull-down menu options including Light Rail Segments, Light Rail Bridges, Light Rail Tunnels, and Light Rail Facilities.

The Light Rail Segments table is composed of track segments represented as GIS polylines, and the Light Rail Bridges, Light Rail Tunnels, and Light Rail Facilities tables contain objects that are represented as GIS point objects.

- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The Add records, Delete records, Import database, Data Dictionary, Metadata, and Calculate statistics selections are available to the user when viewing the Light Rail Bridges, Light Rail Tunnels, and Light Rail Facilities tables. For the Light Rail Segments table, Data Dictionary, Metadata, and Calculate statistics are the available options.

3.2.5.1.6.1.4. Transportation Systems Bus Tab

- a. Selection of this tab shall allow the user to view bus facility data.

The table contains facilities that are represented as GIS point objects.

- b. The tables shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The Add records, Delete records, Import database, Data Dictionary, Metadata, and Calculate statistics selections are available to the user when viewing the table.

3.2.5.1.6.1.5. Transportation Systems Port Tab

- a. Selection of this tab shall allow the user to view port facility data.

The table contains facilities that are represented as GIS point objects.

- b. The tables shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The Add records, Delete records, Import database, Metadata, Data Dictionary, and Calculate statistics selections are available to the user when viewing the table.

3.2.5.1.6.1.6. Transportation Systems Ferry

- a. Selection of this tab shall allow the user to view ferry facility data.

The table contains facilities that are represented as GIS point objects.

- b. The tables shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The Add records, Delete records, Import dataset, Metadata, Data Dictionary, and Calculate statistics selections are available to the user when viewing the table.

3.2.5.1.6.1.7. Transportation Systems Airport

- a. Selection of this tab shall give the user the opportunity to view the airport system through pull-down menu options. These options include Airport Facilities and Airport Runways.

The Airport Facilities and Airport Runways tables contain facilities and runways that are represented as GIS point objects.

- b. The tables shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

3.2.5.1.6.2. Transportation Systems Dollar Exposure

- a. Selection of this menu provides the user with an overview of the total cost of the transportation systems by county. The table is a summary table and is not editable. To access the valuation data, the user must use the Analysis: Parameter: Lifeline-Economic menu option.
- b. The user shall be able to right click the mouse to access the Data Dictionary for the table.
- c. The Dollar Exposure table shall have buttons that allow the user to Close the window, Map a selected feature, and Print the table.

For this table, Data Dictionary and Calculate Statistics are the available options.

3.2.5.1.7. Utility Systems

- a. Selection of this menu shall bring up a sub-menu with selections for Inventory Data and Dollar Exposure.

3.2.5.1.7.1. Utility Systems Inventory Data

- a. Selection of this menu item shall allow the user to access the utility systems inventory data. The user shall see a table with six tabs: Potable Water, Wastewater, Oil, Natural Gas, Electric Power, and Communication.
- b. The user shall be able to view and/or edit the utility systems inventory.
- c. Each utility system type shall be shown by a unique symbol when displayed on a map.
- d. The inventory data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.

3.2.5.1.7.1.1. Utility Systems Potable Water Tab

- a. Selection of this tab shall allow the user to view the potable water system through pull-down menu options. These options include Potable Water Pipelines, Potable Water System Facilities, and Potable Water Distribution Pipes (by Census Tract), Potable Water Network System Hydrants, Potable Water System Tanks, Potable Water System Reservoirs, Potable Water System Valves, and Potable Water System Pumps.

The Potable Water Pipelines table is composed of pipe segments represented as GIS polylines. The Potable Water Oil Facilities table contains facilities that are represented as GIS point objects.

The Distribution Pipes (by Census Tract) table contains length of distribution pipes aggregated by census tract.

- b. The table shall have buttons that allow the user to close the window, map selected data, and print the active table.

The Potable Water Network System Hydrants, Potable Water System Tanks, Potable Water System Reservoirs, Potable Water System Valves, and Potable Water System Pumps tables do not have active map buttons.

- c. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. The Add Records, Delete Records, Import Database, Calculate Statistics, Metadata, and Data Dictionary selections are available to the user when viewing the Potable Water System Facilities table.

The “import kypipe/epanet/cybernet” and Data Dictionary are available to the user when viewing the Potable Water Pipeline Segments table. For the remaining tables, Data Dictionary and Calculate Statistics are the available options.

3.2.5.1.7.1.2. Utility Systems Wastewater Tab

- a. Selection of this tab shall allow the user to view the wastewater system through pull-down menu options: Wastewater Pipelines, Wastewater System Facilities, and Distribution Sewers (By Census Tract).

The earthquake model does not use the Distribution Sewers (By Census Tract) data.

- b. The Wastewater Pipeline Segments table shall be composed of pipe segments represented as GIS polylines; the Wastewater Oil Facilities table contains facilities that are represented as GIS point objects. The Distribution Sewers contains length of distribution pipes aggregated by census tract.
- c. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

- d. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. The Add Records, Delete Records, Import Database, Calculate Statistics, Metadata, and Data Dictionary selections are available to the user when viewing the Wastewater System Facilities table. For the Wastewater Pipeline Segments and Distribution Sewers (by census tract) tables, Data Dictionary, Metadata, and Calculate Statistics are the available options.

3.2.5.1.7.1.3. Utility Systems Oil Tab

- a. Selection of this tab shall allow the user to view the Crude and Refined Oil System and Facilities through pull-down menu options. The available tables include Crude and Refined Oil Pipelines and Crude and Refined Oil Facilities.

The Crude and Refined Oil Pipelines table is composed of pipe segments represented as GIS polylines. The Crude and Refined Oil Facilities table contains facilities that are represented as GIS point objects.

- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. The Add Records, Delete Records, Import Database, Metadata, and Data Dictionary selections are available to the user when viewing the Crude and Refined Oil Facilities table. For the Crude and Refined Oil Pipeline Segments tables, Data Dictionary, Metadata, and Calculate Statistics are the available options.

3.2.5.1.7.1.4. Utility Systems Natural Gas Tab

- a. Selection of this tab shall allow the user to view the Natural Gas System and Facilities through pull-down menu options. The available tables include Natural Gas Pipelines, Natural Gas Facilities, and Gas Distribution Pipes (By Census Tract).

The Natural Gas Pipelines table is composed of pipe segments represented as GIS polylines. The Natural Gas Facilities contains facilities that are represented as GIS point objects, while the Gas Distribution Pipes contains length of distribution pipes aggregated by census tract.

- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

- c. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The Add Records, Delete Records, Import Database, Metadata, and Data Dictionary selections are available to the user when viewing the Natural Gas Facilities table. For the Natural Gas Pipeline Segments and Gas Distribution Pipes (By Census Tract) tables, the Data Dictionary, Metadata, and Calculate Statistics are the available options.

3.2.5.1.7.1.5. Utility Systems Electric Power Tab

- a. Selection of this tab shall allow the user to access a table that contains the inventory of Electric Power Facilities for the study region. In addition, this item also provides the length of power lines by census tract for the study region.
- b. Each table shall allow the user to directly modify the data. The earthquake model does not use the power cable data and should be considered for removal from the earthquake model inventory.
- c. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- d. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. The Add Records, Delete Records, Import Database, Metadata, and Data Dictionary selections are available to the user when viewing the Electric Power Facilities table. For the Power Lines table, Data Dictionary, Metadata, and Calculate Statistics are the available options.

3.2.5.1.7.1.6. Utility Communications Tab

- a. Selection of this tab shall allow the user to access a table that contains the inventory of Communication Facilities for the study region. This item also provides the length of communication cables by census tract for the study region.
- b. Each table shall allow the user to directly modify the data. The earthquake model does not use the Communication Cable data; that data should be considered for removal from the earthquake model inventory.
- c. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

- d. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. The Add Records, Delete Records, Import Database, Metadata, and Data Dictionary selections are available to the user when viewing the Communication Facilities table. For the Communication Cables table, Data Dictionary, Metadata, and Calculate Statistics are the available options.

3.2.5.1.7.2. Utility System Dollar Exposure

- a. The user shall be able to view the dollar exposure of various utility systems for the study region in thousands of dollars by county. This information cannot be mapped thematically.
- b. Selection of this menu provides the user with an overview of the total cost of the utility systems by county. The table is summary table and is not editable. To access the valuation data, the user must use the Analysis: Parameter: Lifeline-Economic menu option.
- c. The Dollar Exposure table shall have buttons that allow the user to Close the window, Map a selected feature, and Print the table.
- d. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. For this table, Data Dictionary and Calculate Statistics are the available options.

3.2.5.1.8. Hazardous Materials

- a. The user shall be able to view the common Hazardous Materials Facilities inventory data.
- b. The inventory data browser shall use the database browser, and all mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.
- c. Selection of this menu item shall allow the user to access a table that contains the inventory of Hazardous Materials Facilities for the study region.
- d. The table shall allow the user to directly modify the data.
- e. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

- f. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. The Add record, Delete records, Import database, Metadata, and Data Dictionary selections are available to the user.

3.2.5.1.9. Demographics

- a. The user shall be able to view and/or edit the common Demographic data by census tract (census block if the region is defined for Flood).
- b. The inventory data browser shall use the database browser, and all the mapping capabilities shall be provided by the mapping API provided by the HAZUS application shell API.
- c. Selection of this menu item shall allow the user to access a table that defines the demographics by census tract for the study region. The table shall allow the user to directly modify the data.
- d. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

3.2.5.1.10. View Classifications

- a. The user shall be able to view the classification descriptions for the general building stock: Occupancy Types and Building Types.
- b. The user shall be able to view the classification for descriptions essential facilities, high potential loss facilities, transportation systems, and utility systems.
- c. The user shall have three tabs for viewing building and facilities, transportation systems, and utility systems.
- d. Each tab shall have a pull-down menu that allows the user to select classifications within the tab selections.
- e. The table shall have buttons that allow the user to Close the window and Print the active table.
- f. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. Data Dictionary is the only option available to the user.

Table 3-3 summarizes the major feature attributes related to the HAZUS Earthquake Model Inventory Menu. For a complete description of the attributes, see Appendix A.

Table 3-3: Earthquake Model Inventory Menu Attributes Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
General Building Stock	A	C	H	L	
Essential Facilities	A	C	H	L	
High Potential Loss Facilities	A	I	M	L	
Advanced Engineering Building Model	A	C	M	M	
User-Defined Structures	A	U	L	L	
Transportation Systems	A	C	H	L	
Utility Systems	A	C	H	L	
Hazardous Material Sites	A	U	M	L	
Demographics	A	C	H	L	
View Classifications	A	U	H	L	

3.2.5.2. Inventory Menu Available in the Hurricane Model

The Inventory Menu shall offer the options described below.

3.2.5.2.1. General Building Stock

3.2.5.2.1.1. Square Footage

- a. The user shall be able to view and/or edit the square footage data for the study region by census tract (census block if the region is defined for flood) and specific occupancy.
- b. The square footage data shall be viewable in thousands of square feet or in percentage of total.
- c. The square footage data browser shall have the Ok, Cancel, and Print buttons enabled.
- d. The data browser shall have a context menu with the option:
 - View Data Dictionary

3.2.5.2.1.2. Building Count

- a. The user shall be able to view and/or edit the building count data for the study region by census tract (census block if the region is defined for flood) and by:

- General Occupancy (common to all three hazards)
 - Specific Occupancy (common to all three hazards)
 - General Building Type (common to all three hazards)
- b. The building count data browser shall have the Ok, Cancel, and Print buttons enabled.
- c. The data browser shall have a context menu with the option:
- Data Dictionary

3.2.5.2.1.3. Dollar Exposure

- a. The user shall be able to view the dollar exposure data for the study region in thousands of dollars by census tract (census block if the region is defined for flood) and by:
- General Occupancy
 - Specific Occupancy
 - General Building Type
 - Specific Building Type
- b. The dollar exposure data browser shall have the Ok, Cancel, Map, and Apply buttons.
- c. The dollar exposure data browser shall have a context menu with the View Data Dictionary option available.

3.2.5.2.1.4. General Building Type Mapping

- a. The user shall be able to view and/or edit the distribution of general building types (e.g., wood, masonry, concrete, steel, and manufactured homes) in each specific occupancy class by census tract (census block if the region is defined for flood).

3.2.5.2.1.5. Specific Building Type Mapping

- a. The user shall be able to view and/or edit the distribution of hurricane-specific building types (e.g., WSF1, WSF2, and MSF1) within each general building type for each specific occupancy class and each census tract.

- b. The hurricane preview model database shall include at least one complete set of default-specific building type occupancy mapping schemes.

The user can create a new mapping scheme from an existing mapping scheme.

3.2.5.2.1.6. Hurricane Building Type Mapping

- a. The user shall be able to view or edit the distribution of hurricane-specific building features documented in the *HAZUS Wind Loss Estimation Methodology* (e.g., hip versus gable roof shape) within each valid hurricane-specific building type (e.g., WSF1).
- b. The hurricane preview model database shall include at least one complete set of default distributions for hurricane-specific building features.

3.2.5.2.2. Essential Facilities

3.2.5.2.2.1. Inventory

- a. The user shall be able to view and/or edit the essential facilities inventory.
- b. The user shall be able to assign an essential facility occupancy class or a hurricane building type to each essential facility.
- c. The essential facilities inventory data browser shall have the Ok, Cancel, Map, and Print buttons enabled.
- d. Each essential facility type shall be shown by a unique symbol when displayed on a map.
- e. The data browser shall have a context menu with the following menu items:
 - Add New Record
 - Remove Record
 - View Data Dictionary

3.2.5.2.2.2. Occupancy Mapping

- a. The user shall be able to view and/or edit the distribution of specific building types in each essential facility occupancy class.

3.2.5.2.3. User-Defined Facilities

- a. The user shall be able to view and/or edit the user-defined facilities inventory.
- b. The user shall be able to assign a user-defined facility occupancy class or a hurricane building type to each user-defined facility.
- c. The User-Defined Facilities data browser shall have the Ok, Cancel, Map, and Print buttons enabled.
- d. The data browser shall have a context menu with the following menu items:
 - Add New Record
 - Remove Record
 - View Data Dictionary

3.2.5.2.4. High Potential Loss Facilities

- a. The user shall be able to view common High Potential Loss Facilities inventory data: dams, levees, nuclear power plants, and military installations.

3.2.5.2.5. Transportation Systems

- a. The user shall be able to view the common Transportation Systems inventory data.

3.2.5.2.6. Utility Systems

- a. The user shall be able to view the common Utility Systems inventory data.

3.2.5.2.7. Hazardous Materials Facilities

- a. The user shall be able to view the common Hazardous Materials Facilities inventory data.

3.2.5.2.8. Demographics

- a. The user shall be able to view the common Demographics data.

3.2.5.2.9. Inventory Classification

- a. The user shall be able to view the classification descriptions for the General Building Stock.
- b. The user shall be able to view the classification descriptions for Essential Facilities.

- c. The user shall be able to view the classification descriptions for User-Defined Facilities.
- d. (Deferred) The user shall be able to view the classification descriptions for High Potential Loss Facilities.
- e. (Deferred) The user shall be able to view the classification descriptions for Transportation Systems.
- f. (Deferred) The user shall be able to view the classification descriptions for Utility Systems.
- g. (Deferred) The user shall be able to view the classification descriptions for Hazardous Materials Facilities.

3.2.5.3. Inventory Menu Available in the Flood Model

- a. The user shall be able to view, edit, and import user-supplied stock data for the following:
 - (1) General Building Stock, (2) Essential Facilities, (3) High Potential Loss Facilities,
 - (4) User-Defined Structures (see [c] below), (5) Transportation Systems, (6) Utility Systems,
 - (7) Hazardous Materials, (8) Demographics, (9) Agricultural Land-Use, (10) Vehicles, and
 - (11) View Classifications.
- b. Menu items General Building Stock and View Classifications have submenus requiring additional user selection.
- c. General Building Stock menu item has submenu items for Square Footage, Building Count, Valuation Parameters, Dollar Exposure (Replacement Value), Depreciation Parameters, Depreciated Exposure, General Occupancy Mapping, Flood Specific Occupancy Mapping, First Floor Elevations, and Building Import Tool (BIT).
- d. View Classification menu item has submenu items Buildings and Facilities, Essential Facilities, High Potential Loss Facilities, Transportation Systems and Utility Systems.

3.2.5.3.1. General Building Stock

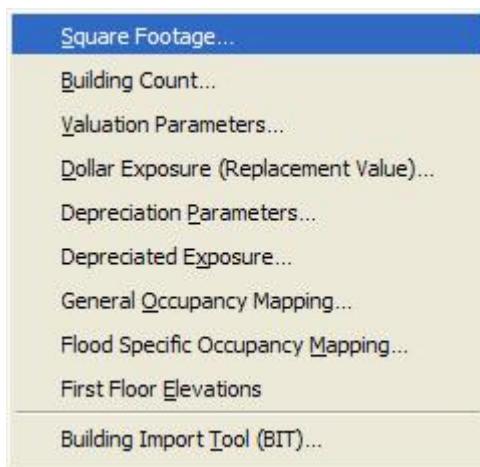
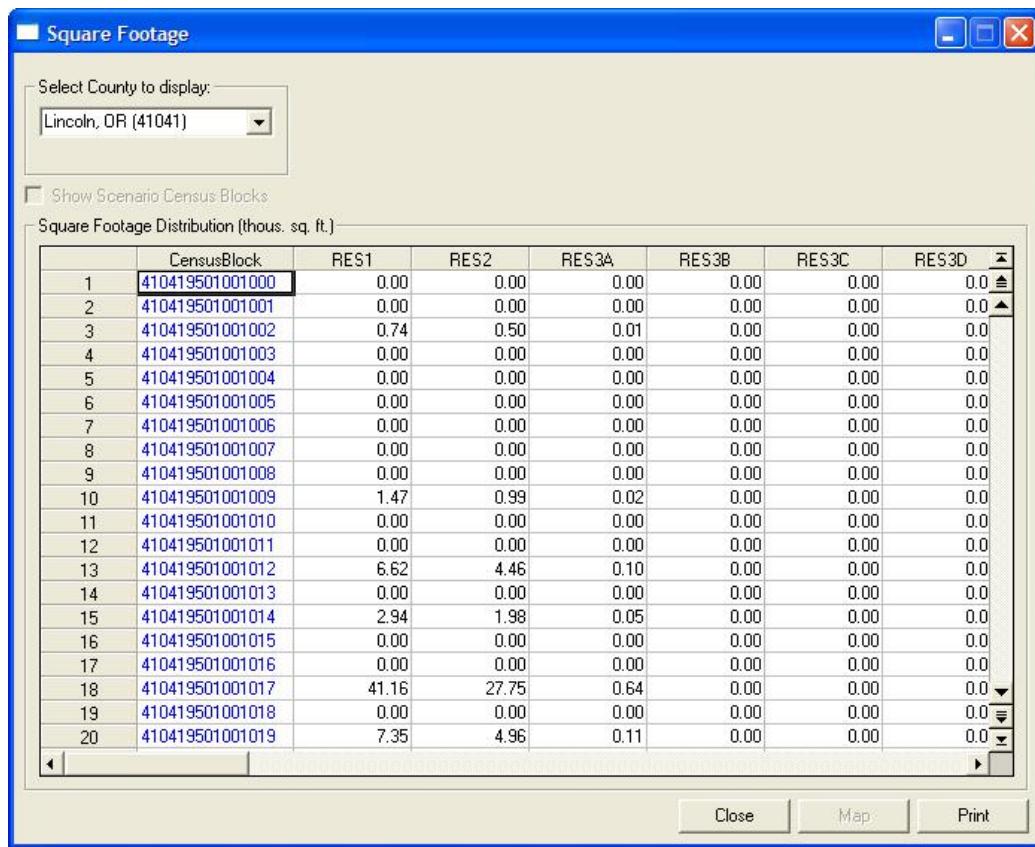


Figure 3-1: Hazus Inventory Menu, General Building Stock Submenu

- a. Curser focus in the General Building Stock menu item provides the user to access to the submenu seen in the Figure 3.1 above.
- b. The General Building Stock submenu includes Square Footage, Building Count, Valuation Parameters, Dollar Exposure (Replacement Value), Depreciation Parameters, Depreciated Exposure, General Occupancy Mapping, Flood Specific Occupancy Mapping, First Floor Elevations, and Building Import Tool (BIT).

3.2.5.3.1.1. Square Footage



**Figure 3-2: HAZUS Inventory Menu, General Building Stock Submenu
Square Footage Dialog**

- Selection of the Square Footage submenu item opens the dialog seen in Figure 3-2 above. This dialog utilizes the Standard Flood Model Browser with the noted exceptions:
 - The dialog has only one combo box that filters the data displayed in the grid to the selected county.
 - Dialog has one grid with editable fields except for the CensusBlock column.
 - Dialog does not have tabs.
 - Dialog does not have radio buttons.
 - Command buttons are Close, Map and Print.

- b. Data for the dialog is stored in the table hzSqFootageOccupB.
- c. The data view for the Square Footage dialog is absv_InvGbsSqFt.
- d. Data is displayed by Specific Occupancy. Specific Occupancy classification data is editable and displayed in black. Edits to this data is rolled up to the General Occupancy and automatically reprocessed. Non-editable columns (Census Block and Total) will be in blue.
- e. Data frame notes that data is displayed in thousands of square feet for the users.
- f. Columns shall be Census Block, RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, REL1, AGR1, GOV1, GOV2, EDU1, EDU2.
- g. Grid cells display the data as a floating point number with a single decimal place. Data input is limited to the same format.
- h. The combo box allows the user to select the county for which data is displayed in the grid. This is provided for those cases where more than one county may be in the users study region. The combo box displays County Name, State two letter abbreviation, and county fips code in parentheses. For example Mecklenburg, NC (37119). Sort order is alphabetic by State by County.
- i. A dialog check box is provided to allow the user to display only those census blocks affected by an open study case. Check box is disabled until the user has opened or created a study case and has the hazard analysis completed through the hydraulic analysis (coastal and/or riverine). The default is unchecked thereby showing the entire study region to the user. Selection of this box filters the display to show only those census blocks intersecting the flood depth grid boundaries for the open study case.
- j. Methodology for selection of the study case block is an intersection between the census block boundary file and the polygon resulting from the greatest return period analyzed within the open study case.

- k. The first column displays the census block number and shall not be editable and is therefore displayed in blue. The column title is CensusBlock. Subsequent columns display the square footage by specific occupancy and are labeled by specific occupancy class. Values are editable by the user. Changes are not final unless accepted by the user as described below.
- l. User can expand the size of the dialog on screen by selecting an edge or corner and dragging with the right mouse button depressed.
- m. The dialog has a vertical scroll bar to allow navigation through the records. The scroll bar allows the user to quickly go to the first or last records in the grid.
- n. Upon selection of the Close button, the dialog closes. If the user has made changes to the data, the user is queried if they would like to save changes. If the user selects “Yes”, the data is modified. This data is assigned to the study region and replaces the baseline data loaded when HAZUS creates the study region. If the user selects “No” the grid dialog box is closed and changes are not saved. If the user selects “Cancel” the save dialog is closed is closed and the user is returned to the grid dialog.
- o. The Map button is disabled until the user selects a data column. Upon selection of a column (shown by highlighting the column), the Map button is enabled. Upon selection of Map button, the model displays a thematic map the selected occupancy column. Thematic map uses ArcGIS default breaks and HAZUS common color selections for display of data.
- p. Upon selection of Print, a standard windows print dialog opens. The user can select the printer and modify print layout as necessary.
- q. Through the use of a right mouse click user accesses a submenu as noted in the table below. Enabled items include:
 - a. Add New Record (function not enabled)
 - b. Delete Selected Record (function not enabled)
 - c. Import (function enabled)
 - d. Export (function enabled)

- e. Data Dictionary (function enabled)
- f. Meta Data (function enabled)
- r. Import in this table allows the user to import a database from the BIT tool. This is a call to a HAZUS common routine developed by DTI.
- s. ABS Consulting developed the export functionality as shown below.

3.2.5.3.1.2. Building Count

The screenshot shows the 'Building Count' dialog box with the 'By Occupancy' tab selected. At the top, there are dropdown menus for 'Table Type' (set to 'General Occupancy Type') and 'Select County to display' (set to 'Lincoln, OR (41041)'). Below these are two checkboxes: 'Show Scenario Census Blocks' (unchecked) and 'General Building Count By Occupancy' (checked). The main area is a table with 17 rows, each representing a census block. The columns are labeled 'CensusBlock', 'Total', 'Residential', 'Commercial', 'Industrial', 'Agriculture', and 'Relig'. The data is as follows:

CensusBlock	Total	Residential	Commercial	Industrial	Agriculture	Relig
1	410419501001000	0	0	0	0	0
2	410419501001001	0	0	0	0	0
3	410419501001002	3	3	0	0	0
4	410419501001003	0	0	0	0	0
5	410419501001004	0	0	0	0	0
6	410419501001005	1	1	0	0	0
7	410419501001006	0	0	0	0	0
8	410419501001007	0	0	0	0	0
9	410419501001008	0	0	0	0	0
10	410419501001009	4	3	0	0	1
11	410419501001010	0	0	0	0	0
12	410419501001011	0	0	0	0	0
13	410419501001012	10	10	0	0	0
14	410419501001013	0	0	0	0	0
15	410419501001014	12	5	4	2	1
16	410419501001015	0	0	0	0	0
17	410419501001016	0	0	0	0	0

At the bottom of the dialog are buttons for 'Sql Factors', 'Close', 'Map', and 'Print'.

Figure 3-3: HAZUS Inventory Menu, General Building Stock Submenu, Building Count Dialog, By Occupancy Tab

- a. Selection of the Building Count Menu item opens the standard HAZUS dialog shown in Figure 3-3 above. With the noted exceptions below:
 - a. The dialog has two tabs.
 - b. The dialog does not have radio buttons

- c. The dialog has a single data grid.
 - d. The dialog has command buttons SqFt Factors, Close, Map, and Print. SqFt Factors button is not available on the By Building Type Tab.
- b. The default dialog is the By Occupancy Tab with the General Occupancy selected in the combo box.
- c. Data is stored in the tables ‘hzCounty’, ‘hzTract’, ‘hzCensusBlock’, and ‘hzBldgCountOccupB’ for General and Specific Occupancy. Data is stored in the tables ‘hzCounty’, ‘hzTract’, ‘hzCensusBlock’, and ‘hzBldgCountGBldgTypeB’ for the By Building Type Tab.
- d. The By Occupancy Tab has a combo box with selection options General and Specific and a Combo Box labeled Select County for Display.
- e. By General Occupancy data is displayed using the data view `absv_InvGbsBldgCountOccupGen`. The data in this view is not editable and is displayed in blue.
 - a. Data frame notes “General Building Count by Occupancy”.
 - b. Columns include Census Block, Total, Residential, Commercial, Industrial, Religious, Agriculture, Government, and Education.
- f. Changes to the `hzBldgCountOccupB` table are aggregated and stored in the `hzBldgCountOccupT` table. Changes are also processed to the `hzBldgCountGBldgTypeB` tables and the `hzBldgCountGBldgTypeT` tab.
- g. Dialog has a check box that allows the user to display only those census blocks within an open study case that has had a completed hydraulic analysis. This is supported similar to the discussion in the square foot occupancy. Totals are the total buildings by census block for the study case.
- h. When viewing the By Occupancy tab, the dialog shall have command buttons SqFt Factors, Close, Map, and Print.

- a. Selection of the SqFt Factors command button opens the dialog seen discussed in the *General Building Stock: Building Count Dialog, Building Square Footage Factors Command Button Dialog* section
- i. Selection of the command Button Close closes the dialog. If the user has chosen to make edits (Specific Occupancy Only), a dialog queries the user if they wish to save changes.
- j. Selection of Map allows the user to perform a thematic map on a selected column within any of the three grids available from this dialog. If the user has not selected a column to map the Map button is disabled.
- k. Selection of the Print command button opens a standard windows print dialog allowing the user to print the table.
- l. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items functions depend on the active grid view. Functions include:

Function	Gen Occup View Enabled	Spec Occup View Enabled	Bldg Type View Enabled
Add New Record	N	N	N
Delete Selected Records	N	N	N
Import	N	Y	N
Export	Y	Y	Y
Data Dictionary	Y	Y	Y
Meta Data	Y	Y	N

- m. If the user has imported a database, the building count displayed in the above dialogs is the actual count of buildings from their database. NOTE: The SqFt Factors Command button is disabled if the user is using an imported BIT database.

By Occupancy Tab:

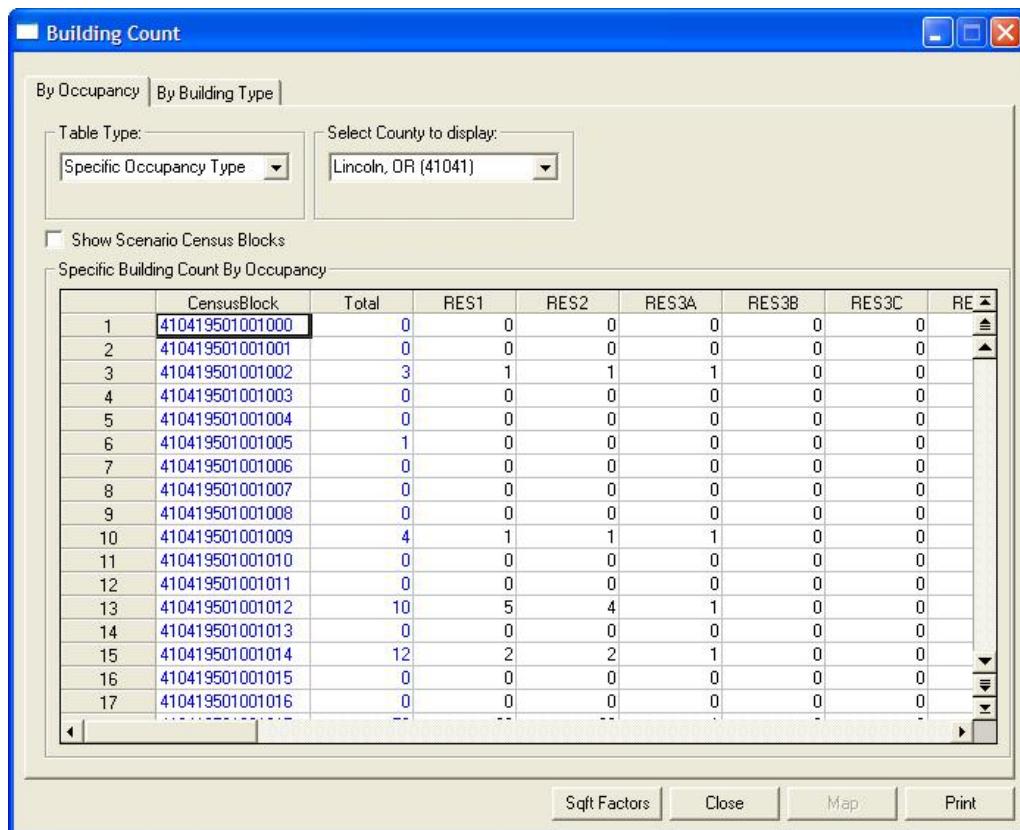


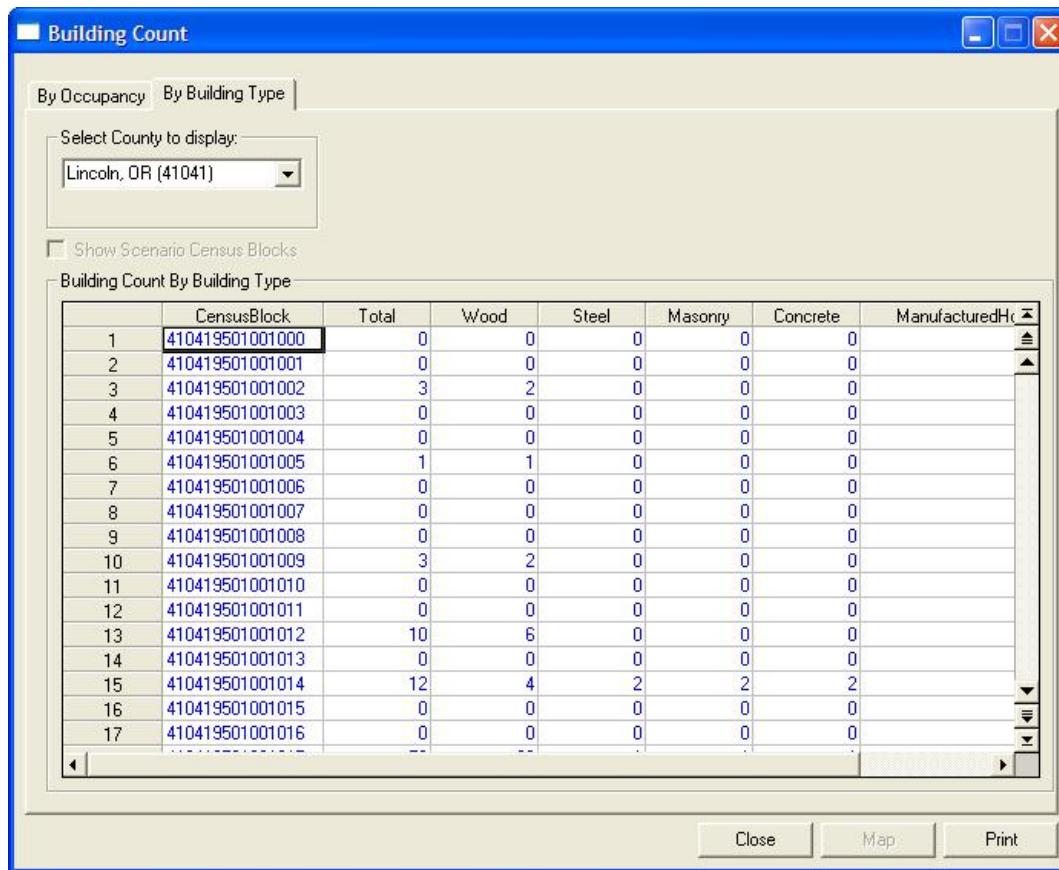
Figure 3-4: HAZUS Inventory Menu, General Building Stock Submenu, Building Count Dialog, By Occupancy Type Tab Specific Occupancy Selection

- n. By Specific Occupancy data is displayed using the view `absv_InvGbsBldgCountOccupSpec`. Specific Occupancy classification data is editable and displayed in black. Edits to this data is rolled up to the General Occupancy and automatically reprocessed for the By Building Type view. Non-editable columns (Census Block and Total) will be in blue..
 - a. Data frame notes “Specific Building Count by Occupancy”.
 - b. Columns shall be Census Block, Total, RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, REL1, AGR1, GOV1, GOV2, EDU1, EDU2.
- o. When values are edited in the Specific Occupancy view, the user data is no longer linked to the square footage factors table (as agreed by the three contractors).

- p. When viewing the Specific Occupancy values and the user has made changes, the user is queried about saving changes if they navigate away from the view.

By Building Type Tab:

- q. The user has the option to select the By Building Type Tab. Selection of this tab changes the display to that seen in Figure 3-5 below.



**Figure 3-5: HAZUS Inventory Menu, General Building Stock Submenu
Building Count Dialog, By Building Type Tab**

- r. The By Building Type Tab opens a standard HAZUS dialog except the dialog has:
- A single combo box labeled County allowing the user to select the available counties within the study region.
 - No radio buttons.

- c. A single data grid that displaying data that is not editable and is therefore displayed in blue text.
- d. Command buttons of Close, Map, and Print.
- s. By Building Type data is displayed using the view absv_InvGbsBldgCountBldgType. Data in this view is not editable and is displayed in blue.

 - a. Data frame notes “Building Count by Building Type”.
 - b. Columns are Census Block, Total, Wood, Steel, Masonry, Concrete, and ManufacturedHousing.

- t. Dialog has a check box that allows the user to display only those census blocks within an open study case. Performance is noted earlier in this section.

3.2.5.3.1.2.1. General Building Stock Building Square Footage Factors

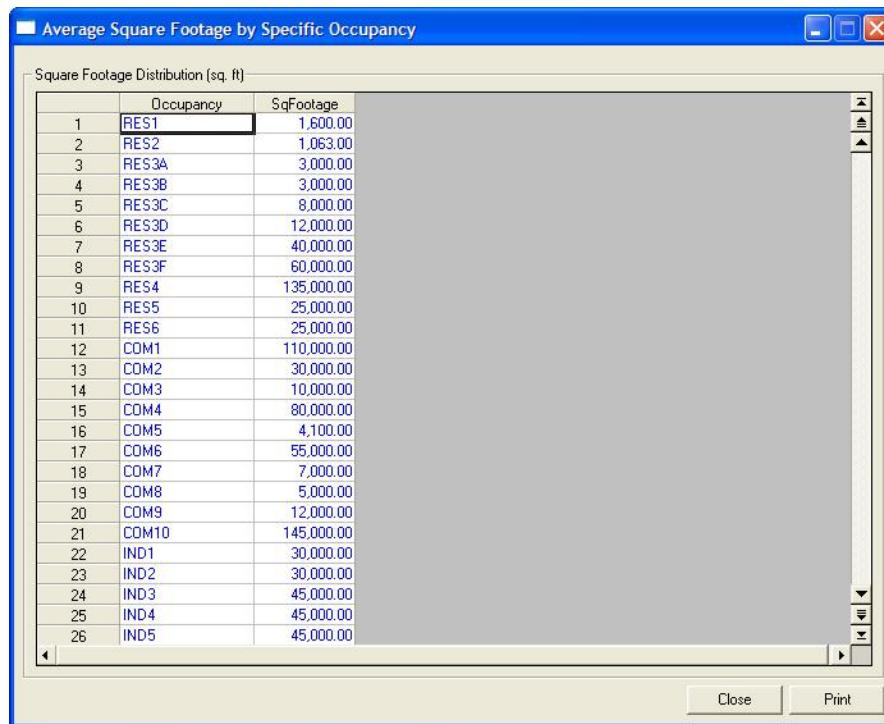


Figure 3-6: HAZUS Inventory Menu, General Building Stock Submenu, Building Count Dialog, SqFt Factors Command Button Dialog

- a. Selection of the Square Foot Factors command button on the By Occupancy Tab opens a standard HAZUS dialog with the following exceptions:
 - a. There are no tabs on the dialog
 - b. There are no combo boxes on the dialog
 - c. There are no radio buttons on the dialog
 - d. There is no check box on the dialog
 - e. There is a single non-editable data grid on the dialog
- b. The SqFt Factors Dialog displays the default square footage by occupancy used to create the Building Count data
- c. The Grid has columns labeled Occupancy and Square Footage. The data is not editable and is displayed in blue.
- d. Data for SqFt Factors can be found in hzSqFtFactors and is displayed using the view absv_InvGbsSqFtFactors.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	N
Data Dictionary	Y
Meta Data	Y

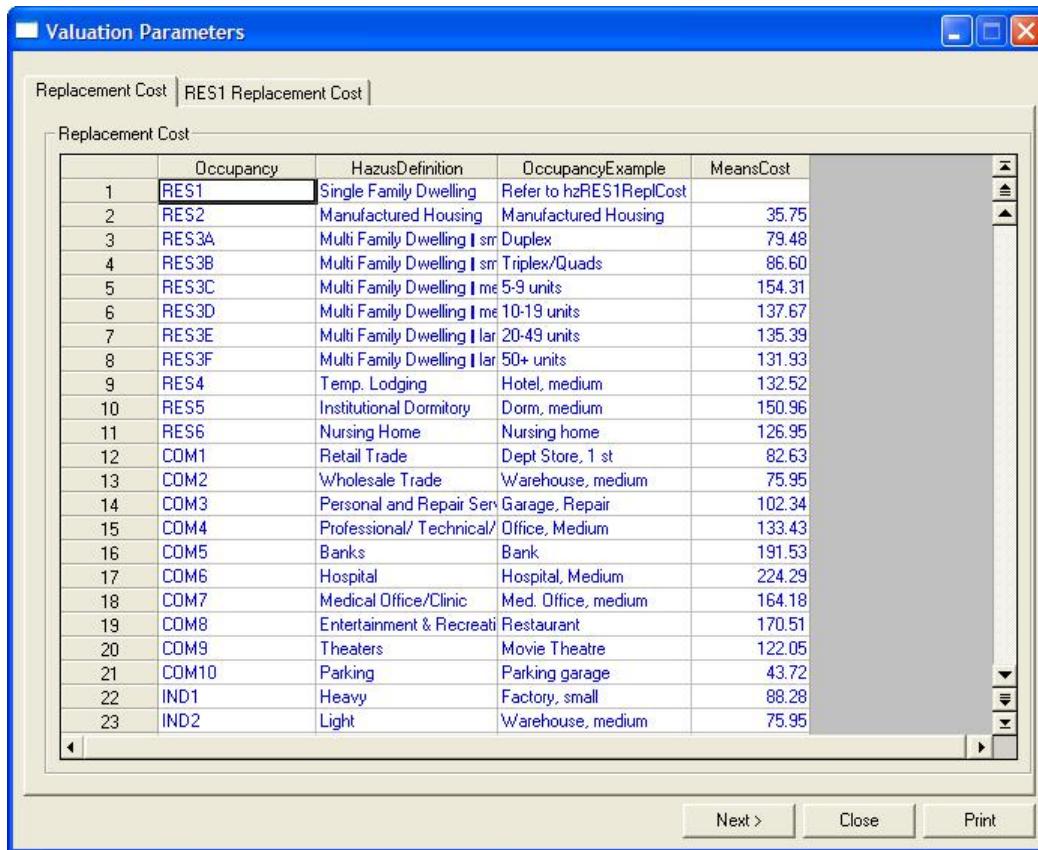
- f. SqFt Factor dialog shall Close and Print command buttons.

- g. Selection of the Close command button closes the dialog and returns the user to the Building Count dialog.
- h. Selection of the Print command button opens a standard print dialog that allows the user to print the open table.

3.2.5.3.1.3. Valuation Parameters Dialog Stream

- a. This dialog stream replaces the Dollar Exposure Dialog Stream discussed in Section 4.4.1.3 of the Flood Model PRD (September 2001). This modification was made to ensure dialog compatibility with the other software contractors.
- b. The Valuation Parameters submenu allows the user to view parameters that developed the HAZUS exposure values. The dialog stream is currently used for display purposes only. Future modifications may allow the data to become editable allowing the user to make regional changes to the baseline data for their study region. Because of the complexity of the three HAZUS models, and time constraints, this was eliminated from the design specifications.
- c. The Dollar Exposure table has been preprocessed for quicker response time by the models. If the user makes and accepts modifications to the parameters, the model shall recalculate the Dollar Exposure table.

3.2.5.3.1.3.1. Dollar Exposure Means Cost Models (Dialog 1)



**Figure 3-7: HAZUS Inventory Menu, General Building Stock Submenu,
Valuation Parameters Dialog Stream, Regional Cost Factors Dialog**

- Selection of the menu item opens the first valuation parameter dialog. This is a standard HAZUS dialog with exceptions as noted:
 - The dialog has two tabs.
 - The dialog does not have any combo boxes or radio buttons.
 - The dialog does not require the check box for study case blocks.
 - The dialog has command buttons Next>, Close, and Print.
 - The dialog has a single data grid that is not editable.

- b. The dialog has two tabs. The default tab is the Replacement Cost tab. This is the tab that opens when the user selects the Valuation Parameters menu item. The second tab is the RES1 Replacement Cost Tab. This tab is discussed in the next section.
- c. This dialog displays the Regional Cost Factors developed from RS Means and other sources of regional cost data.
- d. Data for the Replacement Cost tab (default tab) is in the table hzReplacementCost.
 - a. The data frame is labeled “Replacement Cost.”
- e. The data view for the Replacement Cost tab is absv_ReplacementCost. Column names include Occupancy, HAZUSDefinition, OccupancyExample, MeansCost.
- f. The Means Cost Models can be found in Reference 34 in Section 1.4 and updated in the Flood Model in 2007.
- g. Through the use of a right mouse click user can access a submenu as noted in the table below. The enabled items are the same for both tabs. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- h. Selection of Next> closes the Regional Cost Dialog and open the Location Factors dialog.
- i. Selection of Close closes the dialog.
- j. Selection of Print opens a standard print dialog and allows the user to print the entire table.

**3.2.5.3.1.3.1.1. Valuation Parameters Dialog Stream: Regional Cost Factors Dialog
(1of 6), RES1 Replacement Cost Tab**

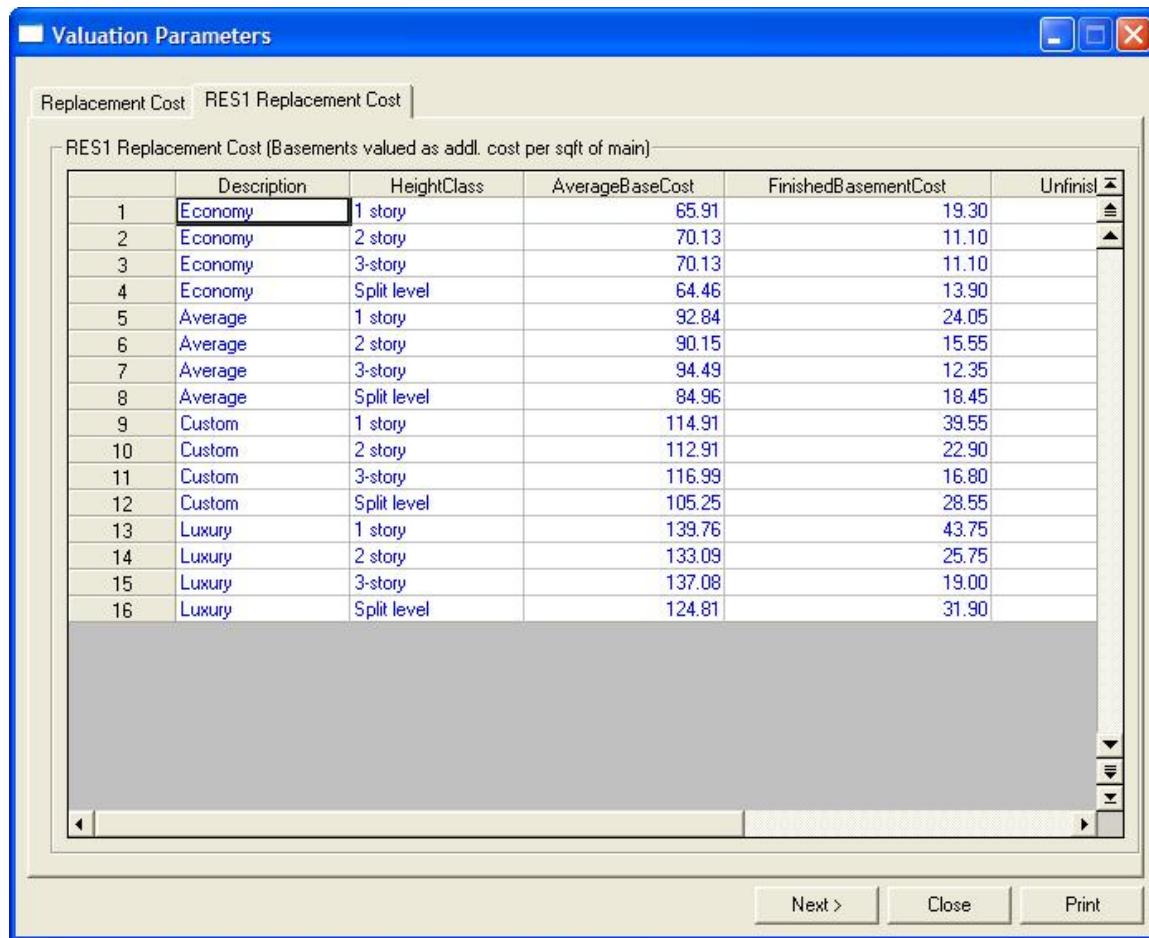


Figure 3-8: HAZUS Inventory Menu, General Building Stock Submenu, Valuation Parameters Dialog Stream, Regional Cost Factors Dialog, RES1 Replacement Cost Tab

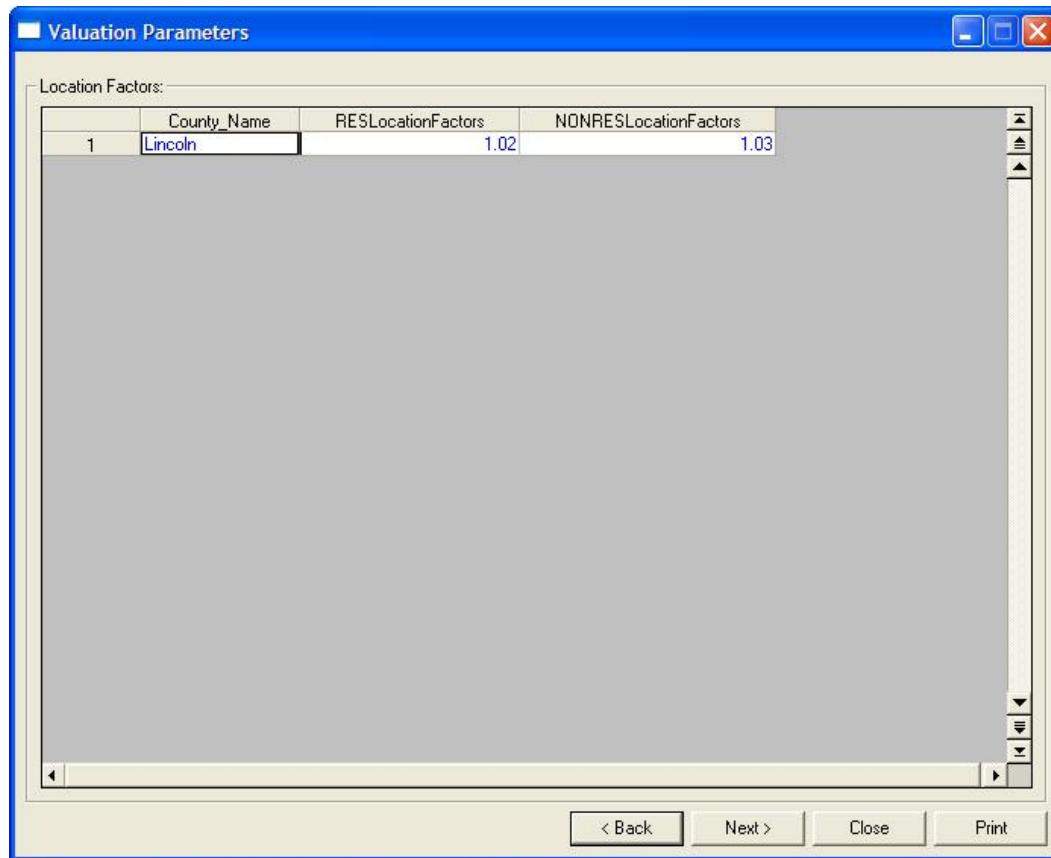
- Selection of the RES1 Replacement Cost Tab opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - The dialog has two tabs.
 - The dialog does not have any combo boxes or radio buttons.
 - The dialog does not require the check box for study case blocks.
 - The dialog has command buttons Next>, Close, and Print.

- e. The dialog has a single data grid that is not editable.
- b. The RES1 Replacement Cost Tab allows the user to view the replacement parameters for the Single-Family (RES1) occupancy classification. The values are not editable and are displayed in blue text.
 - a. The data frame is labeled “RES1 Replacement Cost (Basements valued as addl cost per sqft of main).”
- c. Data displayed under the RES1 Replacement Cost Tab is derived from the tables ‘hzMeansConstructSchemes’ and ‘hzRES1ReplCost’.
- d. The data view for the RES1 Replacement Cost tab is absv_Res1ReplCost. Column names include Description, HeightClass, AvgBaseCost, FinishedBasementCost, UnfinishedBasementCost.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. The enabled items are the same for both tabs. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. Selection of Next> closes the Regional Cost Dialog and open the Location Factors dialog.
- g. Selection of Close closes the dialog.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.

**3.2.5.3.1.3.2. Valuation Parameters Dialog Stream: Location Factors by County Dialog
(Dialog 2)**



**Figure 3-9: HAZUS Inventory Menu, General Building Stock Submenu
Valuation Parameters Dialog**

- a. Selection of the Next> on the first valuation parameter dialog opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog does not have tabs.
 - b. The dialog does not have any combo boxes or radio buttons.
 - c. The dialog does not require the check box for study case blocks.
 - d. The dialog has command buttons <Back, Next>, Close, and Print.
 - e. The dialog has a single data grid that is not editable.

- b. The dialog displays the data in a grid showing the Location Factors by each county within the study region.
- c. Data for the table is stored in hzCounty and hzMeansCountyLocationFactor.
- d. The data view for this table shall be absv_MeansLocationFactors. Columns for the data view include County_Name, RESLocationFactors and NONRESLocationFactors. The RES location factors are the factors used in developing the residential valuation, the NON RES location factors are used for all other development valuation.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- f. Selection of <Back closes the Location Factors by County dialog and open the Regional Cost Factors dialog on the default tab.
- g. Selection of Next> closes the Location Factors by County dialog and open the RES1 Garage Distribution dialog.
- h. Selection of Close closes the dialog.
- i. Selection of Print opens a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.3.3. Valuation Parameters Dialog Stream: RES1 Garage Distribution Dialog (Dialog 3)

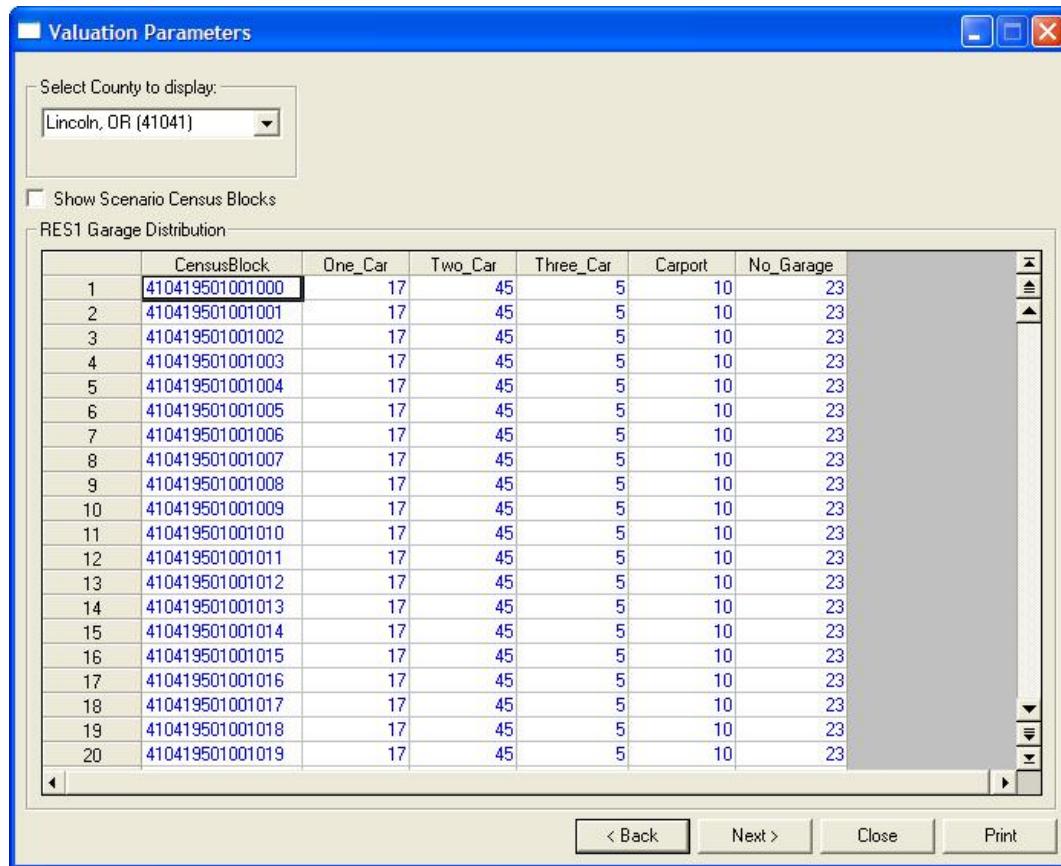


Figure 3-10: HAZUS Inventory Menu, General Building Stock Submenu, Valuation Parameters Dialog Stream, Single-Family Garage Distribution Dialog

- Selection of the Next> on the Location Factors dialog opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - The dialog does not have tabs.
 - The dialog does have a single combo box.
 - The dialog does not have radio buttons.
 - The dialog has check box for study case blocks.
 - The dialog has command buttons <Back, Next>, Close, and Print.

- f. The dialog has a single data grid that is not editable.
- b. The RES1 Garage Distribution dialog allows the user to view the distribution of RES1 garages as a percentage of the universe of structures in a given census block (therefore for each census block, the total percentage is 100).
- c. The data frame is labeled “RES1 Garage Distribution”.
- d. Data for the dialog is stored in the table hzCounty, hzTract, and hzCensusBlock.
- e. The data view is called absv_InvGbsValParmGarages. Displayed columns include Census Block, One_Car, Two_Car, Three_Car, Carport, and No_Garage. None of the data is editable and is displayed in blue.
- f. The columns add up to 100 representing 100% for any given census block (row).
- g. The dialog has a combo box labeled Select County to Display which allows the user to select from the counties within the study region (if multiple).
- h. The dialog has a check box allowing the user to display only those census blocks within an open study case. This check box is labeled “Show Scenario Census Blocks”. Default is unchecked thereby showing every census block in the study region to the user. See square footage dialog discussion for performance of the check box.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- j. Selection of <Back closes the Single-Family Garage Distribution dialog and open the Location Factors by County dialog.
- k. Selection of Next> closes the Single-Family Garage Distributions dialog and open RES1 Garage Replacement Cost dialog.
- l. Selection of Close closes the dialog.
- m. Selection of Print opens a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.3.4. Valuation Parameters Dialog Stream: RES1 Garage Replacement Cost Dialog (Dialog 4)

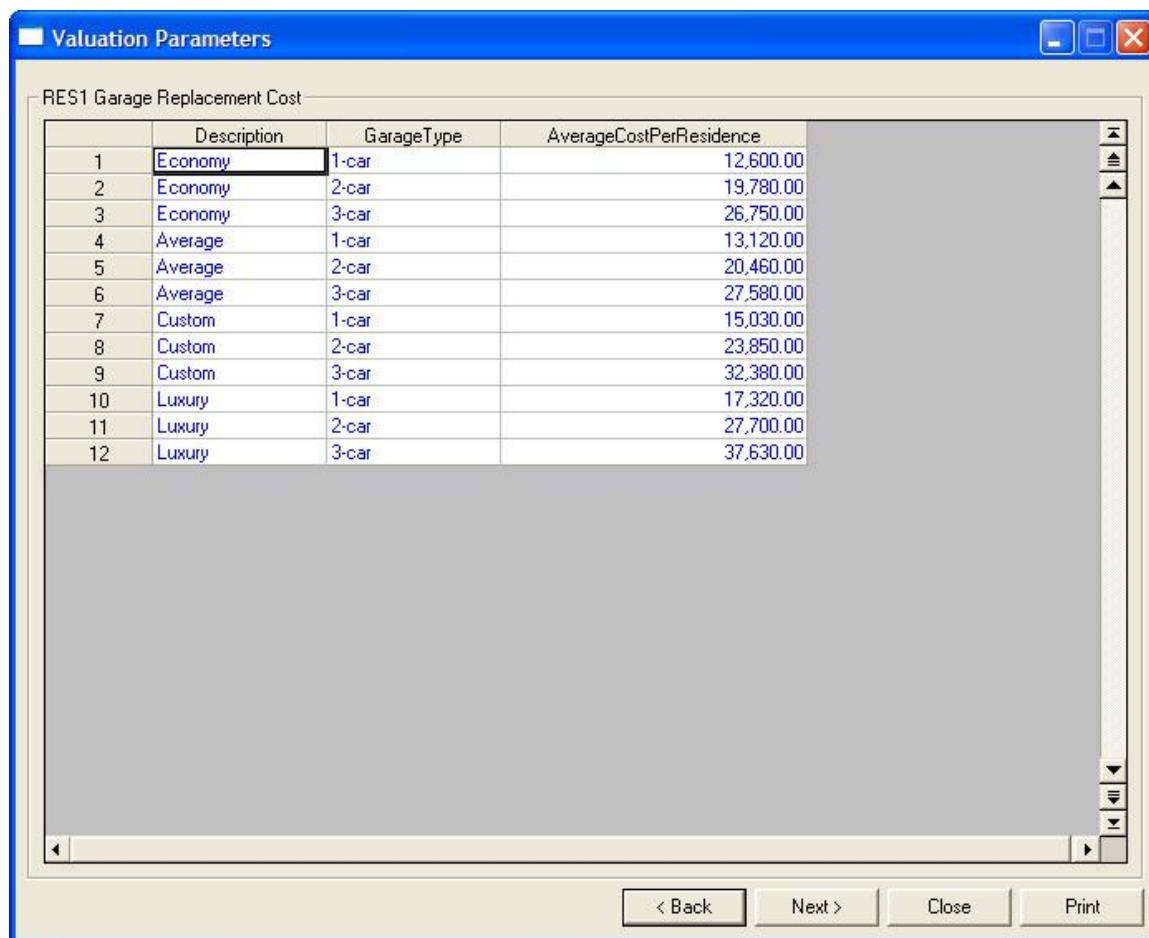


Figure 3-11: HAZUS Inventory Menu, General Building Stock Submenu, Valuation Parameters Dialog Stream, RES1 Garage Replacement Cost Dialog

- a. Selection of the Next> on the Garage Distribution dialog opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog does not have tabs.
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons <Back, Next>, Close, and Print.
 - f. The dialog has a single data grid that is not editable.
- b. The RES1 Garage Replacement Cost dialog allows the user to view the replacement factor for the various RES1garage types used in developing the HAZUS RES1 Valuation.
- c. The data frame is labeled “RES1 Garage Replacement Cost”.
- d. Data is located in the hzMeansCounstructSchemes and hzRES1GarageAdjustment tables.
- e. The data view is derived from absv_Res1GarageAdjustment. The dialog columns Includes Description, GarageType, and AverageCostPerResidence.
- f. Through the use of a right mouse click user shall access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- g. Selection of <Back closes the RES1 Garage Replacement Cost dialog and open the RES1 Garage Distribution dialog.
- h. Selection of Next> closes the RES1 Garage Replacement Cost dialog and open the RES1Basement Distribution dialog.
- i. Selection of Close closes the dialog.
- j. Selection of Print will open a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.3.5. Valuation Parameters Dialog Stream: RES1 Basement Distribution Dialog (Dialog 5)

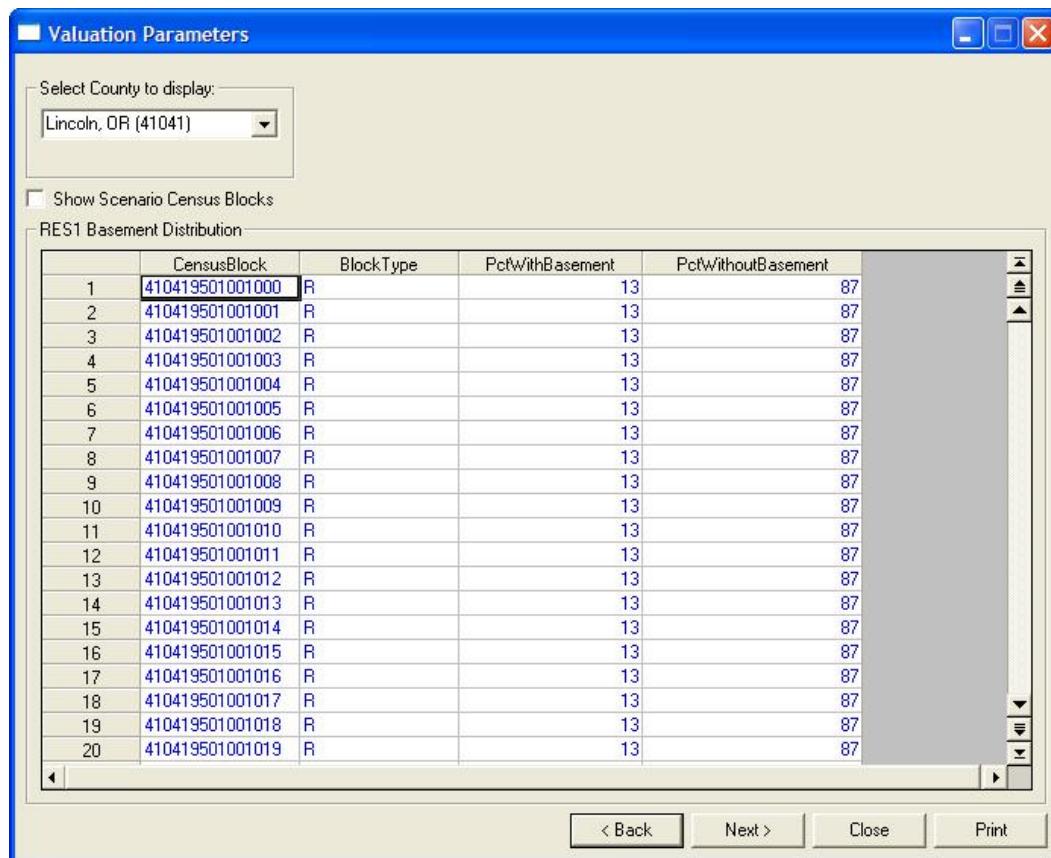


Figure 3-12: HAZUS Inventory Menu, General Building Stock Submenu, Valuation Parameters Dialog Stream, RES1 Basement Distribution Dialog

- a. Selection of the Next> on the RES1 Garage Replacement Cost dialog opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog does not have tabs.
 - b. The dialog has a single combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons <Back, Next>, Close, and Print.
 - f. The dialog has a single data grid that is not editable.
- b. This dialog displays the RES1 Basement distribution by census block for each county in the users study region. The dialog has a combo box that allows the user to select the county to be displayed (if multiple).
- c. The data is not editable and is displayed in blue text.
- d. The data frame is labeled “RES1 Basement Distribution”.
- e. Data for this dialog is stored in the table hzCensusBlock.
- f. The data view for this dialog is absv_InvGbsValParmBasement. Columns include CensusBlock, BlockType, PctWithBasement, PctWithoutBasement.
- g. The dialog has a check box allowing the user to display only those census blocks within an open study case. This check box is labeled “Show Scenario Census Blocks”. Default is unchecked thereby showing every census block in the study region to the user. See square footage dialog discussion for performance of the check box.
- h. The table shows the basement distribution in percentage for each census block. Each row shall add up to 100% for any given census block (row).
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- j. Selection of <Back closes the RES1 Basement Distribution dialog and open the RES1 Garage Distribution dialog.
- k. Selection of Next> closes the RES1 Basement Distribution dialog and open the Height Distribution dialog.
- l. Selection of Close closes the dialog.
- m. Selection of Print will open a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.3.6. Valuation Parameters Dialog Stream: Height Distribution Dialog and Single Family Tab

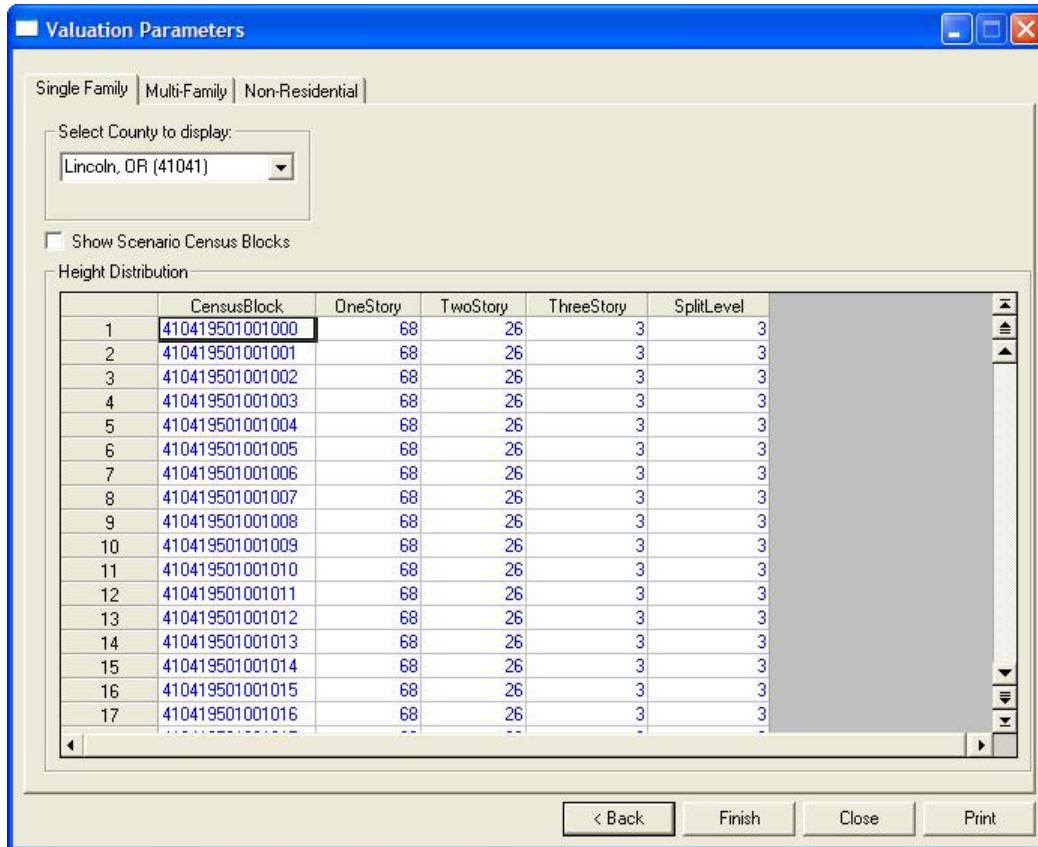


Figure 3-13: HAZUS Inventory Menu, General Building Stock Submenu, Valuation Parameters Dialog Stream, Height Distribution Dialog Single-Family Tab

- Selection of the Next> on the RES1 Basement Distribution dialog opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - The dialog has three tabs.
 - The dialog has a single combo box.
 - The dialog does not have radio buttons.
 - The dialog has a check box for study case blocks.
 - The dialog has command buttons <Back, Finish, Close, and Print.

- f. The dialog has a single data grid that is not editable.
- b. The dialog has three tabs labeled Single-Family, Multi-Family, and Non-Residential. The dialog defaults to the Single Family Tab.
- c. Data for the dialog is stored in the hzCounty, hzTract, and hzCensusBlock tables.
- d. The dialog for all three tabs has a pull down menu labeled Select County To Display that allows the user to select between counties within the study region.
- e. The dialog for all three tabs has a check box that allows the user to display only those census blocks within an open study case. The check box is labeled "Show Scenario Census Blocks." Default is unchecked thereby showing every census block in the study region to the user. Once a study case is open selection of this box change the display to show only those census blocks intersecting the flood depth grid boundaries for the study case.
- f. The dialog has the command buttons <Back, Finish, Close, and Print.
- g. The Single Family tab includes the columns Census Block, OneStory, TwoStory, ThreeStory, and SplitLevel. None of the data is editable and shall be displayed in blue.
- h. The data view for the Single Family tab is absv_Res1NumberStories.
- i. Each row adds up to 100% for any given census block (row).
- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- k. Selection of <Back closes the Height Distribution dialog and opens the RES1 Basement Distribution dialog.
- l. Selection of Finish closes the Height Distribution Dialog
- m. Selection of Close closes the dialog.
- n. Selection of Print will open a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.3.6.1. Valuation Parameters Dialog Stream Height Distribution Dialog, Multi-Family Tab

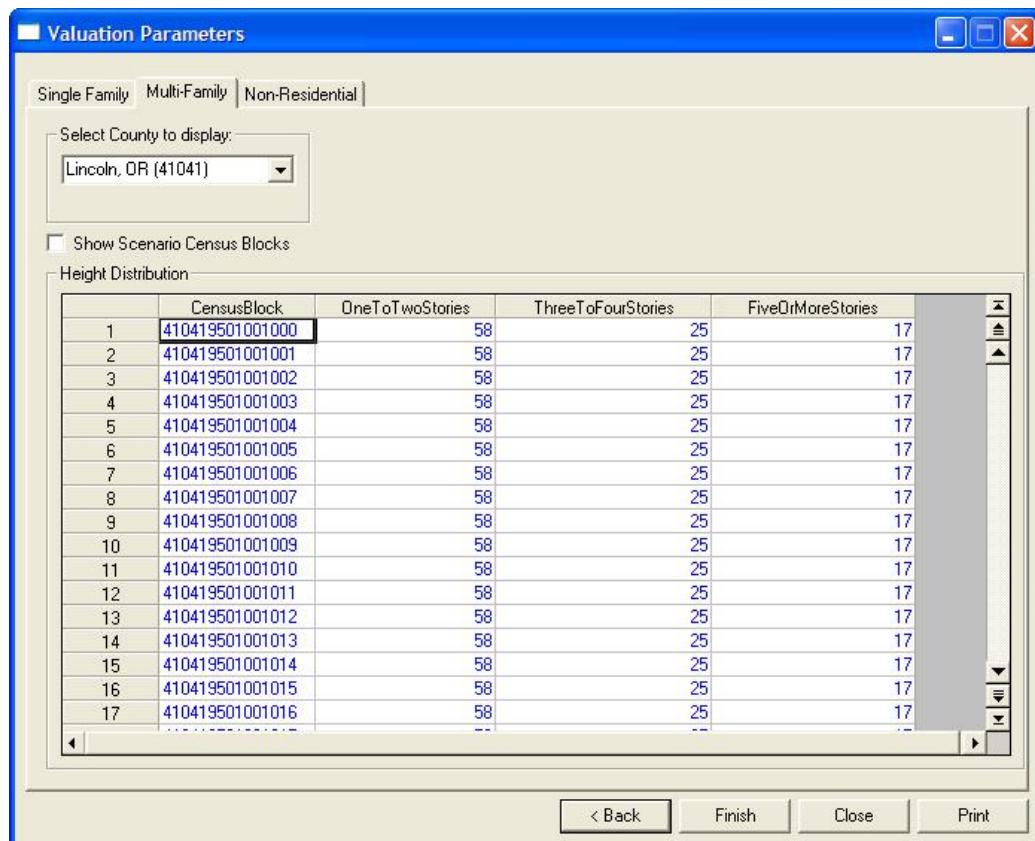


Figure 3-14: HAZUS Inventory Menu, General Building Stock Submenu, Valuation Parameters Dialog Stream, Height Distribution Dialog, Multi-Family Tab

- a. Selection of the Multi-Family Tab dialog opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:

- a. The dialog has three tabs.
 - b. The dialog has a single combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons <Back, Finish, Close, and Print.
 - f. The dialog has a single data grid that is not editable.
 - g. Changing tabs does not alter the function of the combo box (county selection), the check box (scenario census blocks), or command buttons.
-
- b. The Multi-Family tab includes columns CensusBlock, OneToTwo Stories, ThreeToFourStories, and FiveOrMoreStories. None of the data is editable and is displayed in blue.
 - c. The data view is absv_OtherResNumberStories.
 - d. The grid shows the distribution of number of stories for each census block as a percentage. Each row adds up to 100% for any given census block (row).
 - e. Through the use of a right mouse click user can access a submenu as noted in the table below (valid for all three tabs). Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- f. Selection of <Back closes the Height Distribution dialog and opens the RES1 Basement Distribution dialog.
- g. Selection of Finish closes the Height Distribution Dialog.
- h. Selection of Close closes the dialog.
- i. Selection of Print will open a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.3.6.2. Valuation Parameters Dialog Stream: Height Distribution Dialog, Non-Residential Tab

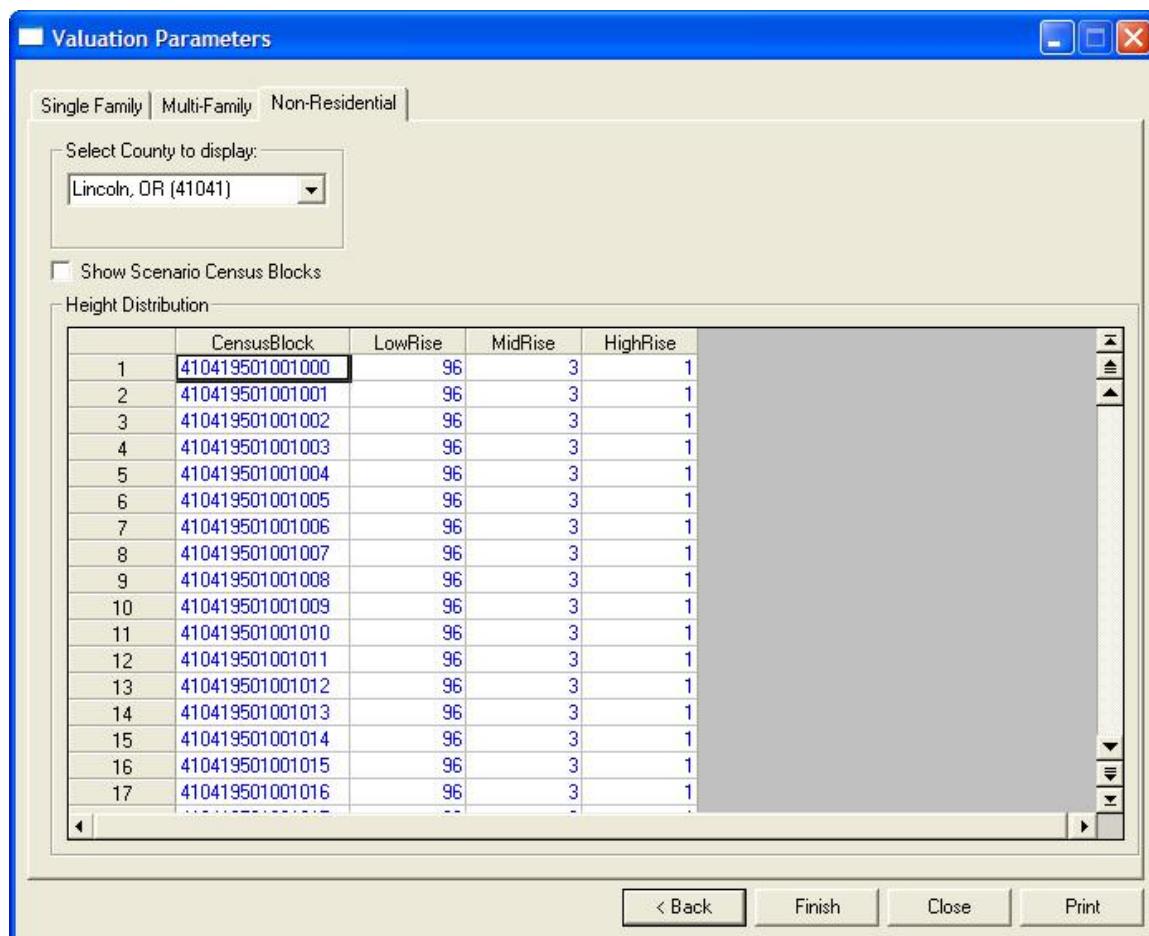


Figure 3-15: HAZUS Inventory Menu, General Building Stock Submenu, Valuation Parameters Dialog Stream, Number of Stories Distribution Dialog, Non Residential Tab

- a. Selection of the Non-Residential Tab dialog opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has three tabs.
 - b. The dialog has a single combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons <Back, Finish, Close, and Print.
 - f. The dialog has a single data grid that is not editable.
 - g. Changing tabs does not alter the function of the combo box (county selection), the check box (scenario census blocks), or command buttons.
- b. The Non-Residential tab includes columns labeled CensusBlock, LowRise, MidRise, and HighRise. None of the data is editable and shall be displayed in blue.
- c. The data is displayed as a distribution of the height within each census block. Each row adds up to 100% for any given census block (row).
- d. Through the use of a right mouse click user can access a submenu as noted in the table below (valid for all three tabs). Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- e. Selection of <Back closes the Height Distribution dialog and opens the RES1 Basement Distribution dialog.
- f. Selection of Finish closes the Height Distribution Dialog.
- g. Selection of Close closes the dialog.
- h. Selection of Print will open a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.4. Dollar Exposure (Replacement Value Dialog)

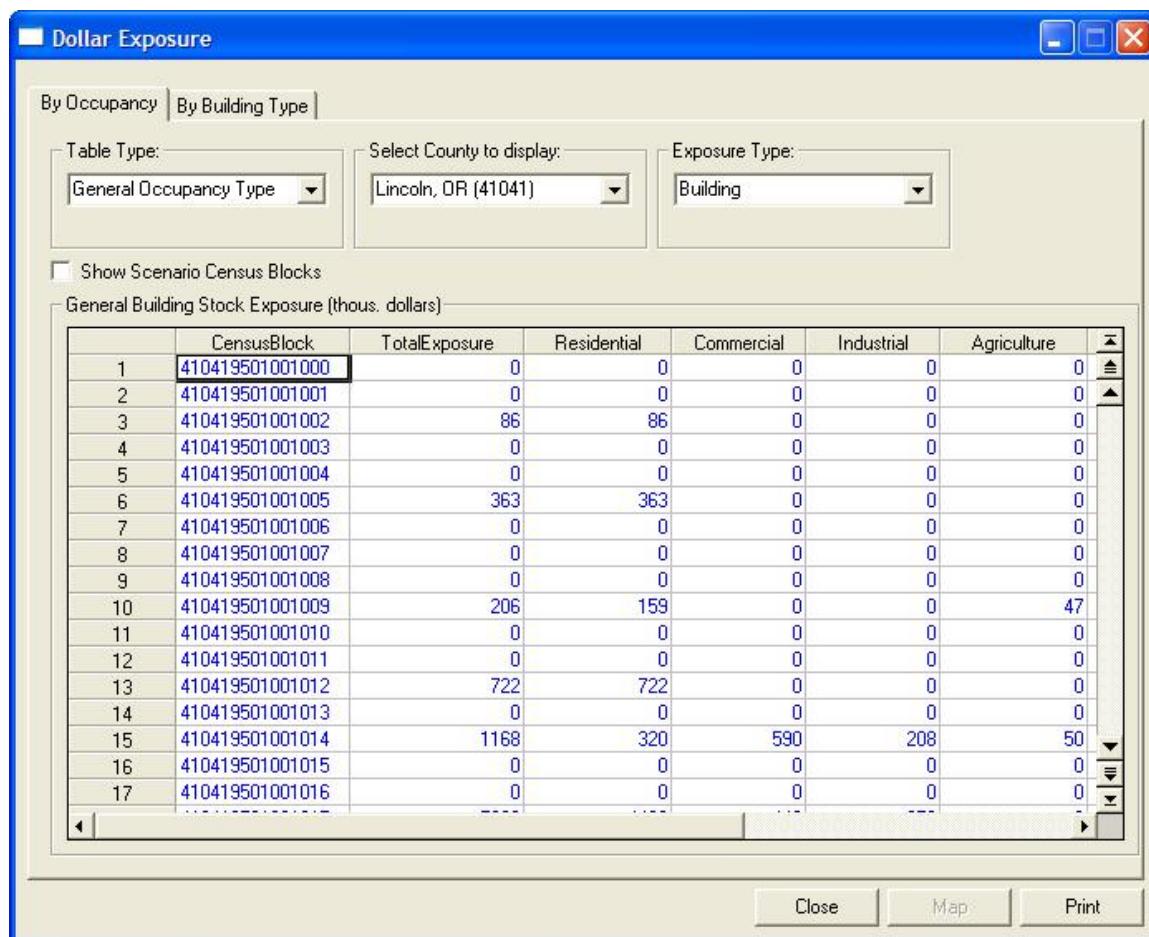


Figure 3-16: HAZUS Inventory Menu, General Building Stock Submenu, Dollar Exposure (Full Valuation) Dialog, By Occupancy Tab, General Occupancy Option

- a. Selection of the Dollar Exposure (Replacement Value) allows the user access to the estimated full replacement value of the study and opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has two tabs.
 - b. The dialog has three combo boxes.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is not editable.
- b. The dialog has two tabs labeled By Occupancy and By Building Type. The By Occupancy tab is the default.
- c. The By Occupancy tab dialog has three combo boxes labeled Table Type, Select County to Display, and Exposure Type. Combo boxes are available on both tabs.
 - a. The Table Type combo box allows the user to select between General Occupancy type and Specific Occupancy type. General Occupancy is the default value for the combo box.
 - b. The Exposure Type combo type to allow the user to view values for Building, Contents, and Total (the summation of the previous two items). Building is the default.
 - c. The County combo box allows the user to view any counties within the study region. Counties are sorted alphabetically, lowest value as the default.
- d. Data for the view is stored in the hzExposureOccupB table. All changes roll up to the flExposureOccupTotal table. Selection of Contents show values within the hzExposureContentOccupB. Selection of Total shows a summation of values from hzExposureOccupB and hzExposureContentOccupB.

- e. The views for the data grid on the General Occupancy Tab are as follows:

Table Type	Exposure Type	View Name
General Occupancy	Building	absv_InvGBSExposureBldgGOccup
General Occupancy	Content	absv_InvGBSExposureContentGOccup
General Occupancy	Total	absv_InvGBSExposureTotalGOccup
Specific Occupancy	Building	absv_InvGBSExposureBldgSOccup
Specific Occupancy	Content	absv_InvGBSExposureContentSOccup
Specific Occupancy	Total	absv_InvGBSExposureTotalSOccup

- f. The dialog has a check box that allows the user to display only those census blocks within an open study case. This is available regardless of which tab the user is viewing. Default is unchecked thereby showing the study region to the user. Once a study case is open selection of this box changes the display to show only those census blocks intersecting the flood depth grid boundaries for the study case.
- g. When viewing the data having selected the General Occupancy option, the grid columns include CensusBlock, TotalExposure, Residential, Commercial, Industrial, Agriculture, Religion, Government, and Education. All columns are non-editable and are displayed in blue text.
- h. When viewing the General Occupancy view, through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- i. Selection of Close closes the dialog.
- j. Selection of Map allows the user to perform a thematic map on a selected column within any of the three grids available from this dialog. If the user has not selected a column to map, the Map command button is disabled.
- k. Selection of Print opens a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.4.1. Dollar Exposure (Replacement Value) Occupancy Dialog, Building Exposure Type

The screenshot shows the 'Dollar Exposure' dialog box. At the top, there are two tabs: 'By Occupancy' (selected) and 'By Building Type'. Below the tabs are three dropdown menus: 'Table Type' (set to 'Specific Occupancy Type'), 'Select County to display' (set to 'Lincoln, OR (41041)'), and 'Exposure Type' (set to 'Building'). There is also a checkbox for 'Show Scenario Census Blocks' which is unchecked. The main area contains a table titled 'General Building Stock Exposure (thous. dollars)' with 17 rows of data. The columns are labeled: CensusBlock, TotalExposure, RES1, RES2, RES3A, RES3B, and RES3C. The data is as follows:

CensusBlock	TotalExposure	RES1	RES2	RES3A	RES3B	RES3C
1	410419501001000	0	0	0	0	0
2	410419501001001	0	0	0	0	0
3	410419501001002	86	67	18	1	0
4	410419501001003	0	0	0	0	0
5	410419501001004	0	0	0	0	0
6	410419501001005	363	0	0	0	0
7	410419501001006	0	0	0	0	0
8	410419501001007	0	0	0	0	0
9	410419501001008	0	0	0	0	0
10	410419501001009	206	122	35	2	0
11	410419501001010	0	0	0	0	0
12	410419501001011	0	0	0	0	0
13	410419501001012	722	555	159	8	0
14	410419501001013	0	0	0	0	0
15	410419501001014	1168	245	71	4	0
16	410419501001015	0	0	0	0	0
17	410419501001016	0	0	0	0	0

At the bottom of the dialog are three buttons: 'Close', 'Map', and 'Print'.

Figure 3-17: HAZUS Inventory Menu, General Building Stock Submenu, Dollar Exposure (Full Valuation) Dialog, By Occupancy Tab Specific Occupancy Option

- a. Selection of the Specific Occupancy item in the Table Type Combo box opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has two tabs.

- b. The dialog has three combo boxes.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. Data for this dialog is found in the tables HzExposureOccupB and hzExposureContentOccupB.
- c. The views for this dialog are shown in the prior section under the discussion of the By Occupancy tab.
- d. When viewing the data having selected the Specific Occupancy option, the grid columns shall be labeled CensusBlock, TotalExposure, RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1-COM10, IND1-IND6, REL, AGR, GOV1, GOV2, EDU1, and EDU2. All occupancy columns may be edited by the user and are in black text. Saved changes will automatically update the General Occupancy view. The user cannot edit the columns CensusBlock, and TotalExposure, which shall be in blue text as seen below
- e. When viewing the Specific Occupancy, through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	Y
Export	Y
Data Dictionary	Y
Meta Data*	Y

* Note: When looking at the Total Exposure Type the Meta Data is Not Enabled.

- f. Selection of Close closes the dialog.

- g. Selection of Map allows the user to perform a thematic map on a selected column within any of the three grids available from this dialog. If the user has not selected a column to map, the Map command button is disabled.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.4.2. Dollar Exposure (Replacement Value), Specific Occupancy Dialog, Content Exposure Type

The screenshot shows the 'Dollar Exposure' dialog box. At the top, there are two tabs: 'By Occupancy' (selected) and 'By Building Type'. Below the tabs are three dropdown menus: 'Table Type' (set to 'Specific Occupancy Type'), 'Select County to display' (set to 'Lincoln, OR (41041)'), and 'Exposure Type' (set to 'Contents'). There is also a checked checkbox for 'Show Scenario Census Blocks'. The main area contains a table titled 'General Building Stock Exposure (thous. dollars)' with 17 rows of data. The columns are labeled: CensusBlock, TotalExposure, RES1, RES2, RES3A, RES3B, and RES3C. The data is as follows:

CensusBlock	TotalExposure	RES1	RES2	RES3A	RES3B	RES3C
1	410419501001000	0	0	0	0	0
2	410419501001001	0	0	0	0	0
3	410419501001002	44	34	9	1	0
4	410419501001003	0	0	0	0	0
5	410419501001004	0	0	0	0	0
6	410419501001005	182	0	0	0	0
7	410419501001006	0	0	0	0	0
8	410419501001007	0	0	0	0	0
9	410419501001008	0	0	0	0	0
10	410419501001009	127	61	18	1	0
11	410419501001010	0	0	0	0	0
12	410419501001011	0	0	0	0	0
13	410419501001012	362	278	80	4	0
14	410419501001013	0	0	0	0	0
15	410419501001014	1047	123	36	2	0
16	410419501001015	0	0	0	0	0
17	410419501001016	0	0	0	0	0

At the bottom of the dialog are three buttons: 'Close', 'Map', and 'Print'.

Figure 3-18: HAZUS Inventory Menu, General Building Stock Submenu, Dollar Exposure (Full Valuation) Dialog, By Occupancy Tab Specific Occupancy Option

- a. Selection of the Specific Occupancy item in the Table Type Combo box and selection of Contents in the Exposure Type opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has two tabs.
 - b. The dialog has three combo boxes.

- c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. Data for this dialog is found in the tables HzExposureOccupB and hzExposureContentOccupB.
- c. The views for this dialog are shown in the prior section under the discussion of the By Occupancy tab.
- d. When viewing the data having selected the Specific Occupancy option, the grid columns shall be labeled CensusBlock, TotalExposure, RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1-COM10, IND1-IND6, REL, AGR, GOV1, GOV2, EDU1, and EDU2. All occupancy columns may be edited by the user and are in black text. Saved changes will automatically update the General Occupancy view. The user cannot edit the columns CensusBlock, and TotalExposure, which shall be in blue text as seen below
- e. When viewing the Specific Occupancy, through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	Y
Export	Y
Data Dictionary	Y
Meta Data*	Y

- f. Selection of Close closes the dialog.

- g. Selection of Map allows the user to perform a thematic map on a selected column within any of the three grids available from this dialog. If the user has not selected a column to map, the Map command button is disabled.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.4.3. Dollar Exposure (Replacement Value), Specific Occupancy Dialog, Total Exposure Type

CensusBlock	TotalExposure	RES1	RES2	RES3A	RES3B	RES3C
1	410419501001000	0	0	0	0	0
2	410419501001001	0	0	0	0	0
3	410419501001002	130	101	27	2	0
4	410419501001003	0	0	0	0	0
5	410419501001004	0	0	0	0	0
6	410419501001005	545	0	0	0	0
7	410419501001006	0	0	0	0	0
8	410419501001007	0	0	0	0	0
9	410419501001008	0	0	0	0	0
10	410419501001009	333	183	53	3	0
11	410419501001010	0	0	0	0	0
12	410419501001011	0	0	0	0	0
13	410419501001012	1084	833	239	12	0
14	410419501001013	0	0	0	0	0
15	410419501001014	2215	368	107	6	0
16	410419501001015	0	0	0	0	0
17	410419501001016	0	0	0	0	0

Figure 3-19: HAZUS Inventory Menu, General Building Stock Submenu, Dollar Exposure (Full Valuation) Dialog, By Occupancy Tab Specific Occupancy Option

- a. Selection of the Specific Occupancy item in the Table Type Combo box and selection of Contents in the Exposure Type opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has two tabs.
 - b. The dialog has three combo boxes.

- c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is not editable.
- b. Data for this dialog is found in the tables HzExposureOccupB and hzExposureContentOccupB.
- c. The views for this dialog are shown in the prior section under the discussion of the By Occupancy tab.
- d. When viewing the data having selected the Specific Occupancy option, the grid columns shall be labeled CensusBlock, TotalExposure, RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1-COM10, IND1-IND6, REL, AGR, GOV1, GOV2, EDU1, and EDU2. All occupancy columns may be edited by the user and are in black text. Saved changes will automatically update the General Occupancy view. The user cannot edit the columns CensusBlock, and TotalExposure, which shall be in blue text as seen below
- e. When viewing the Specific Occupancy, through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	N

- f. Selection of Close closes the dialog.

- g. Selection of Map allows the user to perform a thematic map on a selected column within any of the three grids available from this dialog. If the user has not selected a column to map, the Map command button is disabled.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.4.3.1. Dollar Exposure (Full Valuation) Dialog: By Building Type Tab

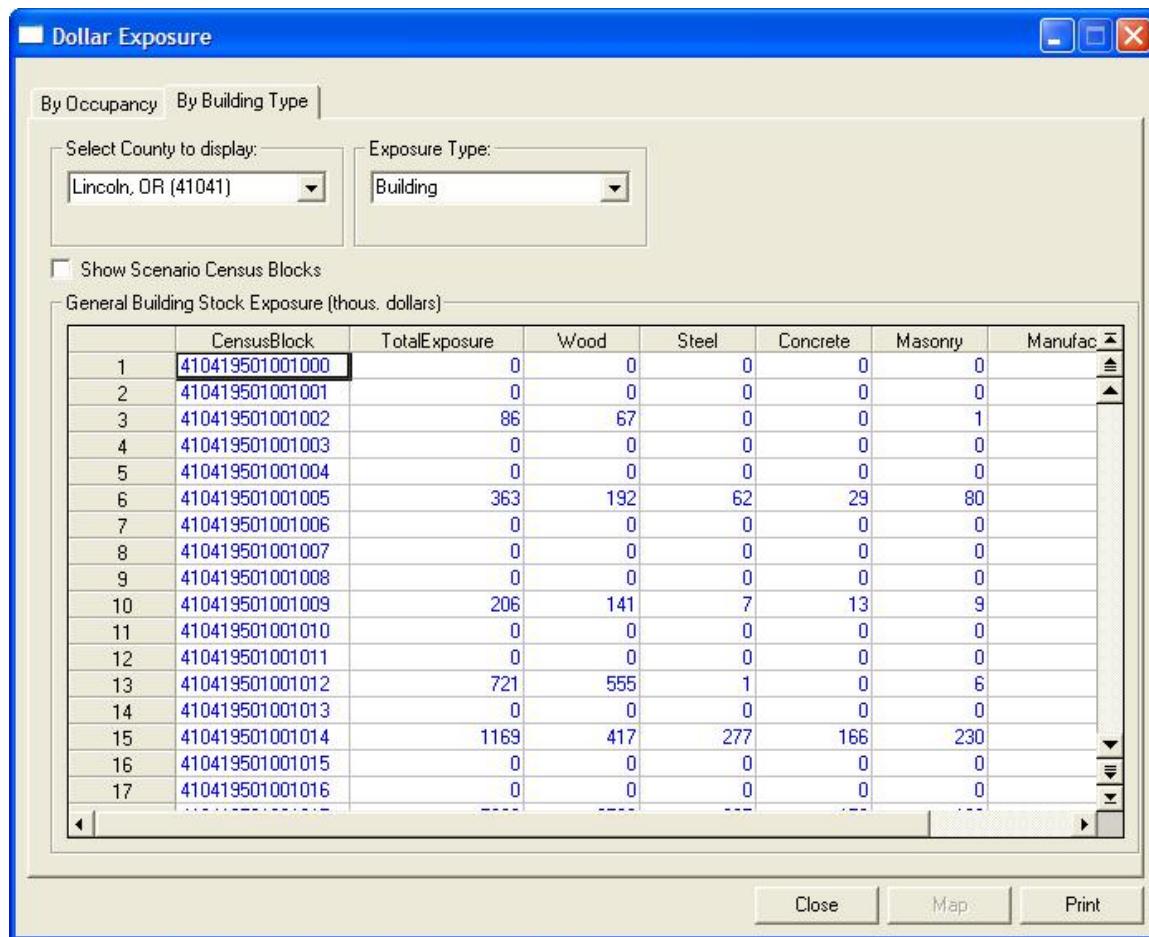


Figure 3-20: HAZUS Inventory Menu, General Building Stock Submenu, Dollar Exposure (Full Valuation) Dialog, By Building Type Tab

- a. Selection of the By Building Type Tab opens the dialog seen above. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has two tabs.
 - b. The dialog has two combo boxes.

- c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is not editable.
- b. The By Building Type tab has two combo boxes labeled County and Exposure Type.
- c. Data for the grid is stored in the tables 'hzExposureGBldgTypeB' and 'hzExposureContentGBldgTypeB'. Total (flExposureOccupTotal table) is a summation of both tables.
- d. The grid columns shall be labeled CensusBlock, TotalExposure, Wood, Steel, Masonry, Concrete, and ManufacturedHousing. The user cannot edit data displayed on the By Building Type tab and the data is displayed in blue text.
- e. The views for the data grid on the Building Type Tab are as follows:

Exposure Type	View Name
Building	absv_InvGBSExposureBldgGBldgType
Content	absv_InvGBSExposureContentGBldgType
Total	absv_InvGBSExposureTotalGBldgType

- f. Through the use of a right mouse click user can access a submenu as noted in the table below (valid for all selections in the Exposure Type combo). Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.5.3.1.5. Depreciation Parameters Dialog Stream

- Selection of the Depreciation Parameters menu item opens a stream of dialogs discussed in the following sections. The user can view the data used to create the depreciation valuation table.
- The user can modify the Depreciation functions in the second dialog.
- The Depreciation Exposure table is preprocessed for quicker response time by the models.

3.2.5.3.1.5.1. Depreciation Parameters Dialog Stream: Median Age for Depreciation Dialog (1of 2)

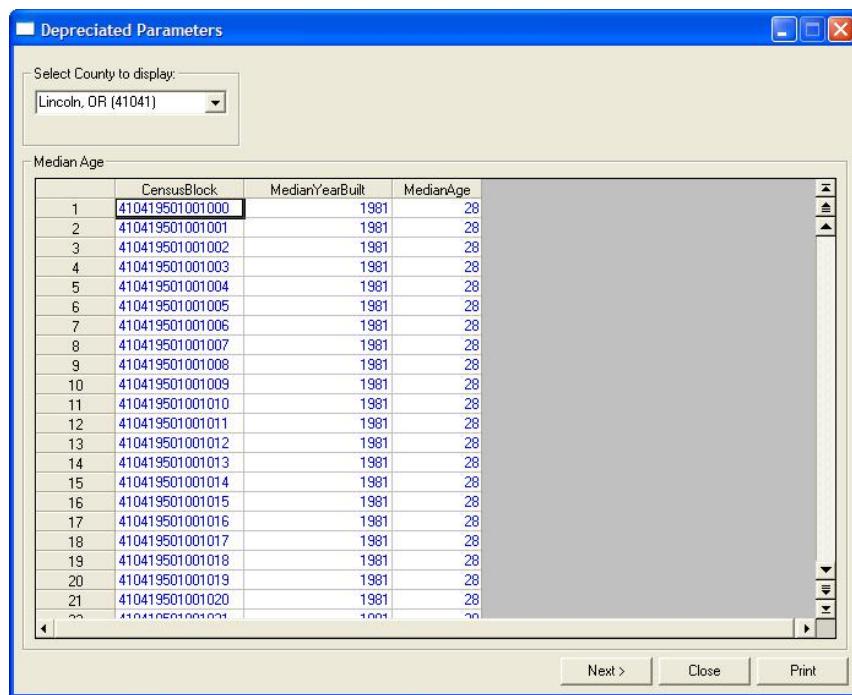


Figure 3-21: HAZUS Inventory Menu, General Building Stock Submenu, Depreciation Parameters Dialog Stream, Median Age Dialog

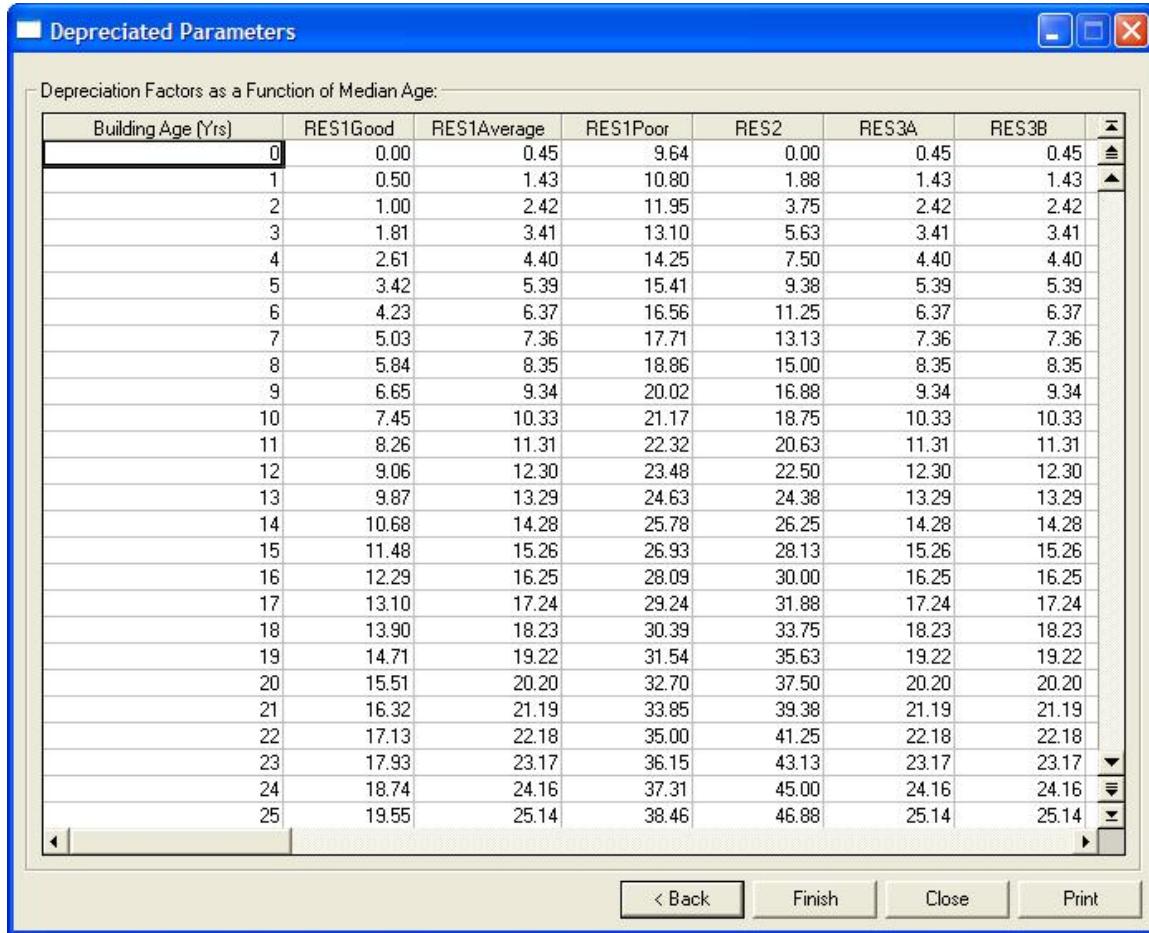
- Selection of the Depreciation Parameters submenu opens the Median Age dialog seen above. This dialog allows the user to view the calculated median age of each census block within the study region. This is a standard HAZUS dialog with exceptions as noted:
 - The dialog has no tabs.
 - The dialog has one combo box.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Next>, Close, and Print.
 - f. The dialog has a single data grid that is not editable.
- b. The data for the table is stored in the hzDemographicsB table.
- c. The data in the grid is displayed using the absv_DepParmCBMedianAge view.
- d. The dialog has a single combo box that allows the user to select and view the median age for any given county within the study region. Counties are ordered alphabetically with the “lowest” value being the default parameter.
- e. The dialog shall display the data in a grid format. The grid columns shall be labeled CensusBlock, MedianYearBuilt, and Median Age.
- f. The values within the dialog are not editable since they are developed directly from the US census data. The values are displayed in blue text.
- g. The Median Age column is processed by HAZUS. The flood model uses the system clock to identify the current year and subtract the system clock from the MedianYearBuilt to determine values in the MedianAge column.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below (valid for all selections in the Exposure Type combo). Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- i. Selection of Next> closes the Median Age dialog and open the Depreciation Functions dialog.
- j. Selection of Close closes the dialog.
- k. Selection of Print opens a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.5.2. Depreciation Parameters Dialog Stream: Depreciation Functions Dialog (2 of 2)



The screenshot shows a Windows-style dialog box titled "Depreciated Parameters". The main title bar says "Depreciation Factors as a Function of Median Age:". Below this is a table with 26 rows, each representing a building age in years from 0 to 25. The columns represent different depreciation functions: RES1Good, RES1Average, RES1Poor, RES2, RES3A, and RES3B. The first row (age 0) has values 0.00, 0.45, 9.64, 0.00, 0.45, and 0.45 respectively. Subsequent rows show increasing values for all functions as age increases. At the bottom of the dialog are buttons for < Back, Finish, Close, and Print.

Building Age (Yrs)	RES1Good	RES1Average	RES1Poor	RES2	RES3A	RES3B
0	0.00	0.45	9.64	0.00	0.45	0.45
1	0.50	1.43	10.80	1.88	1.43	1.43
2	1.00	2.42	11.95	3.75	2.42	2.42
3	1.81	3.41	13.10	5.63	3.41	3.41
4	2.61	4.40	14.25	7.50	4.40	4.40
5	3.42	5.39	15.41	9.38	5.39	5.39
6	4.23	6.37	16.56	11.25	6.37	6.37
7	5.03	7.36	17.71	13.13	7.36	7.36
8	5.84	8.35	18.86	15.00	8.35	8.35
9	6.65	9.34	20.02	16.88	9.34	9.34
10	7.45	10.33	21.17	18.75	10.33	10.33
11	8.26	11.31	22.32	20.63	11.31	11.31
12	9.06	12.30	23.48	22.50	12.30	12.30
13	9.87	13.29	24.63	24.38	13.29	13.29
14	10.68	14.28	25.78	26.25	14.28	14.28
15	11.48	15.26	26.93	28.13	15.26	15.26
16	12.29	16.25	28.09	30.00	16.25	16.25
17	13.10	17.24	29.24	31.88	17.24	17.24
18	13.90	18.23	30.39	33.75	18.23	18.23
19	14.71	19.22	31.54	35.63	19.22	19.22
20	15.51	20.20	32.70	37.50	20.20	20.20
21	16.32	21.19	33.85	39.38	21.19	21.19
22	17.13	22.18	35.00	41.25	22.18	22.18
23	17.93	23.17	36.15	43.13	23.17	23.17
24	18.74	24.16	37.31	45.00	24.16	24.16
25	19.55	25.14	38.46	46.88	25.14	25.14

Figure 3-22: HAZUS Inventory Menu, General Building Stock Submenu, Depreciation Parameters Dialog Stream, Depreciation Functions Dialog

- a. Selection of Next> on the Median Age dialog opens the Median Age dialog seen above. This dialog allows the user to view and edit the depreciation functions used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:

- a. The dialog has no tabs.
 - b. The dialog does not have combo boxes.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons <Back, Next>, Close, and Print.
 - f. The dialog has a single data grid that is editable.
-
- b. The Depreciation Functions dialog allows the user to access to the Depreciation Functions by occupancy.
 - c. Data for this dialog is stored in the table fIDepFunction.
 - d. The data grid displays data from the view absv_DepFunction
 - e. The dialog shows data in a grid format. The columns are labeled BuildingAge(Yrs), RES1Good, RES1Average, RES1Poor, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, AGR1, REL1, GOV1, GOV2, EDU1, EDU2.
 - f. Through the use of a right mouse click user can access a submenu as noted in the table below (valid for all selections in the Exposure Type combo). Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- g. Selection of <Back closes the Depreciation Functions dialog and open the Median Age dialog.
- h. Selection of Finish closes the Depreciation Functions dialog and automatically launches any necessary recalculations using the valuations parameters to establish the depreciated dollar exposure table used within the study region.
- i. Selection of Close closes the dialog. If the user has made modifications to the tables the user is queried as to whether or not they would like to save the changes. If they select OK, a standard save dialog will open. Changes will be applied throughout the study region. If they select no, the dialog closes without saving changes.
- j. Selection of Print opens a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.6. Deprecated Exposure Dialog

3.2.5.3.1.6.1. Deprecated Exposure Dialog By Occupancy Tab and General Occupancy Option

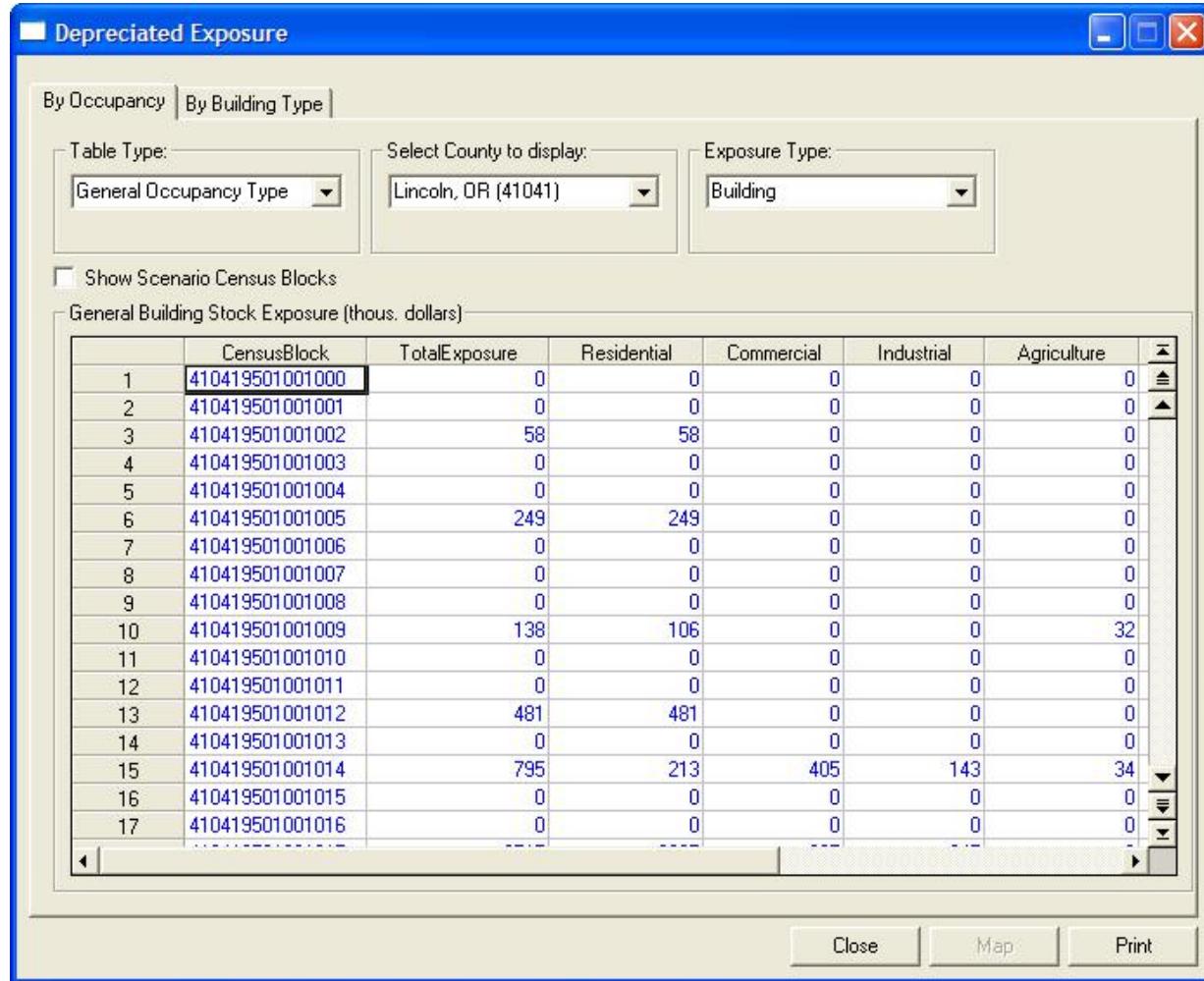


Figure 3-23: HAZUS Inventory Menu, General Building Stock Submenu, Deprecated Exposure Dialog and By Occupancy Tab, By General Occupancy Type Option

- Selection of the Deprecated Exposure allows the user access to the estimated depreciated exposure of buildings within the study region. This dialog allows the user to view and edit the depreciation functions used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
 - The dialog has two tabs.

- b. The dialog has three combo boxes.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is not editable (when on the default General Occupancy Table Type).
- b. Data for the tables are stored in the datatables ‘fIDepExposureOccupB’, ‘fIDepExposureContentOccupB’, and ‘fIDepExposureOccupTotal’.
 - c. The dialog shall have tabs labeled By Occupancy and By Building Type. The By Occupancy tab shall be the default.
 - d. When viewing the By Occupancy dialog, the three combo boxes are labeled Table Type, Select County to Display, and Exposure Type.
 - a. The Table Type combo box allows the user to change the view from General Occupancy and Specific Occupancy.
 - b. The County combo box allows the user to view any counties within the study region. Counties shall be sorted alphabetically, lowest value as the default.
 - c. The Exposure Type combo box allows the user to change the view to display building, content or total (the summation of values for Buildings and Contents two items). Depreciated exposure values. Building shall be the default.
 - e. The views for the data grid on the General Occupancy Tab are as follows:

Table Type	Exposure Type	View Name
General Occupancy	Building	absv_InvGBSDepExposureBldgGOccup
General Occupancy	Content	absv_InvGBSDepExposureContentGOccup
General Occupancy	Total	absv_InvGBSDepExposureTotalGOccup
Specific Occupancy	Building	absv_InvGBSDepExposureBldgSOccup

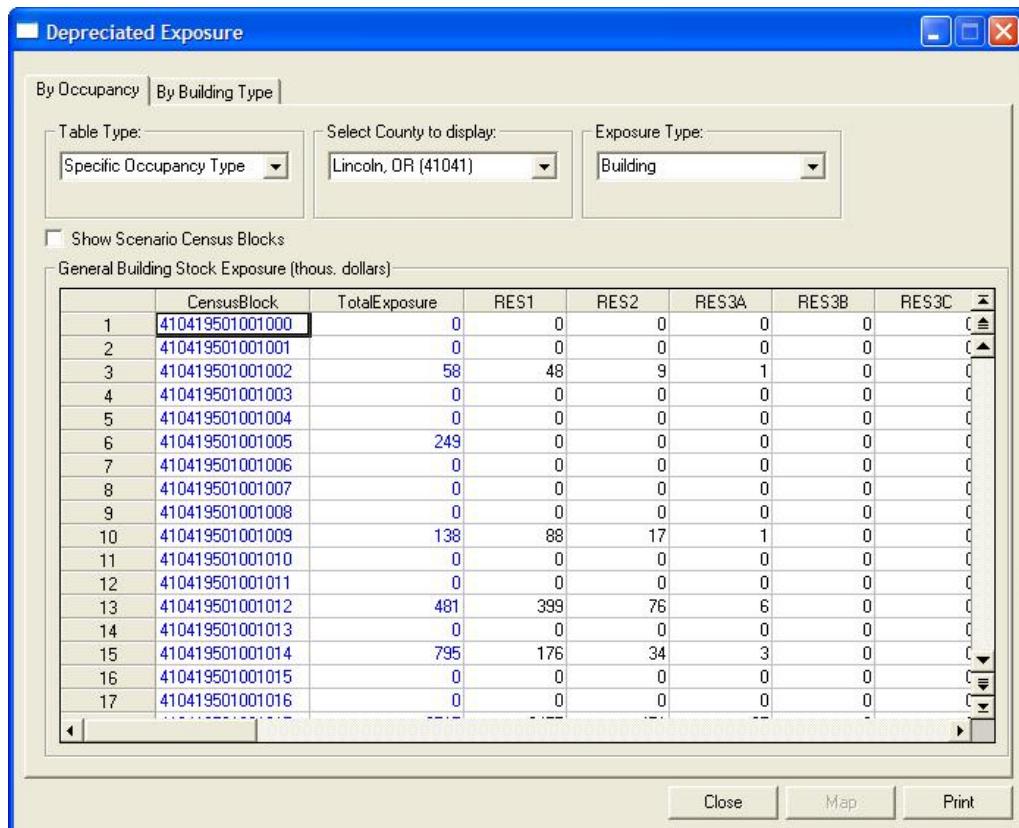
Table Type	Exposure Type	View Name
Specific Occupancy	Content	absv_InvGBSDepExposureContentSOccup
Specific Occupancy	Total	absv_InvGBSDepExposureTotalSOccup

- f. The dialog for both tabs has a check box that allows the user to display only those census blocks within an open study case. Default is unchecked thereby showing the study region to the user. Once a study case is open selection of this box shall change the display to show only those census blocks intersecting the flood depth grid boundaries for the study case.
- g. Both tabs of the dialog have the command buttons Close, Map, and Print.
- h. When viewing the General Occupancy Type, selection of Close closes the dialog.
- i. The Map command button is disabled until the user selects a column to map. Selection of Map allows the user to perform a thematic map on the selected column.
- j. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- k. When viewing the data for the General Occupancy Table Type, the grid columns shall be labeled CensusBlock, TotalExposure, Residential, Commercial, Industrial, Agriculture, Religion, Government, and Education. The General Occupancy data is not editable and is displayed in blue text.
- l. When viewing General Occupancy data, through the use of a right mouse click user can access a submenu as noted in the table below (valid for the Building and Contents Selections in the Exposure Type Combo). Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

Note that Meta Data is disabled when viewing Total in the Exposure Type

3.2.5.3.1.6.2. Deprecated Exposure Dialog By Occupancy Tab, and By Specific Occupancy Option



**Figure 3-24: HAZUS Inventory Menu, General Building Stock Submenu
Deprecated Exposure Dialog By Occupancy Tab and By Specific Occupancy Option**

- Selection of the Specific Occupancy Type in the Table Type combo box opens the dialog shown in Figure 3-24. This dialog has the same look and feel as the General Occupancy Type discussed above with noted exceptions.

- b. (Specific Occupancy) The grid columns shall be labeled CensusBlock, TotalExposure, RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1-COM10, IND1-IND6, REL, AGR, GOV1, GOV2, EDU1, and EDU2. When the Exposure Type selection is either Building or Contents, the user can edit all columns with the exception of the Census Block Column, which shall be in blue.
- c. (Specific Occupancy) Through the use of a right mouse click user can access a submenu as noted in the table below (valid for the Building and Contents Selections in the Exposure Type Combo). Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

Note that Meta Data is disabled when viewing Total in the Exposure Type

- d. (Specific Occupancy) Selection of Close closes the dialog. If the user has made modifications to the specific occupancy data tables the user is queried as to whether or not they would like to save the changes. If they select OK, a standard save dialog opens. Changes will be applied throughout the study region. If they select no, the dialog closes without saving changes.
- e. (Specific Occupancy) The Map command button is disabled until the user selects a column to map. Selection of Map allows the user to perform a thematic map on the selected column.
- f. (Specific Occupancy) Selection of Print opens a standard print dialog and allows the user to print the entire table.

3.2.5.3.1.6.3. Depreciated Exposure Dialog: By Building Type Tab

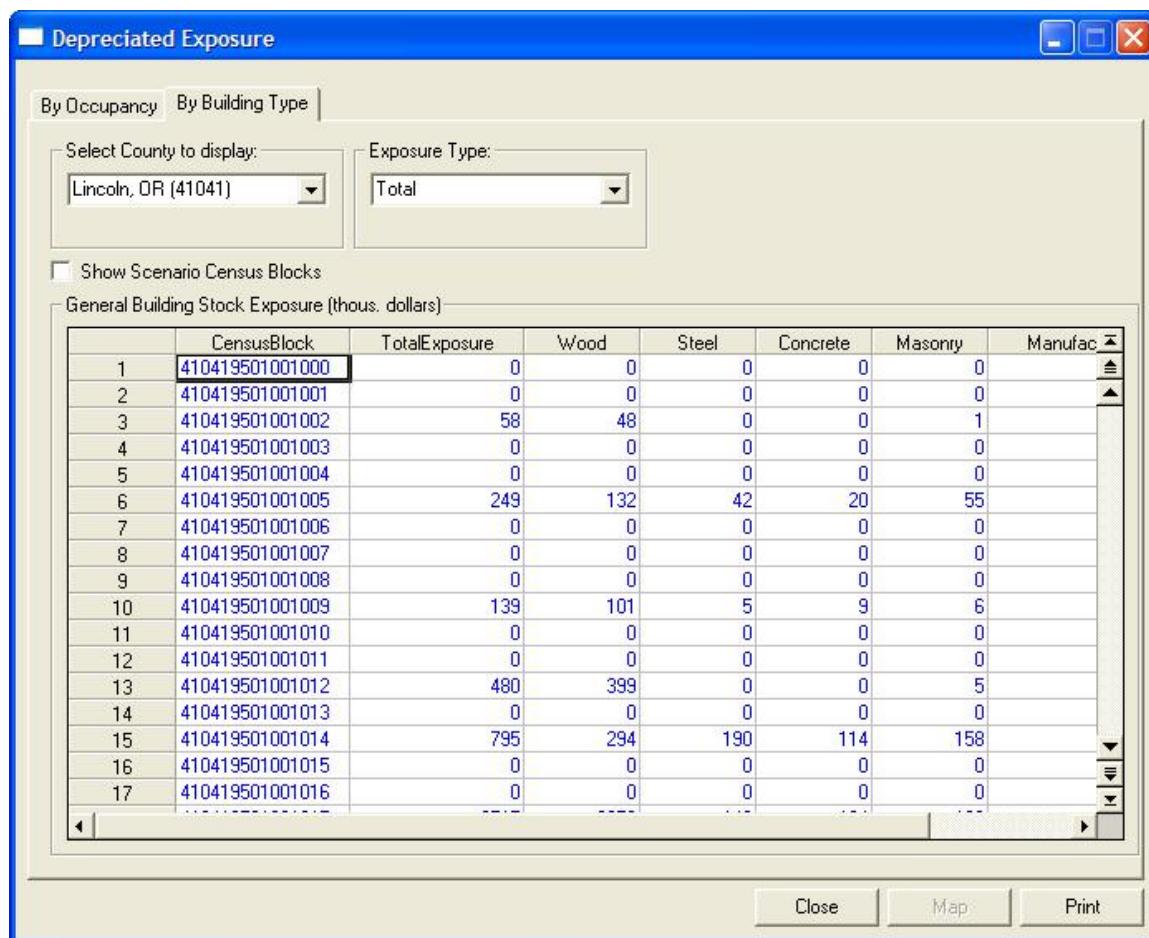


Figure 3-25: HAZUS Inventory Menu, General Building Stock Submenu, Dollar Exposure (Depreciated Valuation) Dialog, By Building Type Tab

- a. Selection of the By Building Type tab on the Depreciated Exposure dialog allows the user access to the estimated depreciated exposure of buildings within the study region. This dialog allows the user to view and edit the depreciation functions used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has two tabs.
 - b. The dialog has two combo boxes.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.

- e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is not editable.
- b. The By Building Type tab has two combo boxes labeled Select County to Display and Exposure Type.
- c. Data for this table is stored in the data tables ‘fIDepExposureGBldgTypeB’ and ‘fIDepExposureContentGBldgTypeB’. Total (fIDepExposureGBldgTypeTotal) is the summation of the two tables.
- d. The views for the data grid on the Building Type Tab are as follows:

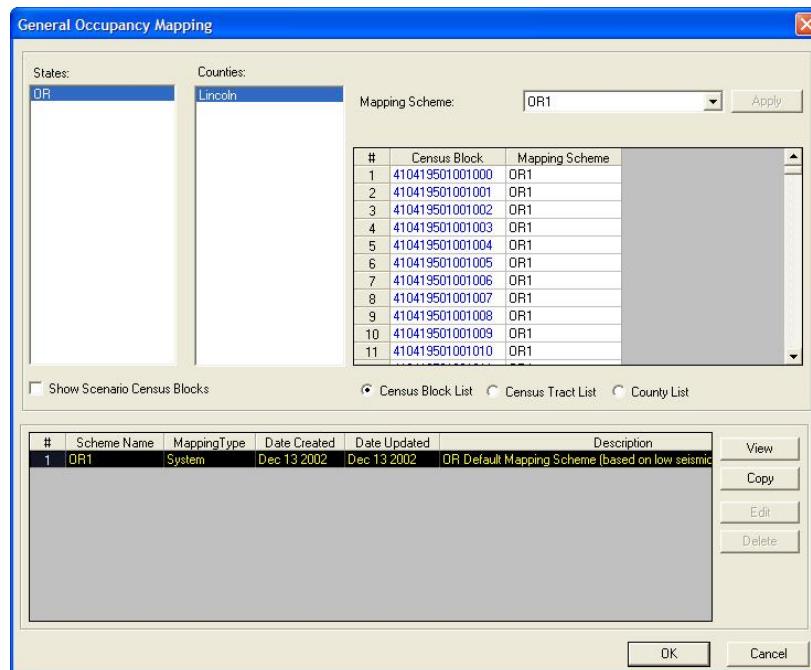
Exposure Type	View Name
Building	absv_InvGBSDepExposureBldgGBldgType
Content	absv_InvGBSDepExposureContentGBldgType
Total	absv_InvGBSDepExposureTotalGBldgType

- e. The By Building Type tab has the check box as discussed in Section 3.2.5.3.1.6
- f. The grid columns are labeled CensusBlock, TotalExposure, Wood, Steel, Masonry, Concrete, and ManufacturedHousing. The grid is non-editable and shall be in blue text.
- g. Selection of Close shall close the dialog.
- h. The Map command button is disabled until the user selects a column to map. Selection of Map allows the user to perform a thematic map on the selected column.
- i. Selection of Print will open a standard print dialog and allows the user to print the entire table.
- j. Through the use of a right mouse click user can access a submenu as noted in the table below (valid for all Selections in the Exposure Type Combo). Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.5.3.1.7. General Occupancy Mapping Dialog

- a. In the prior version of this document, the following discussion was noted. It is retained for historical tracking purposes, but this version of the document reflects the completed dialogs and some of this discussion is no longer relevant.
- b. This dialog stream replaces the Dollar Exposure Dialog Stream discussed in the Flood Model PRD (September 2001). These modifications were made to ensure dialog compatibility with the other software contractors.



**Figure 3-26: HAZUS Inventory Menu, General Building Stock Submenu,
General Occupancy Mapping Dialog**

- a. Selection of the General Occupancy Mapping on the General Building Stock submenu opens the dialog shown in Figure 3-26. This dialog allows the user to view, and potentially edit the building type distribution for each census block within the study region. This is not a standard HAZUS dialog and has the following primary features:
- a. The dialog has no tabs.
 - b. The dialog has one combo box.
 - c. The dialog has three radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has four data grids, two that are not editable, one that is tied to the combo box and one that displays all available mapping schemes.
 - f. The dialog has command buttons Apply (near the combo box) View, Copy, Edit, Delete (all located near the available mapping scheme grid) and OK and Cancel (located at the base of the dialog).
- b. The data for this dialog is stored in the tables ‘hzCensusBlock’, ‘f1StudyCaseBlocks’, ‘hzTract’, and ‘hzCounty’, ‘hzGenBldgSchemes’.
- c. This dialog does not utilize database views.
- d. The first data grid is not editable and displays the states within the users study region (if more than one). The data is displayed using the two letter abbreviation.
- e. The second data grid is not editable and displays the Counties within the users study region. The County’s full name is displayed.
- f. The third data grid is linked to the Radio Buttons and the Combo box. The grid displays two columns.
- g. The first column is not editable and displays the values selected in the radio buttons.

- h. The second column is editable but is linked to the Combo Box above. The user can replace the value in the column by selecting an alternate value in the combo box and hitting the Apply button, which becomes enabled.
- i. The Combo box is labeled Mapping Scheme and has the Apply command button to the right. The combo box allows the user to view and apply mapping schemes to census blocks, tracts, or county displayed in the data grid immediately below it.
- j. The Apply command button is disabled until the user selects a Census Block, Tract or County in the data grid below. Selection of Apply will apply the mapping scheme selected in the combo box to that Census Block, Census Tract, or County.
- k. Radio Buttons are labeled Census Block List, Census Tract List, and County List.
- l. Selection of Census Block List (default) shows the census blocks within the users study region and associated mapping schemes in the third data grid. Changes made by the user at the census block level will show a NULL value in the associated census tract and county if the user changes the view.
- m. Selection of Census Tract List shows the census tracts within the users study region and associated mapping schemes in the third data grid. Changes in the mapping scheme for a tract are processed down to all census blocks within the tract. The County mapping scheme is set to NULL to reflect the change.
- n. Selection of the County List shows the counties within the user study region and the associated mapping schemes in the third data grid. Changes at the county level will be processed to all Census Tracts and Blocks within the county.
- o. The fourth data grid displays the General Mapping Scheme applied to the counties within the study region. The default mapping scheme can be viewed but not edited.
- p. To create a new mapping scheme the user is required to Copy and name a new scheme that can then be edited and applied to the Blocks, Tracts or Counties.
- q. Grid Columns are labeled Scheme Name, MappingType, Date Created, Date Updated, and Description.

- r. A check box labeled Show Scenario Census Blocks filters the information in the third data grid so the user can work only with the census blocks of interest.
- s. Typical dialog controls such as the CTRL-SHIFT-Left Click (to view the HAZUS debugging information) and the Right mouse click to view the meta-data information are disabled for these dialogs.
- t. Selection of View opens a dialog that allows the user to view the mapping scheme information (see discussion below).
- u. Selection of Copy opens a dialog to name and create a copy of the selected mapping scheme (see discussion below).
- v. Selection of Edit allows the user to edit a user created mapping scheme. Default mapping schemes cannot be edited or deleted (see discussion below). The Edit command button is only enabled when the user selects a User Defined Mapping scheme in the fourth data grid.
- w. Selection of Delete allows the user to remove a user created mapping scheme. Any census blocks, tracts, or counties assigned that mapping scheme will automatically be reset to the default mapping scheme. Selection of Delete opens a standard dialog asking the user if they are sure about the request.
- x. Selection of OK closes the dialog.
- y. Selection of Cancel closes the dialog.

3.2.5.3.1.7.1. General Occupancy Mapping, General Building Type Mapping Scheme Distribution

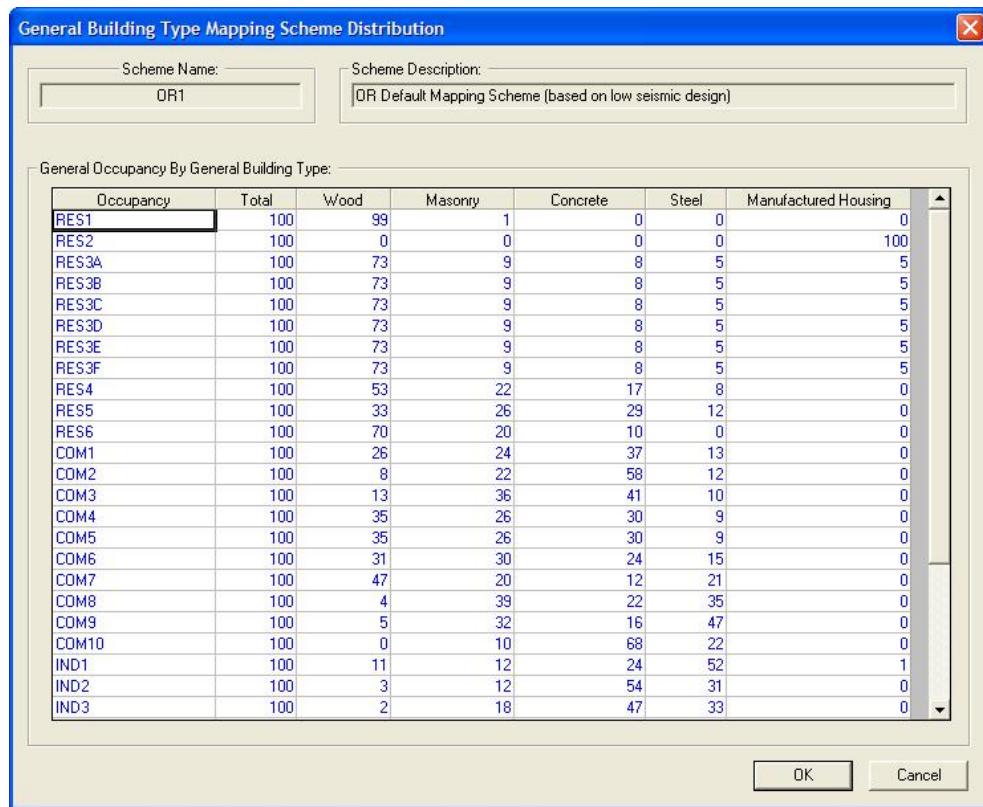
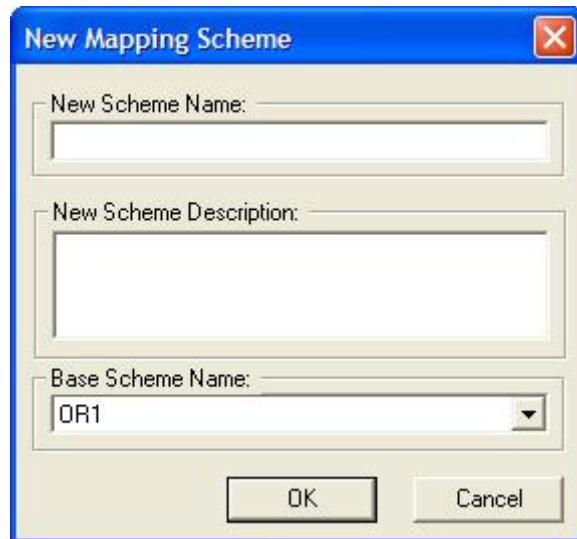


Figure 3-27: HAZUS Inventory Menu, General Building Stock Submenu, General Occupancy Mapping, General Building Type Mapping Scheme Distribution

- a. Selection of the command button View displays the dialog above. The dialog is not a standard HAZUS dialog and is designed as follows:
 - a. The dialog has two display boxes that show the Scheme Name and the Scheme Description (information from the prior dialog).
 - b. The dialog has a single data grid that shows the building distribution by occupancy. The data grid is not editable and displayed in blue text.
 - c. The dialog has command buttons OK and Cancel.
- b. The data for this dialog is stored in the tables ‘clSOccupancy’, ‘hzGenBldgScheme’, ‘hzGenBldgSchemes’.

- c. This dialog does not utilize database views.
- d. The data grid has columns labeled Occupancy, Total, Wood, Masonry, Concrete, Steel, and Manufactured Housing. The total column is the total of the other columns (Wood through Manufactured Housing). Each occupancy total must equal 100 percent.
- e. Selection of OK closes the dialog and returns the user to the General Occupancy Mapping dialog.
- f. Selection of Cancel closes the dialog and returns the user to the General Occupancy Mapping dialog.
- g. Typical dialog controls such as the CTRL-SHIFT-Left Click (to view the HAZUS debugging information) and the Right mouse click to view the metadata information are disabled for these dialogs.

3.2.5.3.1.7.2. General Occupancy Mapping, New Mapping Scheme Dialog



**Figure 3-28: HAZUS Inventory Menu, General Building Stock Submenu,
General Occupancy Mapping, New Mapping Scheme Dialog**

- a. Selection of the command button Copy on the General Occupancy Mapping dialog displays the dialog above. The dialog is not a standard HAZUS dialog and designed as follows:
 - a. The dialog has two input boxes that are editable by the user.

- b. The dialog has a single combo box that allows the user to select the Base Scheme Name (default is the default mapping scheme).
 - c. The dialog has command buttons OK and Cancel.
- b. The user is required to provide a New Scheme Name. The Scheme Name is limited to 10 characters (numbers and special characters allowed).
- c. The user can complete the optional information in the New Scheme Description.
- d. Selection of OK creates the new user defined mapping scheme and returns the user to the General Occupancy Mapping dialog. The user will see the newly created scheme in the fourth data grid. The new scheme is displayed in black text and is completely editable by the user.
- e. Selection of Cancel closes the dialog and returns the user to the General Occupancy Mapping dialog.

3.2.5.3.1.7.3. General Occupancy Mapping, Edit Mapping Scheme Dialog

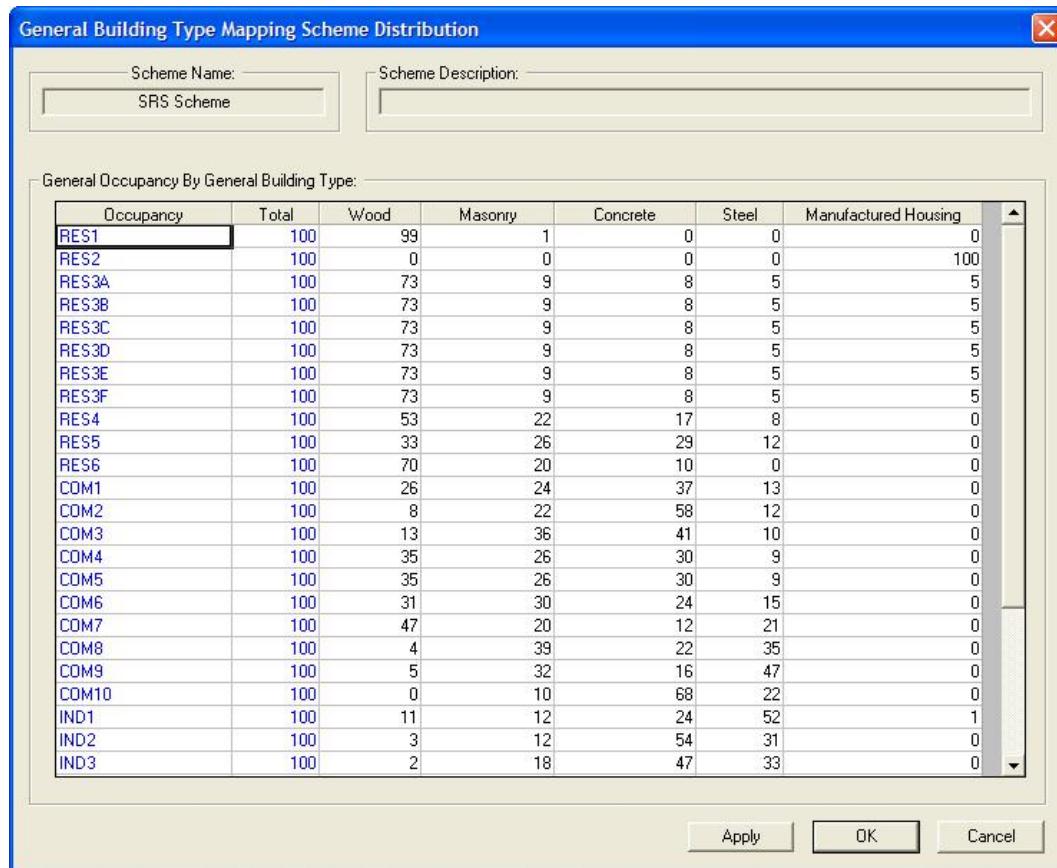


Figure 3-29: HAZUS Inventory Menu, General Building Stock Submenu, General Occupancy Mapping, Edit Mapping Scheme Dialog

- Selection of the command button Edit on the General Occupancy Mapping dialog displays the dialog above. The dialog is not a standard HAZUS dialog, but has the same design as the View dialog discussed earlier. The dialog is designed as follows:
 - The dialog has two display boxes that show the Scheme Name and the Scheme Description (information from the prior dialog).
 - The dialog has a single data grid that shows the building distribution by occupancy. The data grid is not editable and displayed in blue text.
 - The dialog has command buttons Apply, OK and Cancel.

- b. Data for this view is stored in the tables 'clSOccupancy', 'hzGenBldgScheme', 'hzGenBldgSchemes'.
- c. This dialog does not utilize database views.
- d. The Data Grid has column names Occupancy, Total, Wood, Masonry, Concrete, Steel and Manufactured Housing. Occupancy and Total are not editable and displayed in blue text.
 - a. The user can edit values in any of the fields using integer values. The total must always add to 100% (in the total column).
- e. Selection of OK closes the dialog and returns the user to the General Occupancy Mapping dialog.
- f. Selection of Cancel closes the dialog and returns the user to the General Occupancy Mapping dialog.
 - a. Typical dialog controls such as the CTRL-SHIFT-Left Click (to view the HAZUS debugging information) and the Right mouse click to view the metadata information are disabled for these dialogs.

3.2.5.3.1.8. Flood Specific Occupancy Mapping Dialog

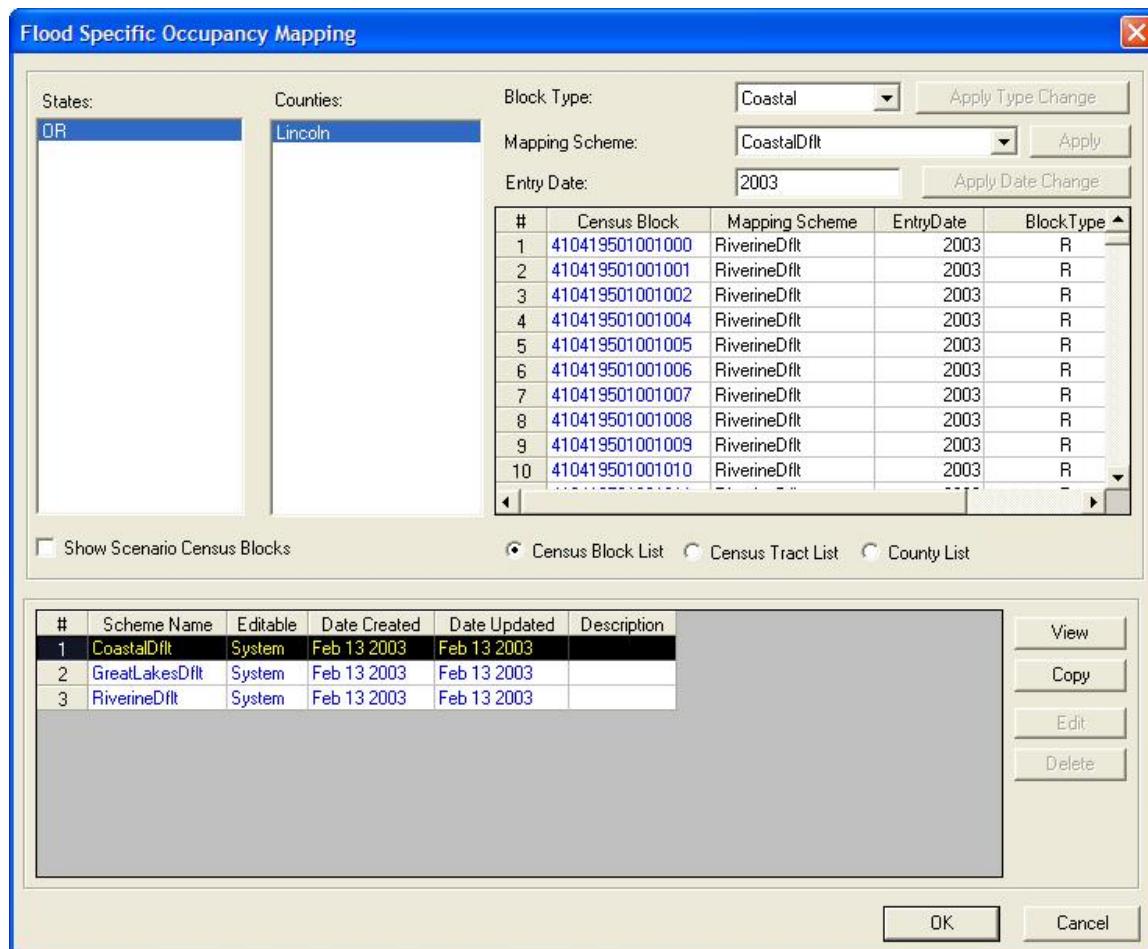


Figure 3-30: HAZUS Inventory Menu, General Building Stock Submenu, Flood Specific Occupancy Mapping Dialog

- Selection of the Flood Specific Occupancy Mapping on the General Building Stock submenu opens the dialog shown in Figure 3-30. This dialog allows the user to view, and potentially edit the flood specific construction standards, specifically the foundation distribution and first floor height. The user has the option to work with Coastal, Great Lake and Riverine development standards. This is not a standard HAZUS dialog and has the following primary features:
 - The dialog has no tabs.
 - The dialog has two combo boxes.

- c. The dialog has a data entry box directly below the combo boxes.
 - d. The dialog has three radio buttons.
 - e. The dialog has a check box for study case blocks.
 - f. The dialog has four data grids, two that are not editable, one that is tied to the combo box and one that displays all available mapping schemes.
 - g. The dialog has command buttons Apply Type Change (near the Block Type combo box), Apply (near the mapping scheme combo box), Apply Date Change (near the Entry Date data entry box), View, Copy, Edit, Delete (all located near the available mapping scheme grid) and OK and Cancel (located at the base of the dialog).
-
- b. The data for this dialog is stored in the tables ‘hzCensusBlock’, ‘flStudyCaseBlocks’, ‘hzTract’, ‘hzCounty’, ‘flSchemeMapping’, and ‘flSchemeInfo’.
 - c. This dialog does not utilize database views.
 - d. The first data grid is not editable and displays the states within the users study region (if more than one). The data is displayed using the two letter abbreviation.
 - e. The second data grid is not editable and displays the Counties within the users study region. The County’s full name is displayed.
 - f. The third data grid is linked to the Radio Buttons, the two Combo boxes, and the Entry Date data box. The grid displays four columns.
 - a. The first column is not editable and displays the values selected in the radio buttons (Census Block, Census Tract, or County).
 - b. The next three columns are editable but are linked to one of the combo boxes above. The Mapping Scheme is linked to the Mapping Scheme combo box, the EntryDate column is linked to the Entry Date data entry box, and finally the Block Type is linked to the Block Type combo box. The user can replace the value in

the column by selecting an alternate value in the respective combo box and hitting the appropriate application command button, which becomes enabled.

- g. The first combo box is labeled Block Type and has the command button Apply Type Change to the right. The combo box allows the user to select between one of three options for block type – Coastal, Lakes, and Riverine. The selection of the block type determines the foundation distribution that is applied to the census block during the flood analysis. The foundation distribution is discussed in greater detail below.
 - a. The Apply Type command button is disabled until the user selects a census block, tract, or county in the data grid below the combo boxes. Selection of Apply Type Change will apply the selected block type to the selected geographic areas.
- h. The second combo box is labeled Mapping Scheme and this combo box displays available mapping schemes that the user can select.
 - a. The Mapping Scheme combo box is filtered by the Block Type Combo selection. That is, the user cannot attempt to apply a riverine or lake mapping scheme to a census block that has a coastal block type. The user can select between the Block Type default and any user created mapping schemes that they may have developed.
 - b. The command button Apply is to the right and enabled when census blocks, tracts, or counties are selected. The combo box allows the user to view and apply mapping schemes to census blocks, tracts, or county displayed in the data grid immediately below it.
- i. The data entry box is labeled Entry Date and this combo box allows the user to enter a year that regulations were applied to the affected census blocks, census tracts, or counties. The user is required to enter a year in 4 digit format. This value is used later when estimating the pre-firm and post-firm foundation distribution for the census blocks.
- j. Radio Buttons are labeled Census Block List, Census Tract List, and County List.

- a. Selection of Census Block List (default) shows the census blocks within the users study region and associated mapping schemes in the third data grid. Changes made by the user at the census block level will show a NULL value in the associated census tract and county if the user changes the view.
 - b. Selection of Census Tract List shows the census tracts within the users study region and associated mapping schemes in the third data grid. Changes in the mapping scheme for a tract are processed down to all census blocks within the tract. The County mapping scheme is set to NULL to reflect the change.
 - c. Selection of the County List shows the counties within the user study region and the associated mapping schemes in the third data grid. Changes at the county level will be processed to all Census Tracts and Blocks within the county.
- k. The fourth data grid displays the Specific Mapping Scheme applied to the counties within the study region. The default mapping scheme can be viewed but not edited.
- a. To create a new mapping scheme the user is required to Copy and name a new scheme that can then be edited and applied to the Blocks, Tracts or Counties.
 - b. Grid Columns are labeled Scheme Name, Editable, Date Created, Date Updated, and Description.
- l. A check box labeled Show Scenario Census Blocks filters the information in the third data grid so the user can work only with the census blocks of interest.
- m. Typical dialog controls such as the CTRL-SHIFT-Left Click (to view the HAZUS debugging information) and the Right mouse click to view the meta-data information are disabled for these dialogs.
- n. Selection of View opens a dialog that allows the user to view the mapping scheme information (see discussion below).
- o. Selection of Copy opens a dialog to name and create a copy of the selected mapping scheme (see discussion below).

- p. Selection of Edit allows the user to edit a user created mapping scheme. Default mapping schemes cannot be edited or deleted (see discussion below). The Edit command button is only enabled when the user selects a User Defined Mapping scheme in the fourth data grid.
- q. Selection of Delete allows the user to remove a user created mapping scheme. Any census blocks, tracts, or counties assigned that mapping scheme will automatically be reset to the default mapping scheme. Selection of Delete opens a standard dialog asking the user if they are sure about the request.
- r. Selection of OK closes the dialog.
- s. Selection of Cancel closes the dialog.

3.2.5.3.1.8.1. Flood Specific Occupancy Mapping, Flood Building Characteristics Distribution Dialog

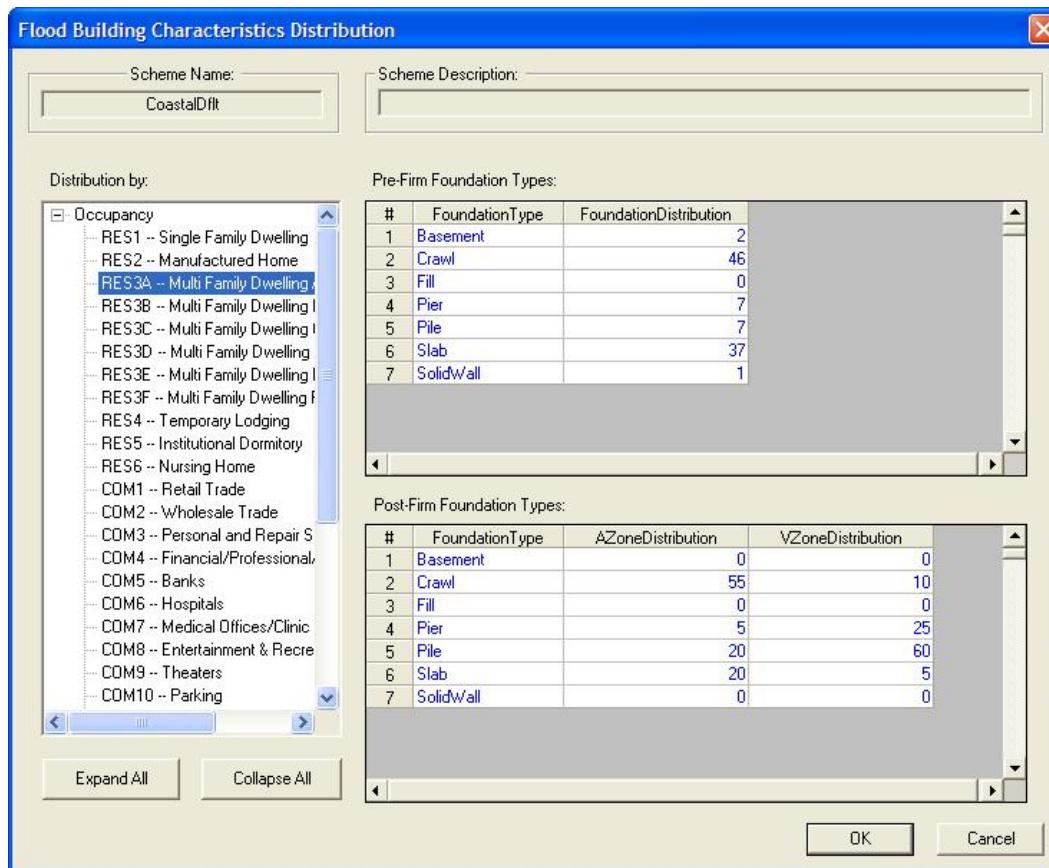


Figure 3-31: HAZUS Inventory Menu, General Building Stock Submenu, Flood Specific Occupancy Mapping, Flood Building Characteristics Distribution Dialog

- I. Selection of the command button View displays the dialog above. The dialog is not a standard HAZUS dialog and designed as follows:
 - a. The dialog has two display boxes that show the Scheme Name and the Scheme Description (information from the prior dialog)
 - b. The dialog has an expandable display menu that allows the user to view the available occupancies.
 - c. The dialog has two data grid that shows the building foundation distribution for that occupancy. One data grid is labeled Pre-Firm Types and shows the pre-firm foundation distribution. The second data grid is labeled Post-Firm Foundation Types and shows the post-firm foundation distribution for the selected occupancy. The data grid is not editable and displayed in blue text.
 - d. The dialog has command buttons Expand All, Collapse All, OK and Cancel.
- m. Data for this view is stored in the tables ‘fISchemeInfo’, ‘cISOccupancy’, and one of the three tables depending on the flood hazard type ‘fISchemeCoastal’, ‘fISchemeGLakes’, or ‘fISchemeRiverine’.
- n. The data views are depending on the flood hazard type absv_SchemeCoastalPre, absv_SchemeCoastalPost, absv_SchemeGLakesPre, absv_SchemeGLakesPost, or absv_SchemeRiverinePre, absv_SchemeRiverinePost.
- o. The Scheme Name is displayed in a data box at the top of the dialog. The Scheme Description is displayed next to the Scheme Name.
- p. The Distribution By display box shows a menu tree of all available specific occupancies. When expanded, the dialog shows RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, AGR1, REL1, GOV1, GOV2, EDU1, EDU2.
- q. Immediately below the Distribution By display box are the command buttons Expand All and Collapse All.

- a. Selection of Expand All will expand the occupancy menu.
- b. Selection of Collapse All will collapse the menu to show only the Occupancy value.
- r. The data grid labeled Pre-Firm Foundation Types shows the pre-firm foundation distribution for the selected occupancy. The Pre-Firm foundation distribution columns are Foundation Type and Foundation Distribution. When viewing the default mapping schemes, the values are not editable and displayed in blue text.
- s. The data grid labeled Post-Firm Foundation Types shows the post-firm foundation distributions for the selected occupancy. The distribution display varies by the hazard – that is the Coastal Great Lakes, or Riverine block types.
 - a. When viewing Riverine the columns are labeled Foundation Type and Foundation Distribution as shown below.

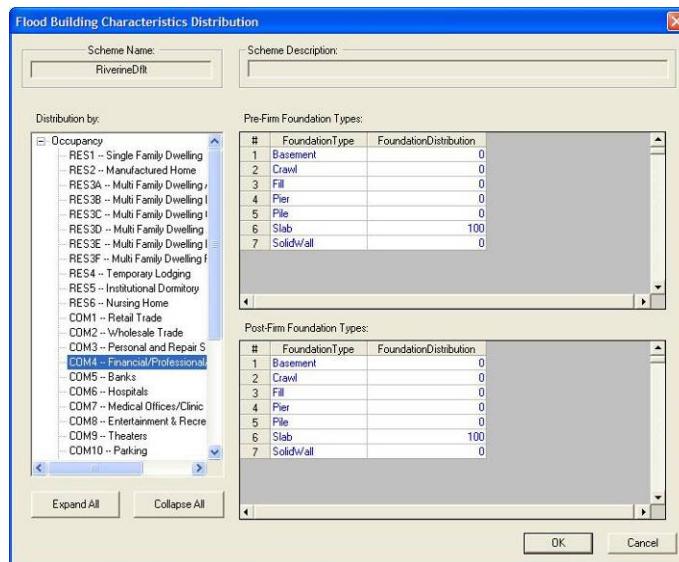


Figure 3-32: Riverine Flood Building Characteristics Distribution Dialog

- b. When viewing Coastal the columns are labeled Foundation Type, AZoneDistribution, and VZoneDistribution.
- c. When viewing the Great Lakes the columns are labeled Foundation Type, AZoneDistribution, and VZoneDistribution.

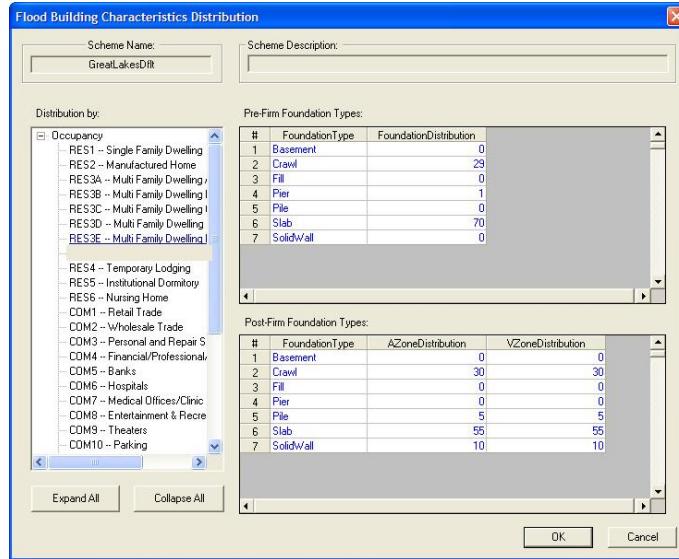
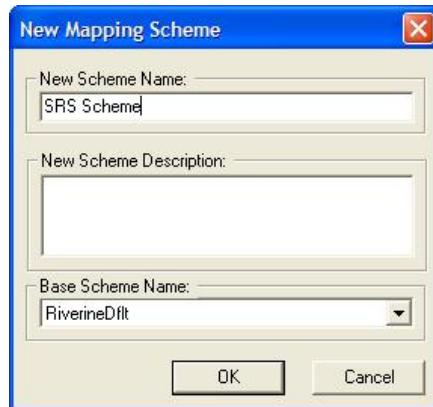


Figure 3-33: Great Lakes Floor Building Characteristics Distribution Dialog

- t. Selection of OK closes the dialog and returns the user to the Specific Occupancy Mapping dialog.
- u. Selection of Cancel closes the dialog and returns the user to the Specific Occupancy Mapping dialog.
- v. Typical dialog controls such as the CTRL-SHIFT-Left Click (to view the HAZUS debugging information) and the Right mouse click to view the metadata information are disabled for these dialogs.



**Figure 3-34: HAZUS Inventory Menu, General Building Stock Submenu,
Specific Occupancy Mapping, New Mapping Scheme Dialog**

- a. Selection of the command button Copy on the Specific Occupancy Mapping dialog displays the dialog above. The dialog is not a standard HAZUS dialog and designed as follows:
 - a. The dialog has two input boxes that are editable by the user.
 - b. The dialog has a single combo box that allows the user to select the Base Scheme Name (default is the default mapping scheme).
 - c. The dialog has command buttons OK and Cancel.
- b. The user is required to provide a New Scheme Name. The Scheme Name is limited to 10 characters (numbers and special characters allowed).
- c. The user can complete the optional information in the New Scheme Description.
- d. Selection of OK creates the new user defined mapping scheme and returns the user to the Specific Occupancy Mapping dialog. The user will see the newly created scheme in the fourth data grid. The new scheme is displayed in black text and is completely editable by the user.
- e. Selection of Cancel closes the dialog and returns the user to the Specific Occupancy Mapping dialog.

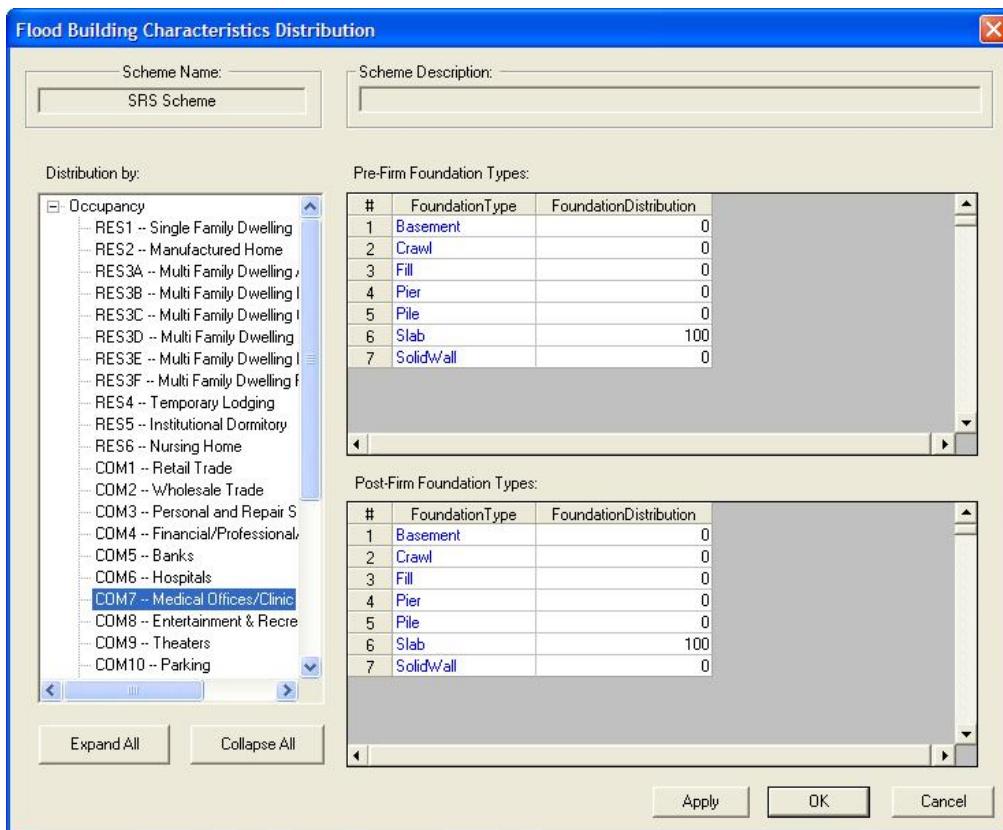


Figure 3-35: HAZUS Inventory Menu, General Building Stock Submenu, Flood Specific Occupancy Mapping, User Defined Mapping Scheme Dialog

- When the user selects the command button Edit when the user defined mapping scheme is selected, displays the dialog above. The dialog is not a standard HAZUS dialog and designed as follows:
 - The dialog has two display boxes that show the Scheme Name and the Scheme Description (information from the prior dialog).
 - The dialog has an expandable display menu that allows the user to view the available occupancies.
 - The dialog has two data grid that shows the building foundation distribution for that occupancy. One data grid is labeled Pre-Firm Types and shows the pre-firm foundation distribution. The second data grid is labeled Post-Firm Foundation Types and shows the post-firm foundation distribution for the selected occupancy.

- d. The dialog has command buttons Expand All, Collapse All, Apply, OK and Cancel.
- b. Data for this dialog is stored in the tables ‘flSchemeInfo’, ‘cISOccupancy’, and one of the three tables depending on the flood hazard type the user defined mapping scheme was derived from ‘flSchemeCoastal’, ‘flSchemeGLakes’, or ‘flSchemeRiverine’.
- c. The data views are depending on the flood hazard type absv_SchemeCoastalPre, absv_SchemeCoastalPost, absv_SchemeGLakesPre, absv_SchemeGLakesPost, or absv_SchemeRiverinePre, absv_SchemeRiverinePost.
- d. The Scheme Name is displayed in a data box at the top of the dialog. The Scheme Description is displayed next to the Scheme Name.
- e. The Distribution By display box shows a menu tree of all available specific occupancies. When expanded, the dialog shows RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, AGR1, REL1, GOV1, GOV2, EDU1, EDU2.
 - a. Immediately below the Distribution By display box are the command buttons Expand All and Collapse All.
 - b. Selection of Expand All will expand the occupancy menu.
 - c. Selection of Collapse All will collapse the menu to show only the Occupancy value.
- f. The data grid labeled Pre-Firm Foundation Types shows the pre-firm foundation distribution for the selected occupancy. The Pre-Firm foundation distribution columns are Foundation Type and Foundation Distribution. When viewing a user defined mapping schemes, the values are editable and displayed in black text.
- g. The data grid labeled Post-Firm Foundation Types shows the post-firm foundation distributions for the selected occupancy. The distribution display varies by the hazard – that is the Coastal Great Lakes, or Riverine block types as discussed above. When viewing the user defined mapping schemes the values are editable and displayed in black text.

- h. Selection of Apply applies changes made by the user to the user defined mapping scheme. The Edit dialog is closed and the user is returned to the Flood Specific Occupancy Mapping dialog.
- i. Selection of OK closes the Edit dialog and returns the Flood Specific Occupancy Mapping dialog.
- j. Selection of Cancel closes the dialog without saving changes and returns the user to the Flood Specific Occupancy Mapping Dialog.

3.2.5.3.1.9. First Floor Elevations

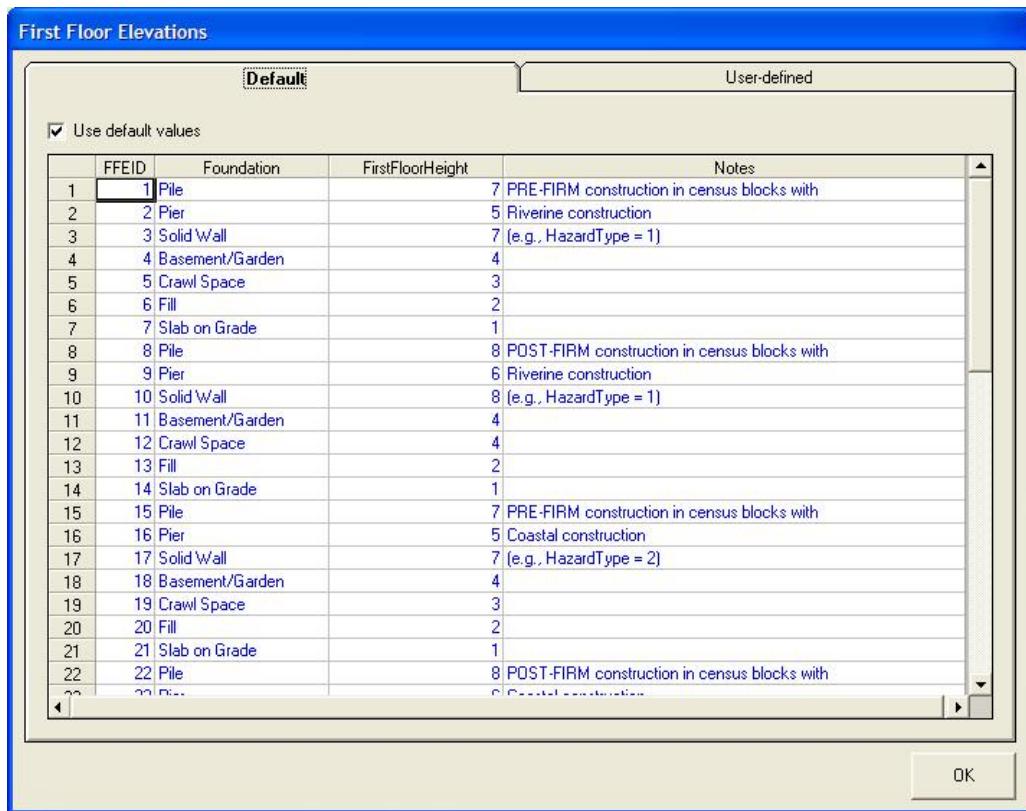


Figure 3-36: HAZUS Inventory Menu, General Building Stock Submenu, First Floor Elevations Dialog

- a. When the user selects the First Floor Elevation command on the General Building Stock submenu, the dialog above is opened. The dialog is not a standard HAZUS dialog and designed as follows:

- a. The dialog has two tabs labeled Default and User defined.
 - b. The dialog has a check box labeled Use default values.
 - c. The dialog has a data grid displaying the first floor elevation data.
 - d. The dialog has command button OK.
-
- b. Data for this dialog is stored in the tables 'flFFEValues', 'flFFEKey', 'flFoundationType'.
 - c. The data view is absv_InvFFEValuesDef.
-
- d. The default tab for the dialog is labeled Default. The name of the tab is intended to tell the user that the displayed data is the default values provided with HAZUS.
-
- e. The check box allows the user to select the user defined first floor elevations or the default values (default is that the default values are used).
-
- f. The data grid has columns labeled FFEID, Foundation, FirstFloorHeight, and Notes. Data in the grid is not editable and displayed in blue text.
-
- g. Typical dialog controls such as the CTRL-SHIFT-Left Click (to view the HAZUS debugging information) and the Right mouse click to view the metadata information are disabled for these dialogs.

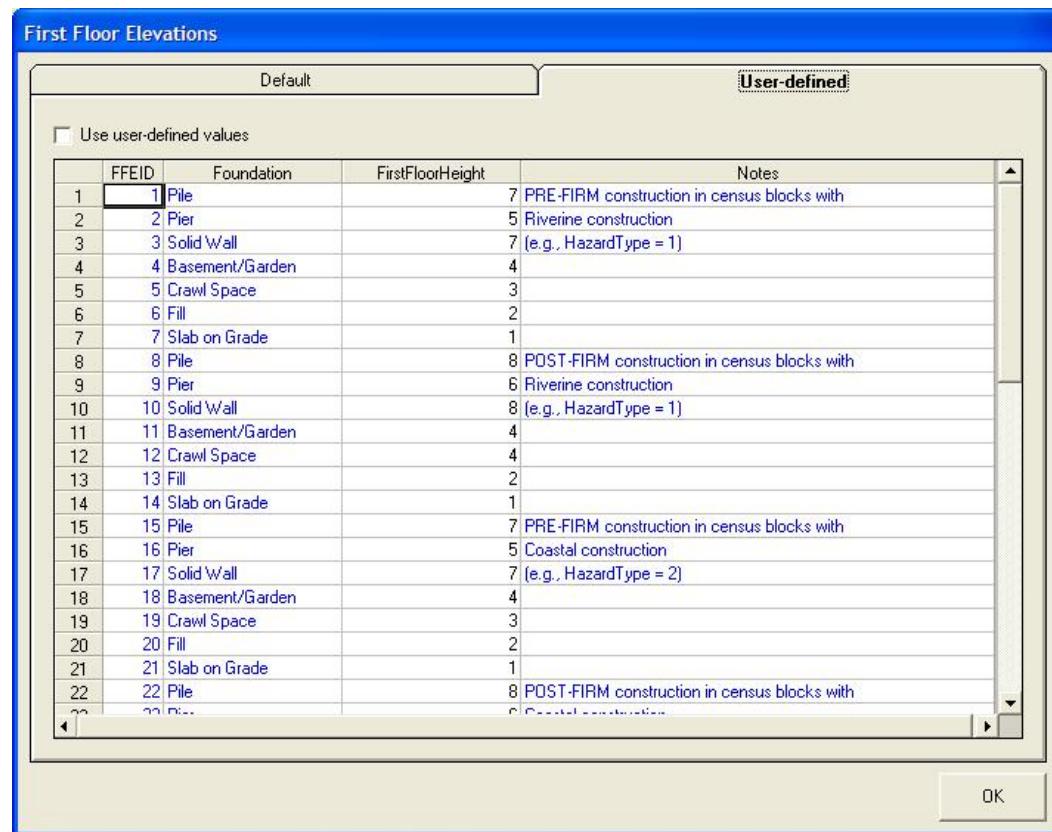


Figure 3-37: HAZUS Inventory Menu, General Building Stock Submenu, First Floor Elevations Dialog

- Selection of the User-defined tab opens the dialog shown above. The dialog is not a standard HAZUS dialog and designed as follows:
 - The dialog has two tabs labeled Default and User defined.
 - The dialog has a check box labeled Use default values.
 - The dialog has a data grid displaying the first floor elevation data.
 - The dialog has command button OK.
- Data for this dialog is stored in the tables 'flFFEValues', 'flFFEKey', 'flFoundationType'.
- The data view is absv_InvFFEValuesUDef.

- d. The check box allows the user to select the user defined first floor elevations or the default values (default is that the default values are used).
- e. The data grid has columns labeled FFEID, Foundation, FirstFloorHeight, and Notes. The user can edit the FirstFloorHeight column in the dialog and the text is displayed in black text. All other columns are not editable and are displayed in blue text.

3.2.5.3.1.10. Building Import Tool (BIT)

- a. The Building Import Tool (BIT) has been developed by PBS&J (developed when the firm was Durham Technologies [DTI]). PBS&J has provided ABS with the proper hooks to open and operate the BIT.
- b. Selection of this menu item automatically launches the BIT and allows the user to develop a general building stock distribution for the flood model. A BIT developed inventory can be imported into the flood model at the Square Foot Occupancy table. Developers are referred to the BIT SRS for detailed discussion of the program requirements for the BIT. Operation of the BIT is detailed in the BIT User manual and the User Manuals of each of the three hazard models.

3.2.5.3.2. Point Level Data

- a. Data under the menu items Essential Facilities, High Potential Loss Facilities, User Defined Facilities, Transportation Systems, Utility Systems, and Hazardous Materials are handled using point level data. That is, the facility is represented by a point with a specific latitude and longitude. Attribute data is assigned to that point.
 - a. Flood damage is performed by identifying the depth of flooding at the latitude and longitude of the point when overlain on the depth grid.
 - b. When adding a data record, the user must provide a latitude and longitude for the data point. When adding a record, the following dialog is provided.

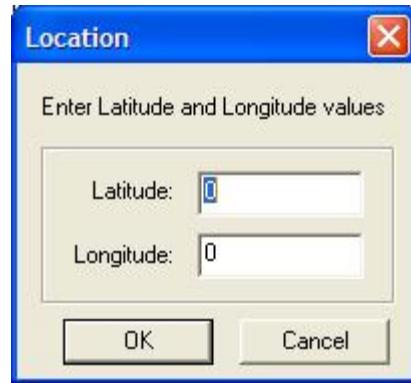


Figure 3-38: Enter Latitude and Longitude Values Dialog for Point Level Record Insertion

- b. The dialog has two text boxes labeled Latitude and Longitude. Default value is 0 for both text boxes.
- c. Dialog has command buttons OK and Cancel.
- d. Selection of OK saves the latitude and longitude to the geodatabase associated with the Inventory data item the user is working on (e.g., Fire stations). The model also pushes the record into the SQL database and the user can edit the record adding attribute data necessary for loss estimation. HAZUS automatically provides default values to the record to protect the user from failing to enter data.
- e. Selection of Cancel closes the Location dialog and returns the user to the inventory dialog where the Insert record command was invoked.

3.2.5.3.3. Essential Facilities

- a. Selection of the Essential Facilities menu item allows the user to view the HAZUS-MH baseline inventory for their study region.
- b. Selection of the Essential Facilities menu item opens a dialog that allows the user to view a number of site specific data for essential facilities. It is important to note that site specific data is managed differently than the general building stock data and so separate dialogs for facility information, valuation, and foundation types are not required. It is anticipated that the user will make changes and modifications directly within the essential facilities database.

- c. The flood model took a different approach from the earthquake model allowing the user to be very specific with the occupancy mapping and foundation mapping directly for each facility within the inventory data. This is permissible because the flood model does not require the detailed data necessary for an earthquake analysis.
- d. The data is generally organized as follows: location information, flood model analysis information, emergency management information.
- e. Essential facilities are analyzed at a site-specific level, but similar to the earthquake, the flood model will only develop estimate damage (in percent) and estimated functionality in terms of availability over time.

3.2.5.3.3.1. Essential Facilities Inventory Dialog and Medical Facilities Tab

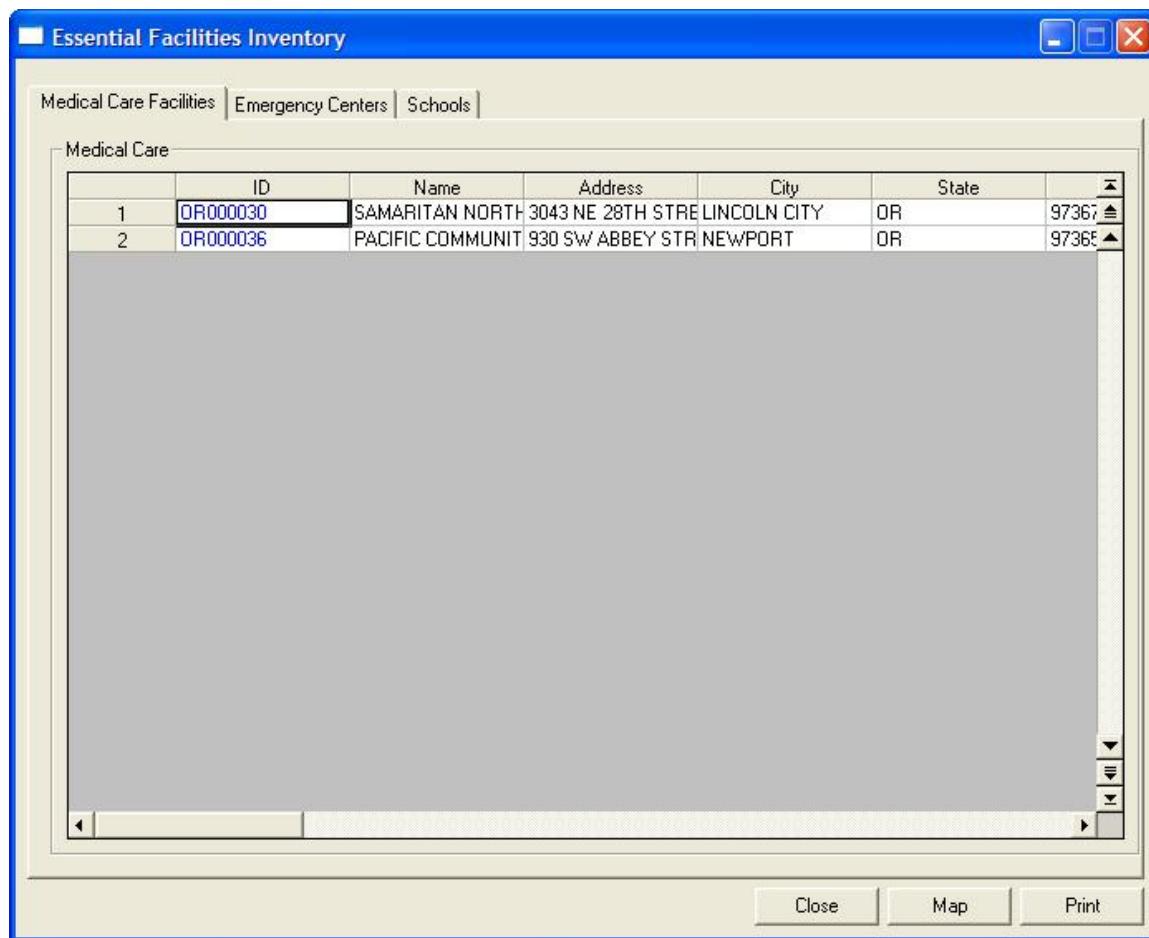


Figure 3-39: HAZUS Inventory Menu, Essential Facilities Inventory Dialog, Medical Care Facilities

- a. Selection of the Essential Facilities menu item on the Inventory menu allows the user access to the site specific data of essential facilities within their study region. This dialog allows the user to view and edit the data used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has three tabs.
 - b. The dialog may or may not have combo boxes depending on the selected tab.
The default tab – Medical Care Facilities does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. Data is stored in the following tables:
 - a. `hzTract`, `clEF`, `hzCareFlty`, and `flCareFlty` for Medical Care Facilities.
 - b. `hzTract`, `clEF`, `hzFireStation`, and `flFireStation` for the fire station selection on the Emergency Center tab.
 - c. `hzTract`, `clEF`, `hzPoliceStation`, and `flPoliceStation` for the police station selection on the Emergency Center tab.
 - d. `hzTract`, `clEF`, `hzEmergencyCtr`, and `flEmergencyCtr` for the emergency center selection on the Emergency Center tab.
 - e. `hzTract`, `clEF`, `hzSchool`, and `flSchool` for the School tab.

- c. The data views are as follows:

Tab	Combo Selection	View
Medical Care Facilities	N/A	absv_CareFlty
Emergency Centers	Emergency Centers	absv_EmergencyCtr
Emergency Centers	Fire Station	absv_FireStation
Emergency Centers	Police Station	absv_PoliceStation
School	N/A	absv_School

- d. The dialog has three tabs labeled Medical Care Facilities, Emergency Response, and Schools. Medical Care Facilities is the default tab.
- e. Medical Care Facilities for every county within the users study region is displayed regardless of the number of counties within the study region.
- f. The grid columns shall be labeled ID, Name, Address, City, State, Zip, Contact, Phone, CareFltyClass, Description, YearBuilt, Cost, NumStories, BldgType, DesignLevel, FoundationType, FirstFloorHeight, BldgDamageFnld, ContDamageFnld, FloodProtection, BUPOWER, Usage, NumBeds, Latitude, Longitude, AHAId, CountyFips, and Comment. The ID and CountyFIPS columns are not be editable and are displayed in blue text.
- g. Default values for Essential Facilities are displayed in table below. These default values replaced the mapping schemes used by the earthquake model in earlier versions of HAZUS.
- h. Data validation will be performed to ensure that specific requirements such as the latitude and longitude, basement, and first floor height are populated with proper values. An error message is given if required data is missing.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- j. The dialog shall have command buttons labeled Close, Map and Print.
- k. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- l. Selection of Map shall add the listed facilities to the map layer and table of contents.
- m. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.3.3.1.1. Essential Facilities Inventory Dialog and Emergency Response Tab

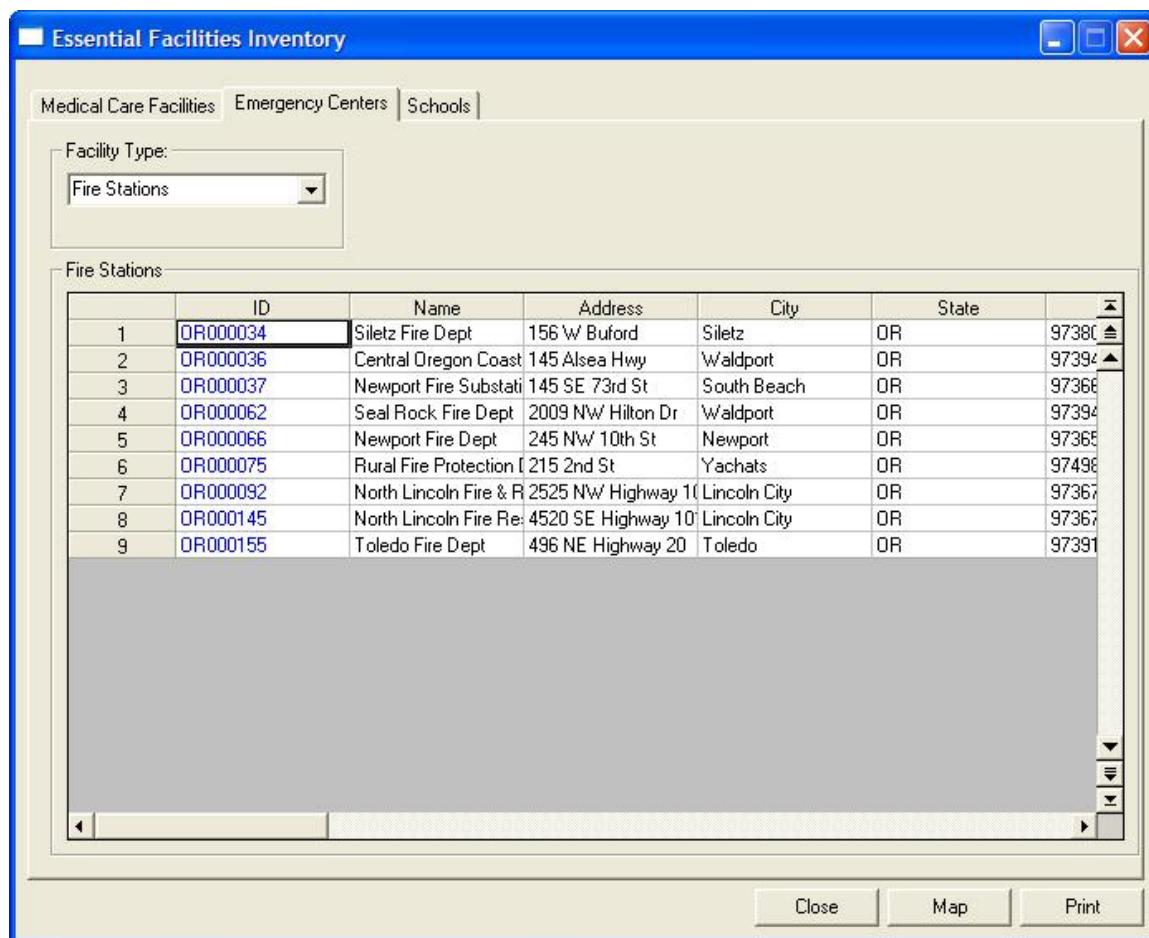


Figure 3-40: HAZUS Inventory Menu, Essential Facilities Inventory Dialog, Emergency Response Tab

- a. Selection of the Emergency Centers tab allows the user access to the site specific data of emergency center facilities (EOCs, Police, and Fire) within their study region. This dialog allows the user to view and edit the data used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has three tabs.
 - b. The dialog has a combo box that allows the user to select between Emergency Centers (default), Fire Stations, and Police Stations.
 - c. The dialog does not have radio buttons.

- d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. The data columns on the Emergency Center tab are generally consistent, but the classification field changes to show the class of the specific occupancy being viewed.
- a. When viewing the Emergency Centers, the data grid columns are labeled ID, Name, Address, City, State, ZipCode, Contact, Phone, EmergCtrClass, Description, YearBuilt, Cost, NumStories, BldgType, DesignLevel, FoundationType, FirstFloorHt, BldgDamageFnId, ContDamageFnId, FloodProtection, BUPower, Latitude, Longitude, CountyFIPS, and Comment. The ID and County FIPS columns shall not be editable and shall be displayed in blue text. All other columns are editable and in black text.
 - b. When viewing the Fire Stations, the data grid columns are labeled ID, Name, Address, City, State, ZipCode, Contact, Phone, FireStnClass, Description, YearBuilt, Cost, NumStories, BldgType, DesignLevel, FoundationType, FirstFloorHt, BldgDamageFnId, ContDamageFnId, FloodProtection, BUPower, Latitude, Longitude, CountyFIPS, and Comment. The ID and County FIPS columns shall not be editable and shall be displayed in blue text. All other columns are editable and in black text.
 - c. When viewing the Police Stations, the data grid columns are labeled ID, Name, Address, City, State, ZipCode, Contact, Phone, PoliceStnClass, Description, YearBuilt, Cost, NumStories, BldgType, DesignLevel, FoundationType, FirstFloorHt, BldgDamageFnId, ContDamageFnId, FloodProtection, BUPower, Latitude, Longitude, CountyFIPS, and Comment. The ID and County FIPS columns shall not be editable and shall be displayed in blue text. All other columns are editable and in black text.

- c. The Default Replacement Occupancy Mapping values for Essential Facilities replaced the mapping schemes used by the earthquake model in earlier versions of HAZUS (see Table 3-4).
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude, basement, and first floor height are populated with proper values. An error message is given if required data is missing.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.3.3.2. Essential Facilities Inventory Dialog and School Tab

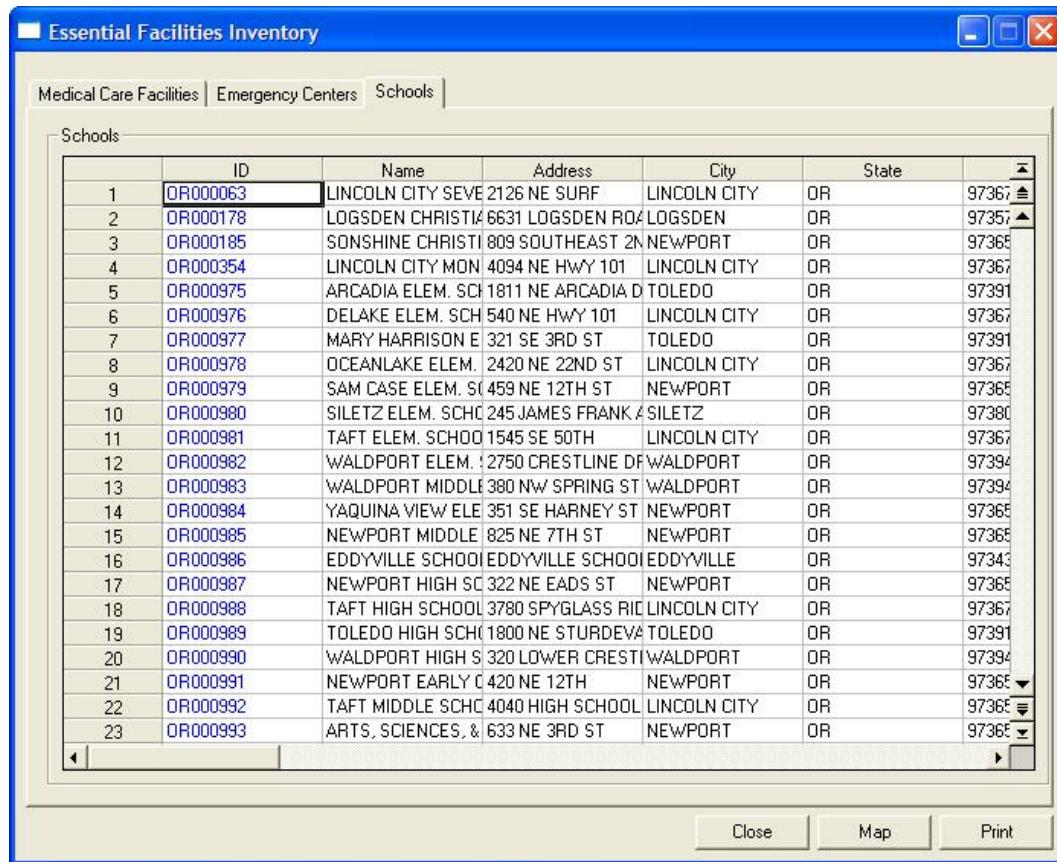


Figure 3-41: HAZUS Inventory Menu, Essential Facilities Inventory Dialog, Schools Tab

- Selection of the Schools tab allows the user access to the site specific data of schools within their study region. This dialog allows the user to view and edit the data used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
 - The dialog has three tabs.
 - The dialog does not have a combo box.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - The dialog has command buttons Close, Map, and Print.

- f. The dialog has a single data grid that is editable.
- b. The data columns on the Schools tab are labeled ID, Name, Address, City, State, ZipCode, Contact, Phone, SchoolClass, Description, YearBuilt, Cost, NumStories, BldgType, DesignLevel, FoundationType, FirstFloorHt, BldgDamageFnId, ContDamageFnId, FloodProtection, BUPower, Latitude, Longitude, CountyFIPS, and Comment. The ID and County FIPS columns shall not be editable and shall be displayed in blue text. All other columns are editable and in black text.
- c. Default values for Schools replaced the mapping schemes used by the earthquake model in earlier versions of HAZUS (see Table 3-4).
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude, basement, and first floor height are populated with proper values. An error message is given if required data is missing.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.

- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

Table 3-4: Essential Facilities Default Values Replacing Occupancy Mapping

Occupancy Class	Description	Building Type	Basement	First Floor (ft)	Number of Stories	Damage Function
EFHS	Small Hospital	Concrete	Yes	3	Low	COM6
EFHM	Medium Hospital	Concrete	Yes	3	Mid	COM6
EFHL	Large Hospital	Concrete	Yes	3	Mid	COM6
EFMC	Medical Center	Concrete	Yes	3	Low	COM7
EFFS	Fire Station	Concrete	No	0	Low	GOV2
EFPS	Police Station	Concrete	Yes	0	Low	GOV2
EFOE	Emergency Operations	Concrete	Yes	0	Low	GOV2
EFS1	School	Brick	No	0	Low	EDU1
EFS2	University	Concrete	No	0	Low	EDU2

3.2.5.3.4. High Potential Loss Facilities

- a. Selection of this submenu opens a dialog that allows the users to view, add, and delete high potential loss facilities from the database.
- b. Because of a lack of available credible damage functions, the flood model does not perform flood loss estimations on the high potential loss facilities. That is, the flood model does not estimate losses, estimates of percent damage or estimates of functionality. Data is for display purposes only.
 - a. The user can overlay the locations onto the flood depth grids as necessary. This does provide some benefit to the user while not attempting to produce results.
- c. As with essential facilities, the flood model does not provide an occupancy mapping menu since the critical values can be provided for each specific facility within the inventory data grid.
- d. Occupancy Classifications are defined in Table 3-5.

Table 3-5: Occupancy Classification for High Potential Loss Facilities

Label	General Occupancy	Specific Occupancy
HPDA	Dams	Arch
HPDB	Dams	Buttress
HPDC	Dams	Concrete
HPDE	Dams	Earth
HPDG	Dams	Gravity
HPDM	Dams	Masonry
HPDR	Dams	Rock fill
HPDS	Dams	Stone
HPDT	Dams	Timber Crib
HPDU	Dams	Multi-Arch
HPDZ	Dams	Miscellaneous
HPNP	Nuclear Power Facilities	Nuclear Power Facilities
HPMI1	Military Installations	Barracks/Group Quarters
HPMI2	Military Installations	Officer/Enlisted Quarters - Multi-Unit
HPMI3	Military Installations	Officer/Enlisted Quarters - Detached
HPMI4	Military Installations	Maintenance/Operations Shops
HPMI5	Military Installations	Administrative Offices
HPMI6	Military Installations	Mess Halls
HPMI7	Military Installations	Officer/Enlisted Clubs
HPMI8	Military Installations	Gymnasiums/Armory
HPMI9	Military Installations	Gas/Services Stations
HPMI10	Military Installations	PX/Retail Stores
HPMI11	Military Installations	Arsenals
HPMI12	Military Installations	Other

3.2.5.3.4.1. High Potential Loss Facilities Inventory Dialog and Dams & Levees Tab

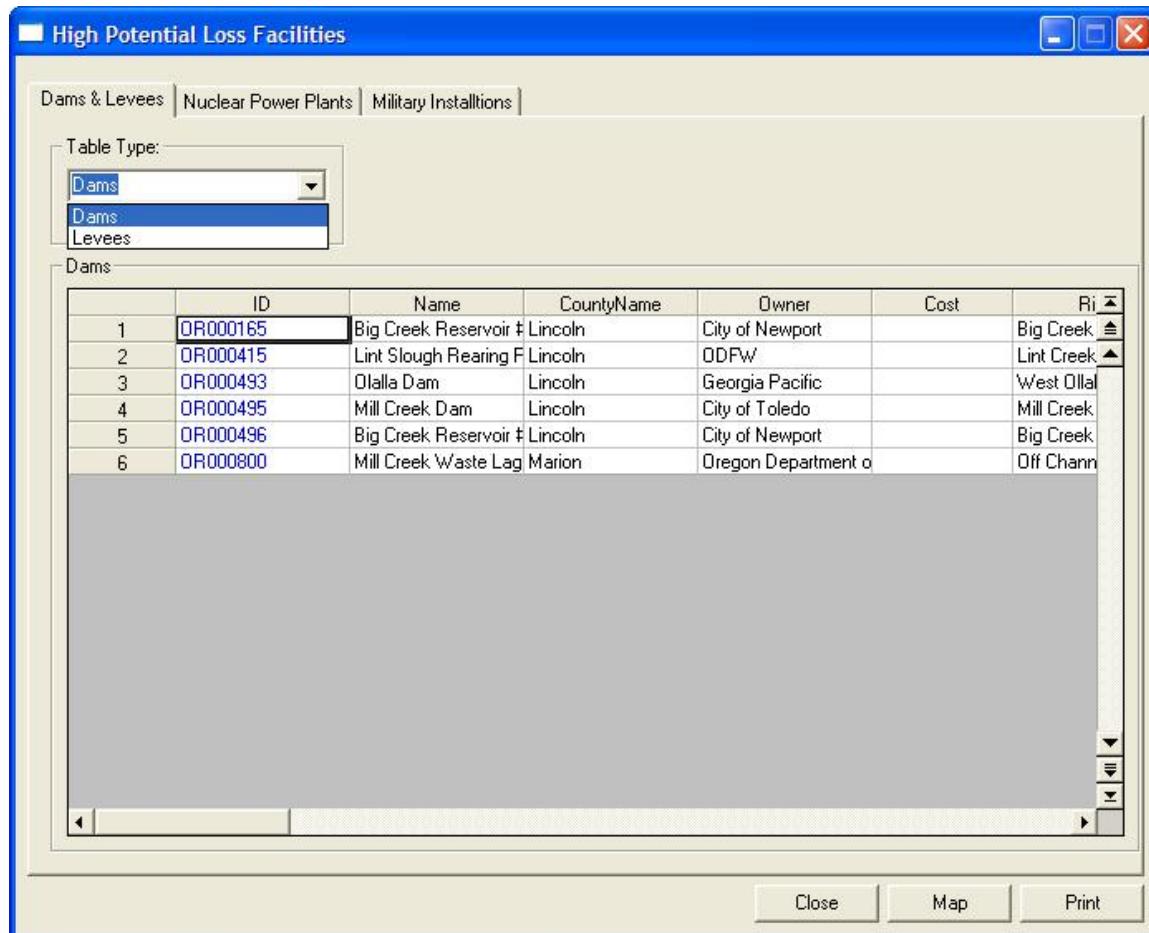


Figure 3-42: HAZUS Inventory Menu, High Potential Loss Inventory Dialog, Dams and Levees Tab

- Selection of High Potential Loss Facilities on the Inventory menu allows the user access to the site specific data for facilities defined as high potential loss within the study region. This dialog allows the user to view and edit the data used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
 - The dialog has three tabs.
 - Depending on the selected tab the dialog may have a combo box.
 - The dialog does not have radio buttons.

- d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. Data is stored in the following tables:
- a. hzDams for Dams,
 - b. hzLevees for the Levees,
 - c. hzTract, clHplf, and hzNuclearFlty for the Nuclear Power Plants,
 - d. hzTract and hzMilitary for the Military Installations.
- c. The data views are as follows:

Tab	View
Dams	absv_Dams
Levees	absv_Levees
Nuclear Facility	absv_NuclearFlty
Military Installations	absv_Military

- d. The dialog has three tabs labeled Dams and Levees, Nuclear Power Plants, and Military Installations. The default tab is the Dams and Levees.
- e. The Dams and Levees tab has a combo box labeled Table Type that allows the user to select between Dams and Levees. Dams shall be the default parameter.
- f. The dialogs data grid shall have columns labeled in accordance with the selection of either Dams or Levees in the combo box.
 - a. When viewing the Dam selection, columns are labeled ID, Name, CountyName, Owner, Cost, River, DamClass, NearCity, DistanceCity, Purpose, YearCompleted, DamLength, DamHeight, StructHeight, MaxDischarge,

HydroHeight, MaxStorage, NormalStorage, SurfaceArea, DrainArea, Hazard, EAP, SpillType, SpillWidth, Volume, NATID, PrimaryAgency, Latitude, Longitude, CountyFips, and Comment. The ID and CountyFIPS are not editable and displayed in blue text, all other fields are editable and in black text.

- b. When viewing the Levee selection, columns are labeled ID and County FIPS.
- g. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- i. The dialog shall have command buttons labeled Close, Map, and Print.
- j. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- k. Selection of Map shall add the listed facilities to the map layer and table of contents.
- l. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.3.4.2. High Potential Loss Facilities Inventory Dialog, Nuclear Power Plants Tab

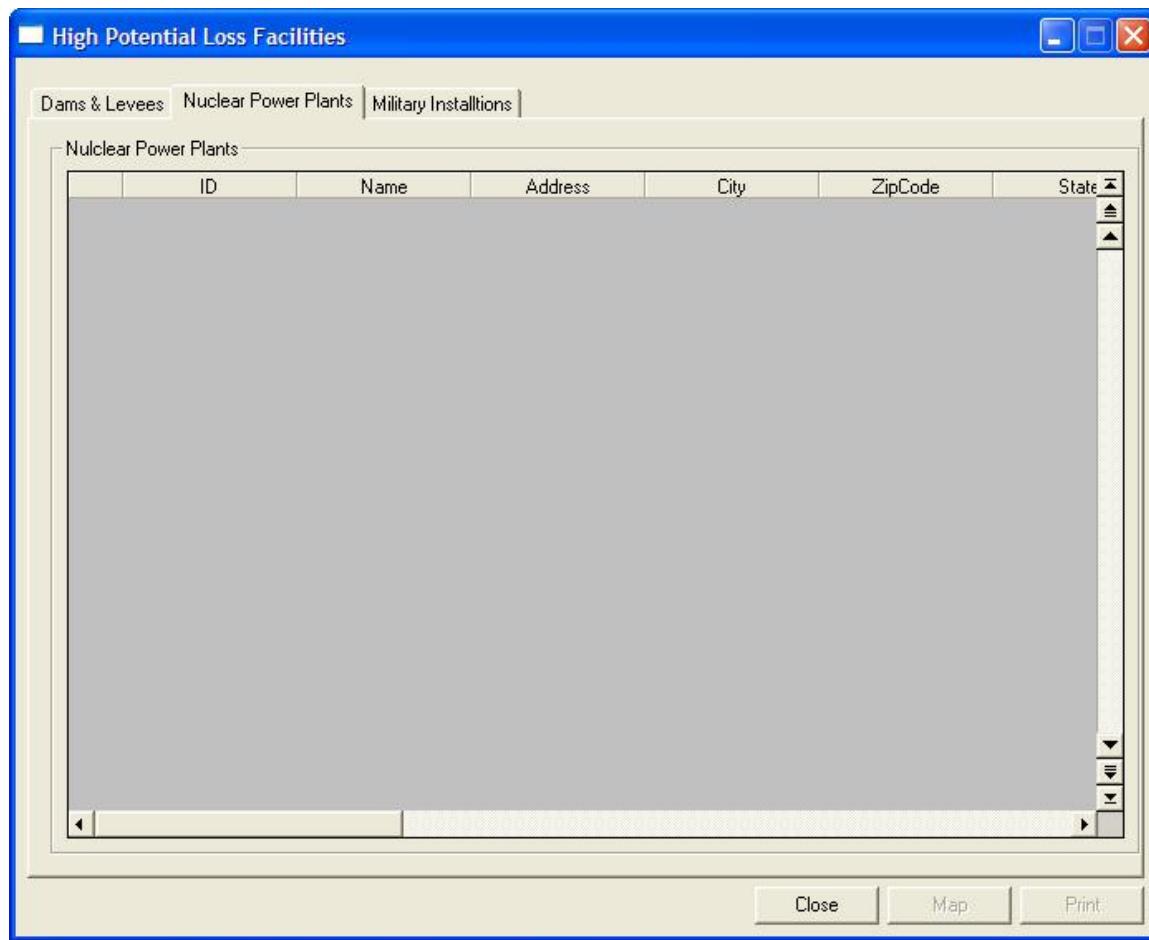


Figure 3-43: HAZUS Inventory Menu, High Potential Loss Inventory Dialog, Nuclear Power Plant

- a. Selection of Nuclear Power Plants tab on the High Potential Loss Facility dialog allows the user to access site specific data for nuclear facilities within the study region. This dialog allows the user to view and edit the data used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has three tabs.
 - b. The Nuclear Power Plants tab does not have a combo box.
 - c. The dialog does not have radio buttons.

- d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. The dialogs data grid shall have columns labeled ID, Name, Address, City, ZipCode, State, Owner, Contact, Phone, NuclearFltyClass, Description, Cost, YearBuilt, NumStories, Capacity, Latitude, Longitude, CountyFips Comment. The ID and CountyFIPS are not editable and displayed in blue text, all other fields are editable and in black text.
- c. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- d. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- e. The dialog shall have command buttons labeled Close, Map, and Print.
- f. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- g. Selection of Map shall add the listed facilities to the map layer and table of contents.

- h. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.3.4.3. High Potential Loss Facilities Inventory Dialog, Military Installations Tab

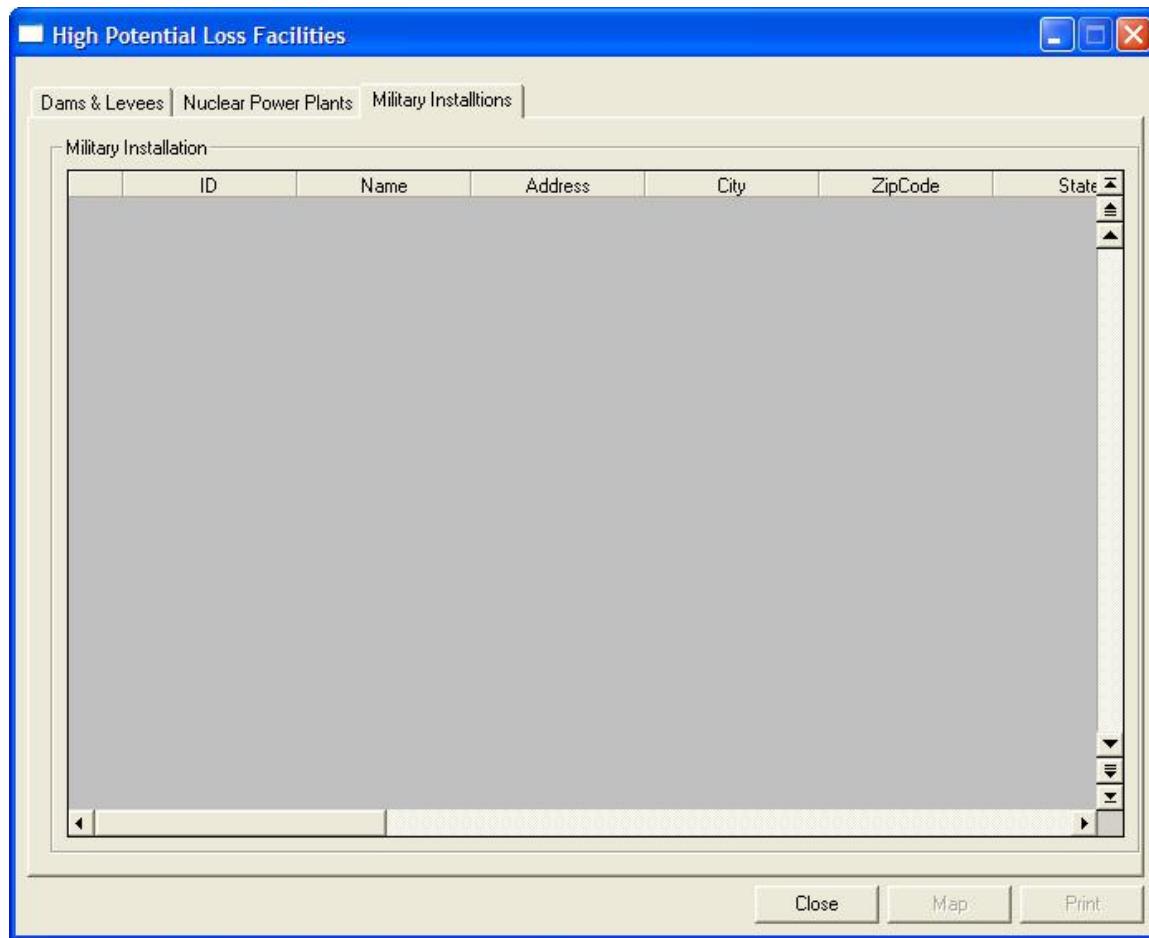


Figure 3-44: HAZUS Inventory Menu, High Potential Loss Inventory Dialog, Military Installations Tab

- a. Selection of Military Installations tab on the High Potential Loss Facility dialog allows the user to access site specific data for military bases and other installations within the study region. This dialog allows the user to view and edit the data used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
- The dialog has three tabs.
 - The Military Installation tab does not have a combo box.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. The dialog data grid shall have columns labeled ID, Name, Address, City, ZipCode, State, Owner, Contact, Phone, MilitaryInstallationClass, Usage, BldgCost, YearBuilt, NumStories, ContentCost, ShelterCapacity, Latitude, Longitude, CountyFips Comment. The ID and CountyFips are not editable and displayed in blue text, all other fields are editable and in black text.
- c. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- d. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- e. The dialog shall have command buttons labeled Close, Map, and Print.
- f. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied

throughout the study region. If the user selects no, the dialog shall close without saving changes.

- g. Selection of Map shall add the listed facilities to the map layer and table of contents.
- h. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.3.5. User-Defined Structures

- a. Selection of this menu item launches the user defined structure dialog discussed below. This dialog shall allow the user to add, delete and identify specific or unique facilities.
- b. The flood model develops loss estimates for these structures based on the occupancy classification supplied by the user. The flood model does not validate that the user has correctly input the occupancy classification.

3.2.5.3.5.1. User Defined Inventory Dialog

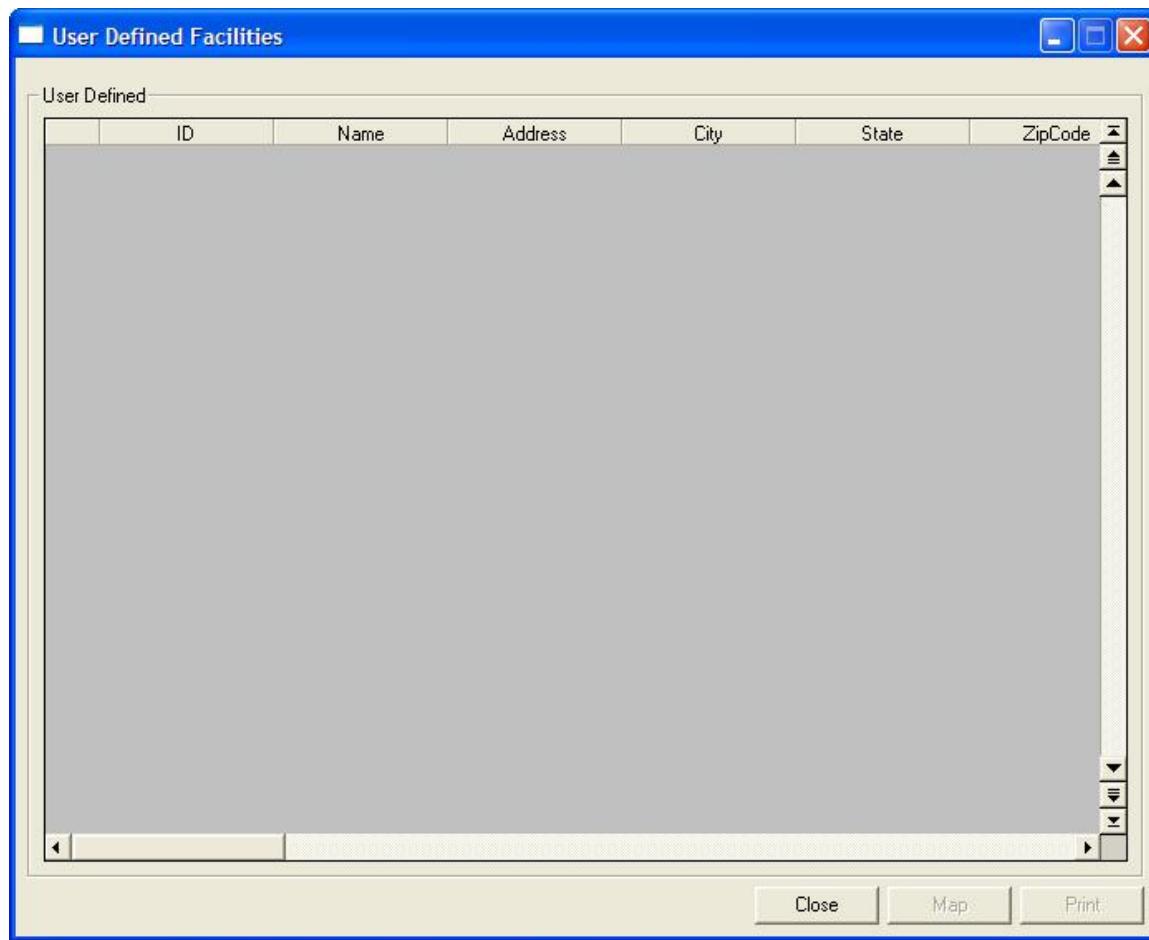


Figure 3-45: HAZUS Inventory Menu, User Defined Structures Inventory Dialog

- a. Selection of User Defined Facilities on the Inventory menu allows the user access a dialog designed to allow users to import data unique to their region or analysis. The flood model will perform estimates to the data based on values provided by the user. These values are not validated by the flood model. This dialog allows the user to view and edit the data used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog does not have any tabs.
 - b. The dialog does not have any combo boxes.
 - c. The dialog does not have radio buttons.

- d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. Data is stored in the following tables:
- c. hzCounty, hzTract, hzUserDefinedFlty, and flUserDefinedFlty.
- d. The data view for the data grid is absv_UserDefinedFlty:
- e. The data grid shall have columns labeled ID, Name, Address, City, State, ZipCode, Contact, Phone, Occupancy, BldgType, Cost, YearBuilt, Area, NumStories, DesignLevel, FoundationType, FirstFloorHt, ContentCost, BldgDamageFnId, ContDamageFnId, InvDamageFnId, FloodProtection, ShelterCapacity, BUPower, Latitude, Longitude, County, Comment. The ID and County are not editable and displayed in blue text, all other fields are editable and in black text.
- f. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- g. Through the use of a right mouse click user can access a submenu as noted below.

Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	N

- h. The dialog shall have command buttons labeled Close, Map and Print.

- i. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- j. Selection of Map shall add the listed facilities to the map layer and table of contents.
- k. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.3.6. Transportation Systems

The screenshot shows a Windows-style dialog box titled "Transportation Systems Inventory Data". At the top, there is a tab bar with "Highway", "Railway", "Light Rail", "Bus", "Port", "Ferry", and "Airport". Below the tabs, a "Table Type:" dropdown menu is open, showing options: "Highway Bridges" (selected), "Highway Tunnels", and "Highway Segments". The main area contains a table with the following data:

ID	Name	Owner	BridgeClass	BridgeType
1	OR000185	US 20 (HWY 033)	State Highway Agency	HWB28
2	OR000188	US 20 (HWY 033)	State Highway Agency	HWB3
3	OR000224	US 20 (HWY 033)	State Highway Agency	HWB28
4	OR000243	US101(HWY009)	State Highway Agency	HWB10
5	OR000244	US101(HWY009)	State Highway Agency	HWB10
6	OR000245	US101(HWY009)	State Highway Agency	HWB10
7	OR000247	US 20 (HWY 033)	State Highway Agency	HWB28
8	OR000340	US101(HWY009)	State Highway Agency	HWB3
9	OR000341	US101(HWY009)	State Highway Agency	HWB10
10	OR000342	US101(HWY009)	State Highway Agency	HWB10
11	OR000356	OR 18 (HWY 039)	State Highway Agency	HWB5
12	OR000383	US101(HWY009)	State Highway Agency	HWB17
13	OR000396	US101(HWY009)	State Highway Agency	HWB10
14	OR000464	US101(HWY009)	State Highway Agency	HWB4
15	OR000480	US101(HWY009)	State Highway Agency	HWB3
16	OR000645	US101(HWY009)	State Highway Agency	HWB3
17	OR000807	US101(HWY009)	State Highway Agency	HWB10
18	OR000808	US101(HWY009)	State Highway Agency	HWB10
19	OR000809	OR 18 (HWY 039)	State Highway Agency	HWB5

At the bottom of the dialog are three buttons: "Close", "Map", and "Print".

Figure 3-46: HAZUS Inventory Menu, Transportation Systems Highway Tab

- a. Selection of Transportation Systems on the Inventory menu allows the user access a dialog designed to allow users to view, edit, import, and/or export transportation systems data to their region or analysis. The Flood Model performs analysis on components of the transportation systems as damage functions were available. Additional funding and research is required to expand the current functionality. This dialog allows the user to view

and edit the data used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:

- a. The dialog has seven tabs.
 - b. The dialog may or may not have combo boxes depending on the transportation system tab.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. Data is stored in the following tables:
- a. hzTract, hzHighwayBridge, f1HighwayBridge, hzHighwayTunnel, clTunnels, hzHighwaySegment, and clSegments for data on the Highway tab,
 - b. hzTract, hzRailwayBridge, f1RailwayBridge, hzRailFlty, hzRailwayTunnel, clTunnels, hzRailwaySegment, and clSegments for data on the Railway tab,
 - c. hzTract, hzLightRailBridge, f1LightRailBridge, hzLightRailFlty, hzLightRailTunnel, clTunnels, hzLightRailSegment, and clSegments for data on the Light Rail tab,
 - d. hzTract and hzBusFlty for data on the Bus tab,
 - e. hzTract and hzPortFlty for data on the Port tab,
 - f. hzTract and hzFerryFlty for data on the Ferry tab,
 - g. hzTract, hzRunway, and hzAirportFlty for data on the Airport tab.
- c. The data views are as follows:

Tab	Combo Selection	View
Highway	Highway Bridges	absv_HighwayBridge
Highway	Highway Tunnels	absv_HighwayTunnel
Highway	Highway Segments	absv_HighwaySegment
Railway	Railway Bridges	absv_RailwayBridge
Railway	Railway Facilities	absv_RailFlty
Railway	Railway Tunnels	absv_RailwayTunnel
Railway	Railway Segments	absv_RailwaySegment
Light Rail	Light Rail Bridges	absv_LightRailBridge
Light Rail	Light Rail Facilities	absv_LightRailFlty
Light Rail	Light Rail Tunnels	absv_LightRailTunnel
Light Rail	Light Rail Segments	absv_LightRailSegment
Bus	N/A	absv_BusFlty
Port	N/A	absv_PortFlty
Ferry	N/A	absv_FerryFlty
Airport	Airport Runways	absv_Runway
Airport	Airport Facilities	absv_AirportFlty

- d. The default tab is the Highway Tab. The Highway tab has the following appearance items:
- a. A single combo box labeled Table Type. Highway Bridges is the default value upon opening of the dialog.
 - b. A single data grid labeled Highway.
 - c. Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.
 - d. When viewing Highway Bridges columns are labeled: ID, Name, Owner, BridgeClass, BridgeType, Width, NumSpans, Length, MaxSpanLength, SkewAngle, SeatLength, SeatWidth, YearBuilt, YearRemodelled, PierType, FoundationType, ScourIndex, Traffic, TrafficIndex, Condition, Cost, Elevation, Latitude, Longitude, CountyFips, Comment.

- e. When viewing Highway Tunnels columns are labeled: ID, Name, Owner, TunnelClass, Description, Type, Width, Length, YearBuilt, Traffic, Cost, Latitude, Longitude, CountyFips, Comment.
 - f. When viewing Highway Segments columns are labeled: ID, Name, Owner, SegmentClass, Description, Length, Traffic, Cost, NumLanes, Pavement, Width, Capacity, CountyFips, Comment.
- e. The Flood Model will be producing damage estimates (% damage) and estimates of functionality for transportation bridges only. This includes Highway, Railway and Light Rail bridges. The flood model keys on the field Scour Index in the probabilistic analysis of the potential of bridge failure.
- a. All other transportation features, either default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- f. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- g. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- h. The dialog shall have command buttons labeled Close, Map, and Print.
- i. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied

throughout the study region. If the user selects no, the dialog shall close without saving changes.

- j. Selection of Map shall add the listed facilities to the map layer and table of contents.
- k. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

Label	Earthquake Classification	General Classification	Specific Classification	Hazus Valuation	% Damage	\$ Loss	Functionality
HRD1	HRD1	HighwayRoads	Major Roads (1km 4 lanes)	10,000	No	No	No
HRD2	HRD2	HighwayRoads	Urban Roads (1 km 2 lanes)	5,000	No	No	No
HTU	HTU1, 2	Highway Tunnel	Highway Tunnel	20,000	No	No	No
HWBM	HWB1, 2	Highway Bridge	Major Bridge	20,000	Yes	No	Yes
HWBO	HWB3, 4, 28	Highway Bridge	Other Bridge (include all wood)	1,000	Yes	No	Yes
HWBCO	HWB5, 6, 7, 17, 18	Highway Bridge	Other Concrete Bridge	1,000	Yes	No	Yes
HWBCC	HWB8, 9, 10, 11, 20, 21, 22, 23	Highway Bridge	Continuous Concrete Bridge	5,000	Yes	No	Yes
HWBSO	HWB12, 13, 14, 24, 25	Highway Bridge	Other Steel Bridge	1,000	Yes	No	Yes
HWBSC	HWB15, 16, 26, 27	Highway Bridge	Continuous Steel Bridge	5,000	Yes	No	Yes

Highway Classifications, Valuation and Flood Model Analysis

3.2.5.3.6.1. Transportation Systems: Railway Tab

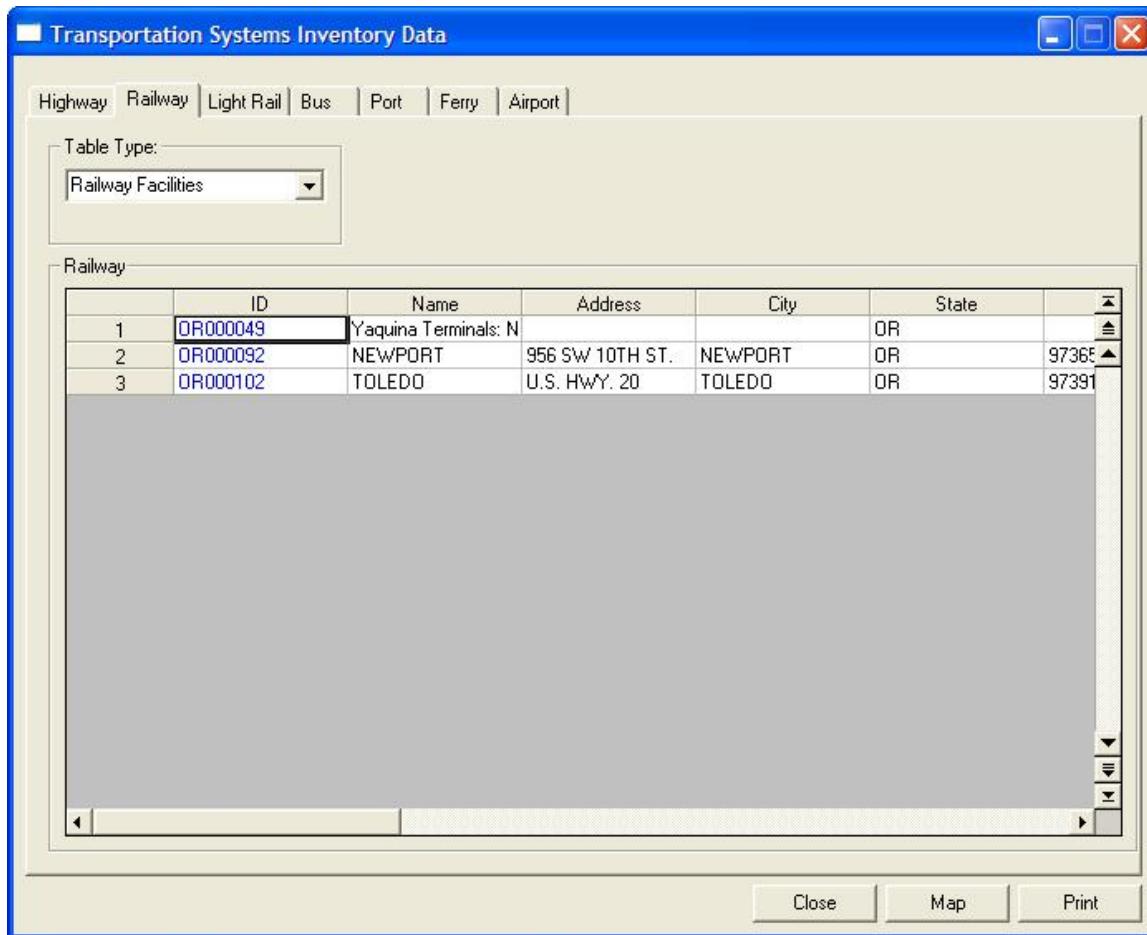


Figure 3-47: HAZUS Inventory Menu, Transportation Systems Dialog, Railway Tab

- Selection of the Railway Tab allows the user to view data related to the railway system within their study region. The Railway tab has the following appearance items:
 - A single combo box labeled Table Type. Railway Bridges is the default value upon opening of the dialog.
 - A single data grid labeled Railway.
- Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.

- a. When viewing Railway Bridges columns are labeled: ID, Name, Owner, BridgeClass, BridgeType, Width, NumSpans, Length, MaxSpanLength, Angle, SeatLength, SeatWidth, YearBuilt, YearRemodelled, PierType, FoundationType, ScourIndex, Traffic, TrafficIndex, Condition, Cost, Elevation, Latitude, Longitude, CountyFips, Comment.
- b. When viewing Railway Facilities columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, TransportationClass, Usage, YearBuilt, Cost, Traffic, BUPower, Latitude, Longitude, CountyFips, Comment.
- c. When viewing Railway Tunnels columns are labeled: ID, Name, Owner, TunnelClass, Description, TunnelType, Width, Length, YearBuilt, Traffic, Cost, Latitude, Longitude, CountyFips, Comment.
- d. When viewing Railway Segments columns are labeled: ID, Name, Owner, SegmentClass, Description, Length, Traffic, Cost, NumTracks, CountyFips, Comment
- e. The Flood Model will be producing damage estimates (% damage) and estimates of functionality for transportation bridges only. This includes Highway, Railway and Light Rail bridges. The flood model keys on the field Scour Index in the probabilistic analysis of the potential of bridge failure.
- f. All other transportation features, either default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- g. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- g. The dialog shall have command buttons labeled Close, Map, and Print.
- h. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- i. Selection of Map shall add the listed facilities to the map layer and table of contents.
- j. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.
- k. Table 3-6 maps the flood model Railway labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-6: Railway Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Classification	Specific Classification	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
RTR	RTR1, 2	Railway Tracks	Railway Tracks (per km)	1,500	No	No	No
RBRU	RBR1,	Railway Bridge	Railway Bridge Unknown	5,000	Yes	No	Yes
RBRC		Railway Bridge	Concrete Railway Bridge	5,000	Yes	No	Yes
RBRS		Railway Bridge	Steel Railway Bridge	5,000	Yes	No	Yes
RBRW		Railway Bridge	Wood Railway Bridge	5,000	Yes	No	Yes
RTU	RTU1, 2	Railway Tunnel	Railway Tunnel	10,000	No	No	No
RSTS	RST2L, RST3L, RST2M, RST3M, RST2H, RST3H	Railway Urban Station	Steel Railway Urban Station	2,000	No	No	No
RSTC	RST1L, RST5L, RST1M, RST5M, RST1H, RST5H	Railway Urban Station	Concrete Railway Urban Station	2,000	No	No	No
RSTW	RST7L, RST7M, RST7H	Railway Urban Station	Wood Railway Urban Station	2,000	No	No	No
RSTB	RST4L, RST6L, RST4M, RST6M, RST4H, RST6H	Railway Urban Station	Brick Railway Urban Station	2,000	No	No	No
RFF	RFF1, RFF2, RFF3, RFF4, RFF5	Railway Fuel Facility	Railway Fuel Facility (Tanks)	3,000	No	No	No
RDF	RDF1, RDF2, RDF3, RDF4	Railway Dispatch Facility	Railway Dispatch Facility (Equip)	3,000	No	No	No
RMFS	RMF2L, RMF3L, RMF2M, RMF3M, RMF2H, RMF3H,	Railway Maintenance Facility	Steel Railway Maintenance Facility	2,800	No	No	No
RMFC	RMF1L, RMF5L, RMF1M, RMF5M, RMF1H, RMF5H	Railway Maintenance Facility	Concrete Railway Maintenance Facility	2,800	No	No	No
RMFW	RMF7L, RMF7M, RMF7H	Railway Maintenance Facility	Wood Railway Maintenance Facility	2,800	No	No	No
RMFB	RMF4L, RMF6L, RMF4M, RMF6M, RMF4H, RMF6H	Railway Maintenance Facility	Brick Railway Maintenance Facility	2,800	No	No	No

3.2.5.3.6.2. Transportation Systems Dialog: Light Rail Tab

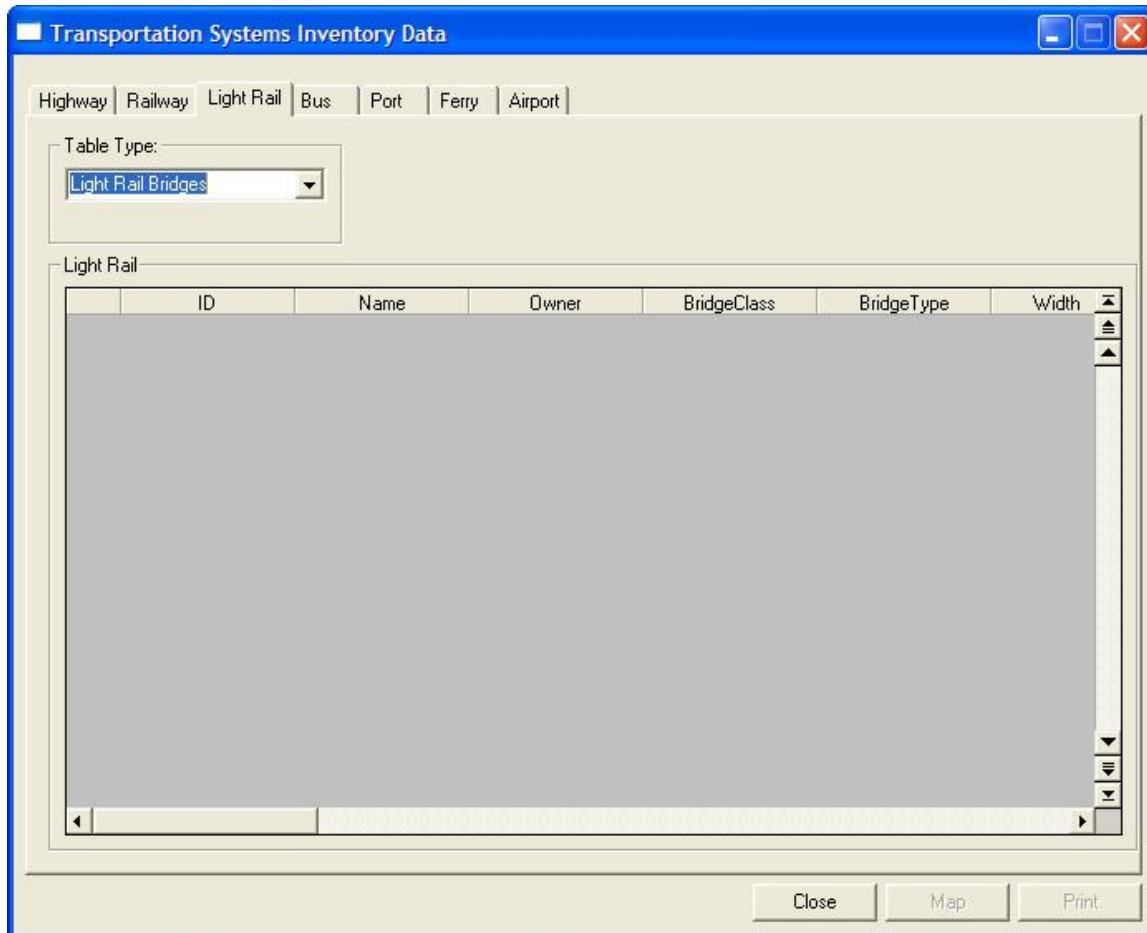


Figure 3-48: HAZUS Inventory Menu, Transportation Systems Dialog, Light Rail Tab

- a. Selection of the Light Rail Tab allows the user to view data related to the light railway system within their study region. The Light Rail tab has the following appearance items:
 - a. A single combo box labeled Table Type. Light Rail Bridges is the default value upon opening of the dialog.
 - b. A single data grid labeled Light Rail.
- b. Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.

- a. When viewing Light Rail Bridges columns are labeled: ID, Name, Owner, BridgeClass, BridgeType, Width, NumSpans, Length, MaxSpanLength, SkewAngle, SeatLength, SeatWidth, YearBuilt, YearRemodelled, PierType, FoundationType, ScourIndex, Traffic, TrafficIndex, Condition, Cost, Elevation, Latitude, Longitude, CountyFips, Comment.
 - b. When viewing Light Rail Facilities columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, TransportationClass, Usage, YearBuilt, Cost, NumStories, Traffic, BUPower, Latitude, Longitude, CountyFips, Comment.
 - c. When viewing Light Rail Tunnels columns are labeled: ID, Name, Owner, TunnelClass, Description, Type, Width, Length, YearBuilt, Traffic, Cost, Latitude, Longitude, CountyFips, Comment.
 - d. When viewing Light Rail Segments columns are labeled: ID, Name, Owner, SegmentClass, Description, Length, Traffic, Cost, NumTracks, CountyFips, Comment.
- c. The Flood Model will be producing damage estimates (% damage) and estimates of functionality for transportation bridges only. This includes Highway, Railway and Light Rail bridges. The flood model keys on the field Scour Index in the probabilistic analysis of the potential of bridge failure.
- a. All other transportation features, either default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
 - d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
 - e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.
- j. Table 3-7 maps the flood model Light Rail labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-7: Light Rail Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
LTR	LTR1	Light Rail Track	Light Rail Track (per km)	1,500	No	No	No
LBRU	LBR1, LBR2	Light Rail Bridge	Light Rail Bridge Unknown	5,000	Yes	No	Yes
LBRC	LBR1, LBR2	Light Rail Bridge	Concrete Light Rail Bridge	5,000	Yes	No	Yes
LBRS	LBR1, LBR2	Light Rail Bridge	Steel Light Rail Bridge	5,000	Yes	No	Yes
LBRW	LBR1, LBR2	Light Rail Bridge	Wood Light Rail Bridge	5,000	Yes	No	Yes
LTU	LTU1, LTU2	Light Rail Tunnel	Light Rail Tunnel	10,000	No	No	No
LDC	LDC1, LDC2	DC Substation	DC Substation (equip)	2,000	No	No	No
LDF	LDF1, LDF2, LDF3, LDF4	Dispatch Facility	Dispatch Facility (equip)	3,000	No	No	No
LMFS	LMF2L, LMF3L, LMF2M, LMF3M, LMF2H, LMF3H	Maintenance Facility	Steel Maintenance Facility	2,600	No	No	No
LMFC	LMF1L, LMF5L, LMF1M, LMF5M, LMF1H, LMF5H	Maintenance Facility	Concrete Maintenance Facility	2,600	No	No	No
LMFW	LMF7L, LMF7M, LMF7H	Maintenance Facility	Wood Maintenance Facility	2,600	No	No	No
LMFB	LMF4L, LMF6L, LMF4M, LMF6M, LMF4H, LMF6H	Maintenance Facility	Brick Maintenance Facility	2,600	No	No	No

*** All values are in thousands of dollars

3.2.5.3.6.3. Transportation Systems Dialog: Bus Tab

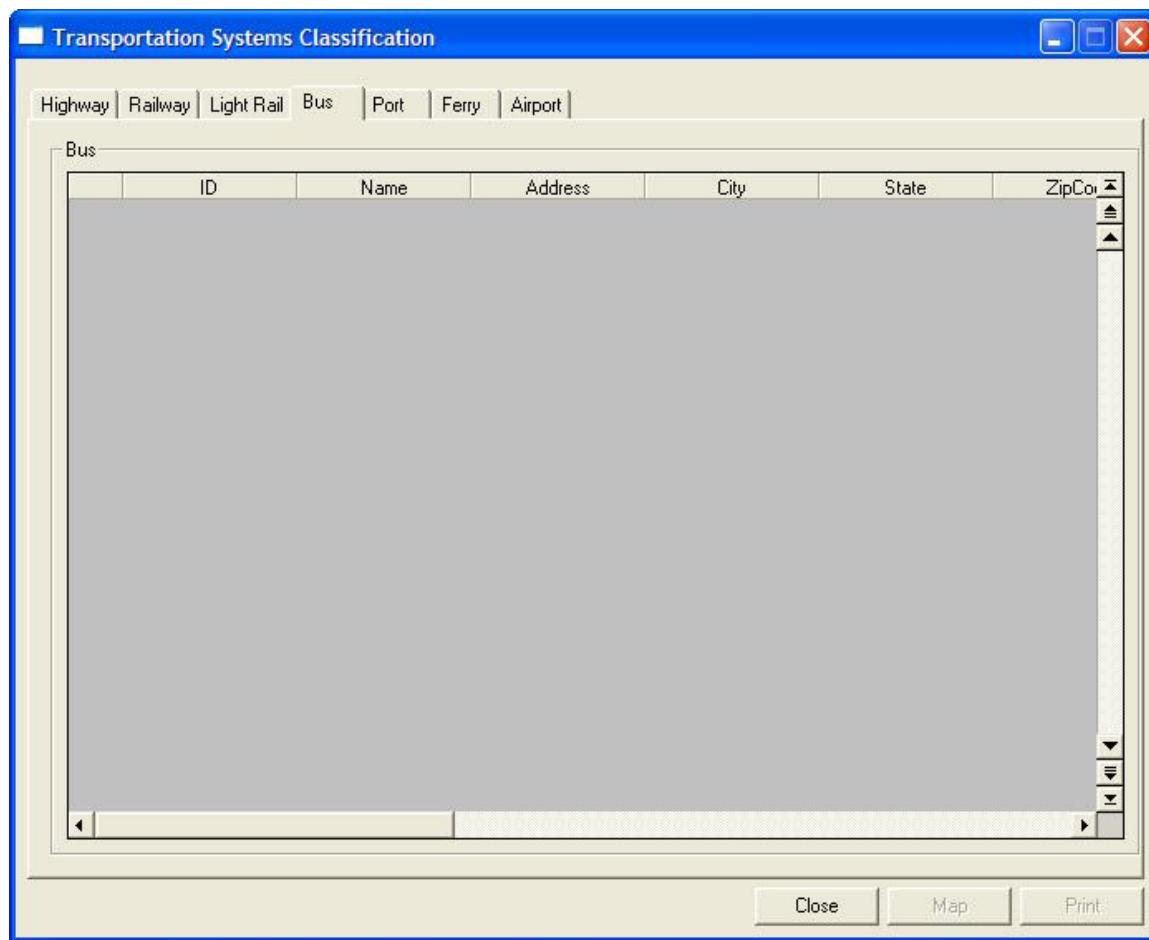


Figure 3-49: HAZUS Inventory Menu, Transportation Systems Dialog, Bus Tab

- a. Selection of the Bus Tab allows the user to view data related to the bus system within their study region. The Bus tab has the following appearance items:
 - a. Dialog has no combo box.
 - b. A single data grid labeled Bus.
- b. Data in the data grid is editable. The data grid columns names are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, TransportationClass, Usage, YearBuilt, Cost, Traffic, BUPOWER, Latitude, Longitude, CountyFips, and Comment. Column labeled ID is not editable and is displayed in Blue text.

- c. The Flood Model will be producing damage estimates (% damage) and estimates of functionality for transportation bridges only. This includes Highway, Railway and Light Rail bridges.
 - a. All other transportation features, either default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

- j. Table 3-8 maps the flood model Bus labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-8: Bus Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
BPTS	BPT2L, BPT3L, BPT2M, BPT3M, BPT2H, BPT3H	Bus Urban Station	Steel Bus Urban Station	1,000	No	No	No
BPTC	BPT1L, BPT5L, BPT1M, BPT5M, BPT1H, BPT5H	Bus Urban Station	Concrete Bus Urban Station	1,000	No	No	No
BPTB	BPT4L, BPT6L, BPT4M, BPT6M, BPT4H, BPT6H	Bus Urban Station	Brick Bus Urban Station	1,000	No	No	No
BPTW	BPT7L, BPT7M, BPT7H	Bus Urban Station	Wood Bus Urban Station	1,000	No	No	No
BFF	BFF1, BFF2, BFF3, BFF4, BFF5	Bus Fuel Facility	Bus Fuel Facility (tanks)	150	No	No	No
BDF	BDF1, BDF2, BDF3, BDF4	Bus Dispatch Facility	Bus Dispatch Facility (equip)	400	No	No	No
BMFW	BMF7L, BMF7M, BMF7H	Bus Maintenance Facility	Wood Bus Maintenance Facility	1,300	No	No	No
BMFS	BMF2L, BMF3L, BMF2M, BMF3M, BMF2H, BMF3H	Bus Maintenance Facility	Steel Bus Maintenance Facility	1,300	No	No	No
BMFC	BMF1L, BMF5L, BMF1M, BMF5M, BMF1H, BMF5H	Bus Maintenance Facility	Concrete Bus Maintenance Facility	1,300	No	No	No
BMFB	BMF4L, BMF6L, BMF4M, BMF6M, BMF4H, BMF6H	Bus Maintenance Facility	Brick Bus Maintenance Facility	1,300	No	No	No

*** All values are in thousands of dollars

3.2.5.3.6.4. Transportation Systems Dialog: Port Tab

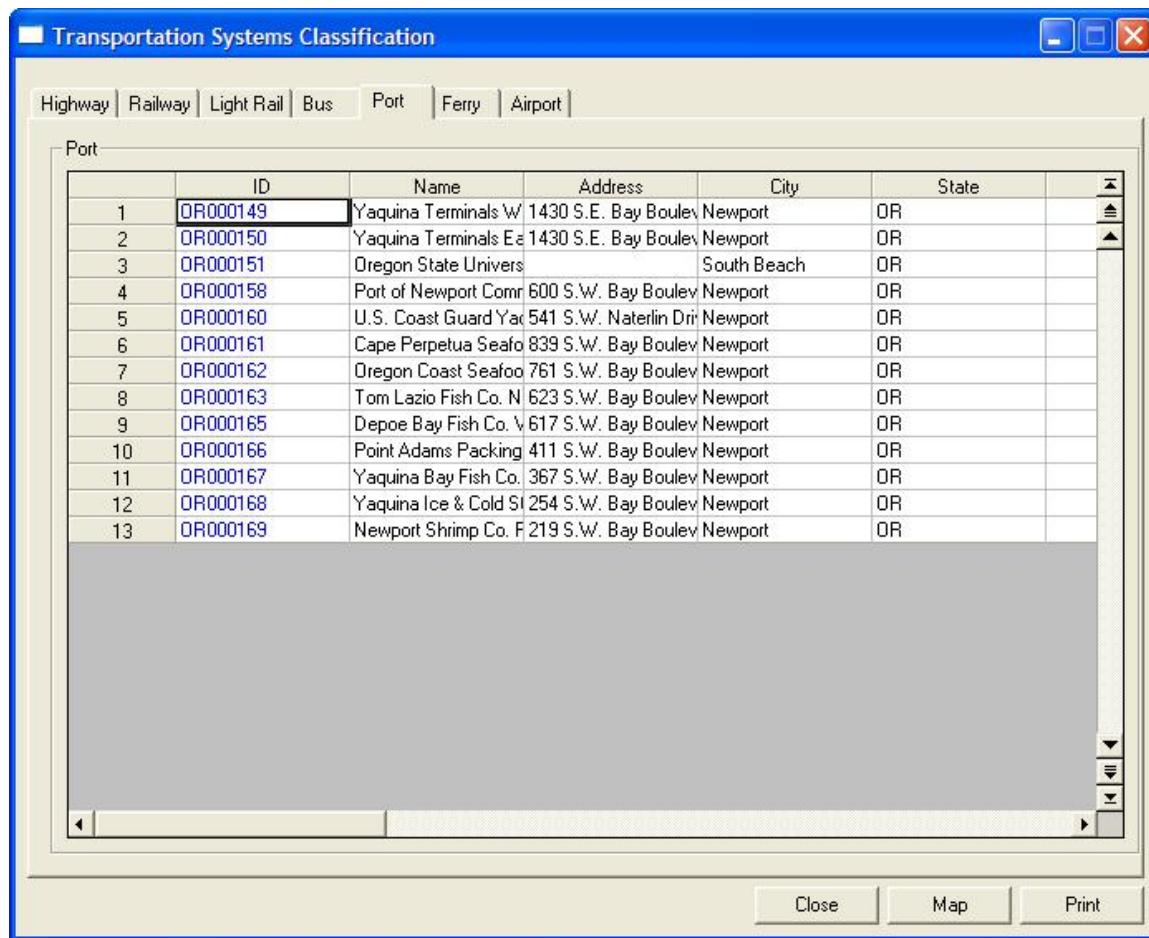


Figure 3-50: HAZUS Inventory Menu, Transportation Systems Dialog, Port Tab

- Selection of the Port Tab allows the user to view data related to ports within their study region. The Port tab has the following appearance items:
 - Dialog has no combo box.
 - A single data grid labeled Port.
- Data in the data grid is editable. The data grid columns names are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, TransportationClass, Usage, YearBuilt, Cost, Capacity, Berths, BUPower, Latitude, Longitude, CountyFips, and Comment. Column labeled ID is not editable and is displayed in Blue text.

- c. The Flood Model will be producing damage estimates (% damage) and estimates of functionality for transportation bridges only. This includes Highway, Railway and Light Rail bridges.
 - a. All other transportation features, either default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

- j. Table 3-9 maps the flood model Port labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-9: Port Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
PWS	PWS1	Waterfront Structures	Waterfront Structures	1,500	No	No	No
PEQ	PEQ1, PEQ2	Cranes/Cargo Handling Equipment	Cranes/Cargo Handling Equipment	2,000	No	No	No
PWHW	PWH7L, PWH7M, PWH7H	Warehouses	Wood Port Warehouses	1,200	No	No	No
PWHS	PWH2L, PWH3L, PWH2M, PWH3M, PWH2H, PWH3H	Warehouses	Steel Port Warehouses	1,200	No	No	No
PWHC	PWH1L, PWH5L, PWH1M, PWH5M, PWH1H, PWH5H	Warehouses	Concrete Port Warehouses	1,200	No	No	No
PWHB	PWH4L, PWH6L, PWH4M, PWH6M, PWH4H, PWH6H	Warehouses	Brick Port Warehouses	1,200	No	No	No
PFF	PFF1, PFF2, PFF3, PFF4, PFF5	Fuel Facility	Port Fuel Facility	2,000	No	No	No

*** All values are in thousands of dollars

3.2.5.3.6.5. Transportation Systems Dialog: Ferry Tab

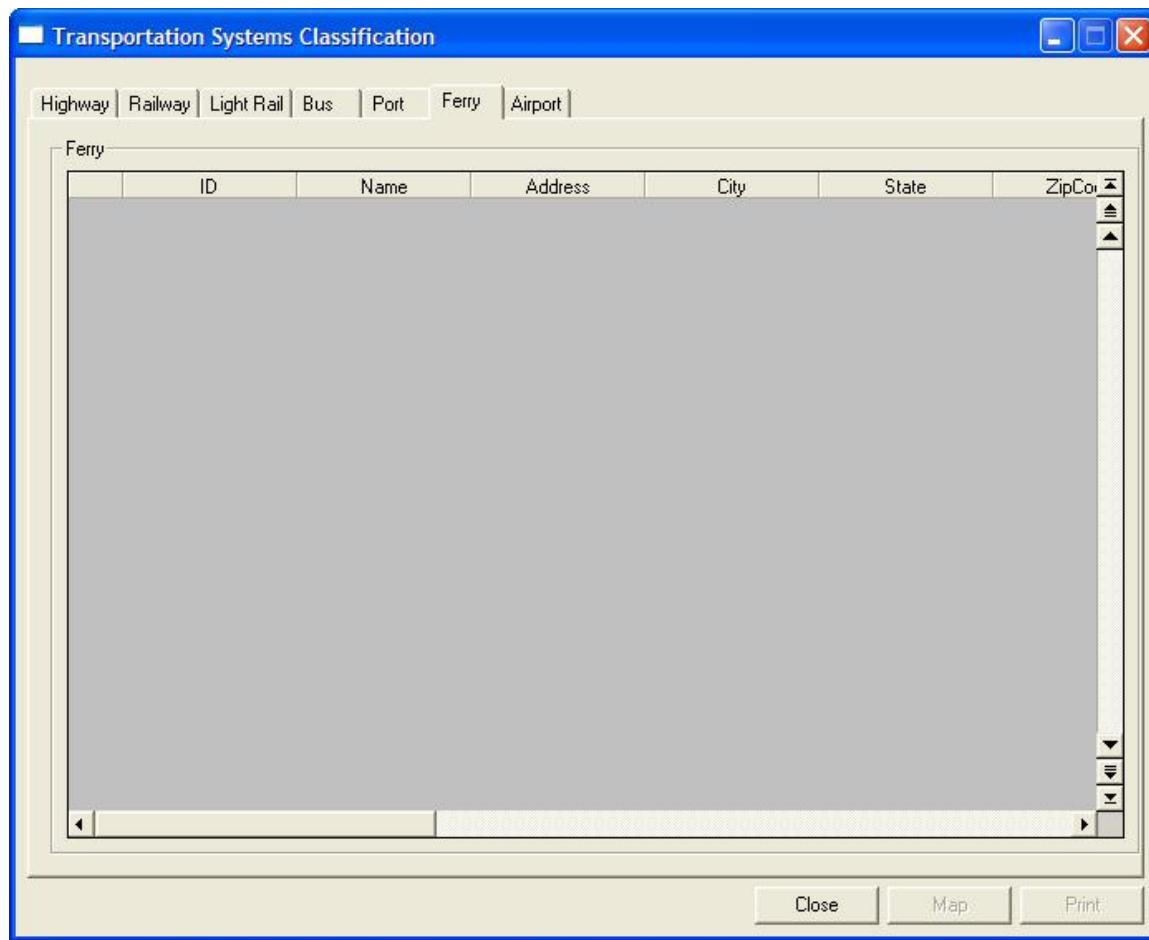


Figure 3-51: HAZUS Inventory Menu, Transportation Systems Dialog, Ferry Tab

- a. Selection of the Ferry Tab allows the user to view data related to the Ferry system within their study region. The Ferry tab has the following appearance items:
 - a. Dialog has no combo box.
 - b. A single data grid labeled Ferry.
- b. Data in the data grid is editable. The data grid columns names are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, TransportationClass, Usage, YearBuilt, Cost, NumStories, Traffic, BUPower, Latitude, Longitude, CountyFips, and Comment. Column labeled ID is not editable and is displayed in Blue text.

- c. The Flood Model will be producing damage estimates (% damage) and estimates of functionality for transportation bridges only. This includes Highway, Railway and Light Rail bridges.
 - a. All other transportation features, either default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

- j. Table 3-10 maps the flood model Ferry labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-10: Ferry Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
FWS	FWS1	Water Front Structures	Ferry Waterfront Structures	1,500	No	No	No
FPTW	FPT7L, FPT7M, FPT7H	Ferry Passenger Terminals	Wood Ferry Passenger Terminals	1,000	No	No	No
FPTS	FPT2L, FPT3L, FPT2M, FPT3M, FPT2H, FPT3H	Ferry Passenger Terminals	Steel Ferry Passenger Terminals	1,000	No	No	No
FPTC	FPT1L, FPT5L, FPT1M, FPT5M, FPT1H, FPT5H	Ferry Passenger Terminals	Concrete Ferry Passenger Terminals	1,000	No	No	No
FPTB	FPT4L, FPT6L, FPT4M, FPT6M, FPT4H, FPT6H	Ferry Passenger Terminals	Brick Ferry Passenger Terminals	1,000	No	No	No
FFF	FFF1, FFF2, FFF3, FFF4, FFF5	Ferry Fuel Facility	Ferry Fuel Facility	400	No	No	No
FDF	FDF1, FDF2, FDF3, FDF4	Ferry Dispatch Facility	Ferry Dispatch Facility	200	No	No	No
FMFW	FMF7L, FMF7M, FMF7H	Piers and Dock Facilities	Wood Piers and Dock Facilities	520	No	No	No
FMFS	FMF2L, FMF3L, FMF2M, FMF3M, FMF2H, FMF3H	Piers and Dock Facilities	Steel Piers and Dock Facilities	520	No	No	No
FMFC	FMF1L, FMF5L, FMF1M, FMF5M, FMF1H, FMF5H	Piers and Dock Facilities	Concrete Piers and Dock Facilities	520	No	No	No
FMFB	FMF4L, FMF6L, FMF4M, FMF6M, FMF4H, FMF6H	Piers and Dock Facilities	Brick Piers and Dock Facilities	520	No	No	No

*** All values are in thousands of dollars

3.2.5.3.6.6. Transportation Systems Dialog Airport Tab

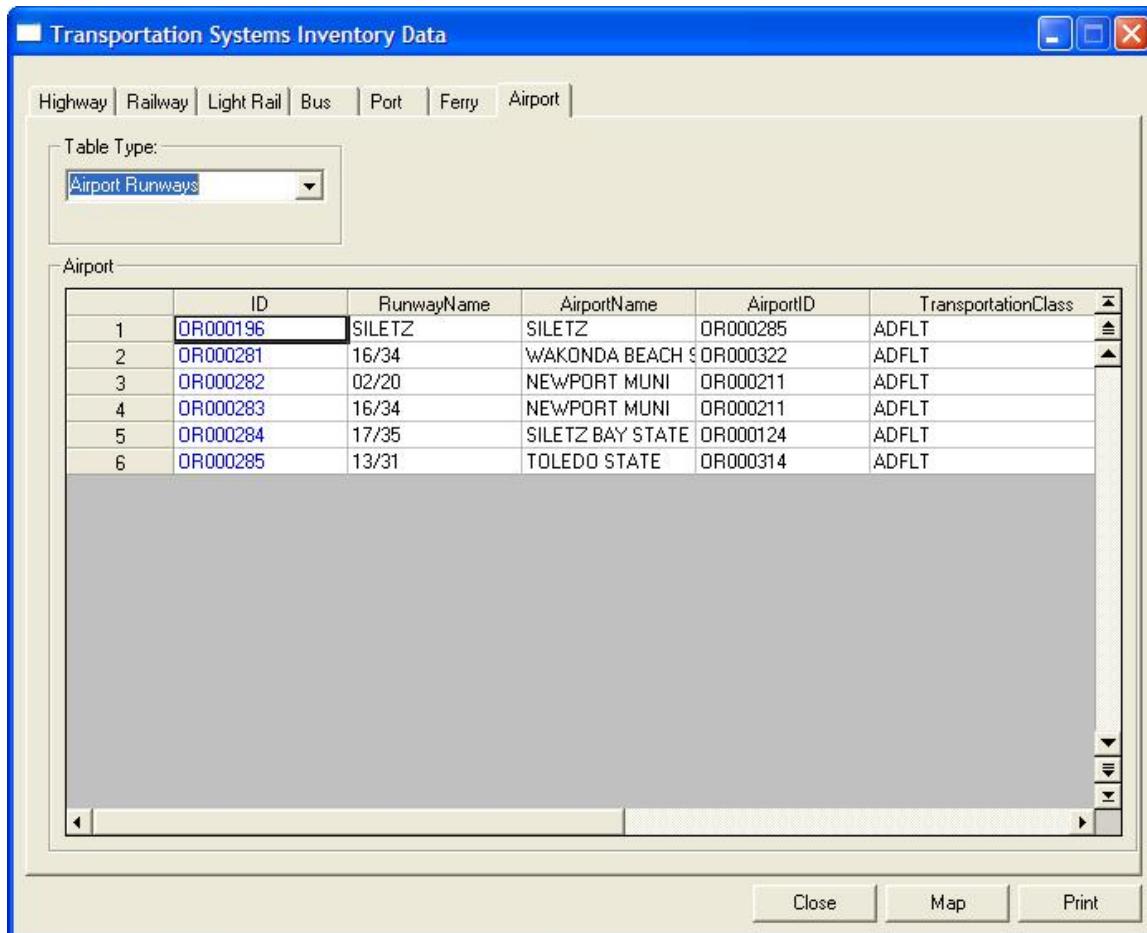


Figure 3-52: HAZUS Inventory Menu, Transportation Systems Dialog, Airport Tab

- Selection of the Airport Tab allows the user to view data related to airports within their study region. The Airport tab has the following appearance items:
 - A single combo box labeled Table Type. Airport Runways is the default value upon opening of the dialog.
 - A single data grid labeled Airport.
- Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.

- a. When viewing Airport Runways columns are labeled: ID, RunwayName, AirportName, AirportID, TransportationClass, PavementType, Length, Cost, Capacity, CountyFips, Comment.
- b. When viewing Airport Facilities columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, TransportationClass, Usage, YearBuilt, Cost, Flights, Passengers, Capacity, BUPower, Latitude, Longitude, CountyFips, Comment.
- c. The Flood Model will be producing damage estimates (% damage) and estimates of functionality for transportation bridges only. This includes Highway, Railway and Light Rail bridges. The flood model keys on the field Scour Index in the probabilistic analysis of the potential of bridge failure.
 - a. All other transportation features, either default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.

- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.
- j. Table 3-11 maps the flood model Airport labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-11: Airport Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancies	Specific Occupancies	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
ACTW	ACT7L, ACT7M, ACT7H	Airport Control Towers	Wood Airport Control Towers	5,000	No	No	No
ACTS	ACT2L, ACT3L, ACT2M, ACT3M, ACT2H, ACT3H	Airport Control Towers	Steel Airport Control Towers	5,000	No	No	No
ACTC	ACT1L, ACT5L, ACT1M, ACT5M, ACT1H, ACT5H	Airport Control Towers	Concrete Airport Control Towers	5,000	No	No	No
ACTB	ACT4L, ACT6L, ACT4M, ACT6M, ACT4H, ACT6H	Airport Control Towers	Brick Airport Control Towers	5,000	No	No	No
APTR	ARW1	Airport Runway	Airport Runway (total)	28,000	No	No	No
AFF	AFF1, AFF2, AFF3, AFF4, AFF5	Fuel Facilities	Fuel Facilities	5,000	No	No	No
AFO	AFO1	Seaport / Stolport / Gliderport / etc.	Seaport / Stolport / Gliderport / etc.	500	No	No	No
AFH	AFH1	Heliport Facilities	Heliport Facilities	2,000	No	No	No
APS	ALL	Airport Parking Structure	Airport Parking Structure	1,400	No	No	No

Label	Earthquake Classification	General Occupancies	Specific Occupancies	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
AMFW	AMF7L, AMF7M, AMF7H	Airport Maintenance & Hangar Facility	Wood Airport Maintenance & Hangar Facility	3,200	No	No	No
AMFS	AMF2L, AMF3L, AMF2M, AMF3M, AMF2H, AMF3H	Airport Maintenance & Hangar Facility	Steel Airport Maintenance & Hangar Facility	3,200	No	No	No
AMFC	AMF1L, AMF5L, AMF1M, AMF5M, AMF1H, AMF5H	Airport Maintenance & Hangar Facility	Concrete Airport Maintenance & Hangar Facility	3,200	No	No	No
AMFB	AMF4L, AMF6L, AMF4M, AMF6M, AMF4H, AMF6H	Airport Maintenance & Hangar Facility	Brick Airport Maintenance & Hangar Facility	3,200	No	No	No
ATBW	ATB7L, ATB7M, ATB7H	Airport Terminal Buildings	Wood Airport Terminal Buildings	8,000	No	No	No
ATBS	ATB2L, ATB3L, ATB2M, ATB3M, ATB2H, ATB3H	Airport Terminal Buildings	Steel Airport Terminal Buildings	8,000	No	No	No
ATBC	ATB1L, ATB5L, ATB1M, ATB5M, ATB1H, ATB5H	Airport Terminal Buildings	Concrete Airport Terminal Buildings	8,000	No	No	No
ATBB	ATB4L, ATB6L, ATB4M, ATB6M, ATB4H, ATB6H	Airport Terminal Buildings	Brick Airport Terminal Buildings	8,000	No	No	No
ATBU	ATBU1	Airport Terminal Unknown	Airport Terminal Buildings Unknown	8,000	No	No	No

***All values are in thousands of dollars

3.2.5.3.7. Utility Systems Submenu

3.2.5.3.7.1. Utility Systems Dialog: Potable Water Tab

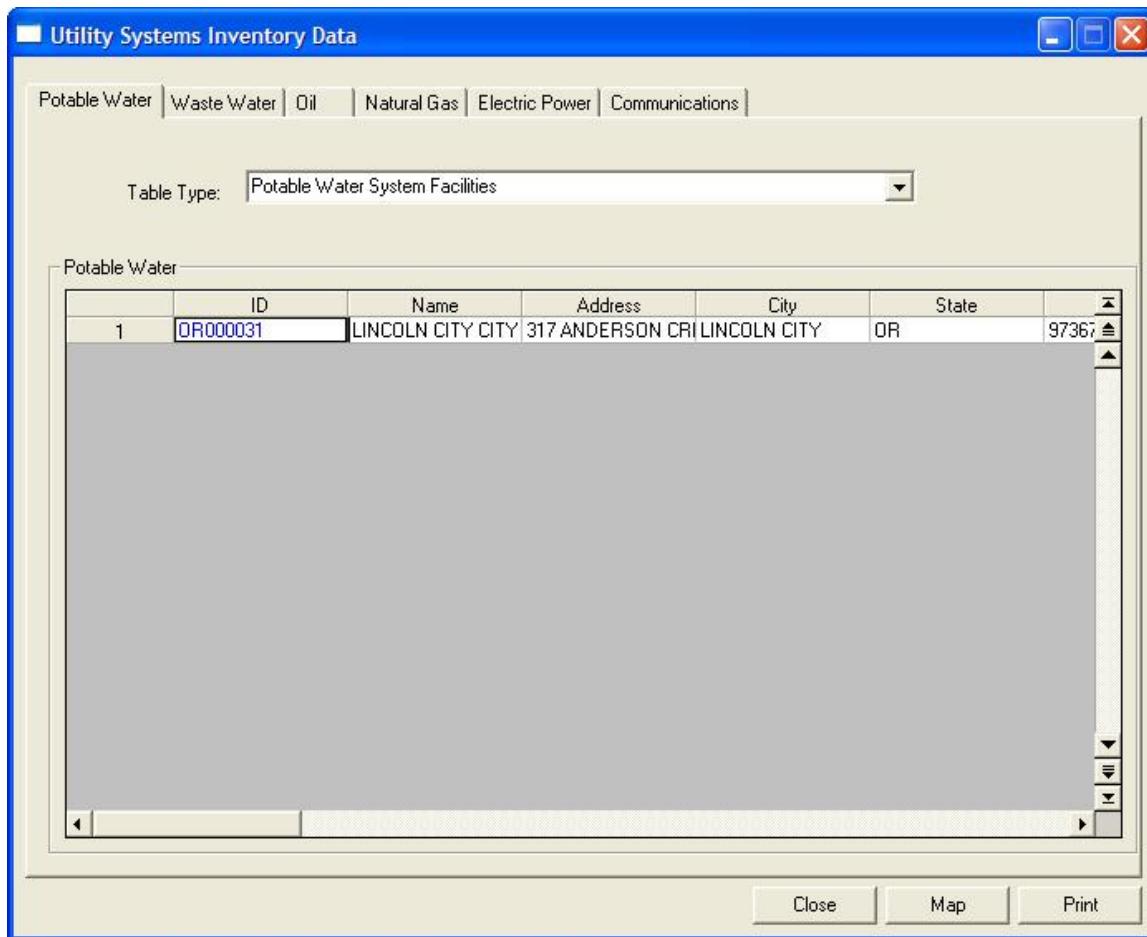


Figure 3-53: HAZUS Inventory Menu, Utility Systems Dialog, Potable Water Tab

- a. Selection of Utility Systems on the Inventory menu allows the user access a dialog designed to allow users to view, edit, import, and/or export utility systems data to their region or analysis. The Flood Model performs analysis on components of the utility systems presented herein as damage functions were available. Additional funding and research is required to expand the current functionality. This dialog allows the user to view and edit the data used in HAZUS. This is a standard HAZUS dialog with exceptions as noted:
 - a. The dialog has six tabs.
 - b. The dialog has a single combo box.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. Data is stored in the following tables:
- a. clUtilFacilities, hzPotableWaterFlty, flPotableWaterFlty, clPipelines, hzPotableWaterPI, and flPotableWaterPI for data on the Potable Water tab,
 - b. clUtilFacilities, hzWasteWaterFlty, flWasteWaterFlty, clPipelines, hzWasteWaterPI, and flWasteWaterPI for data on the Waste Water tab,
 - c. clUtilFacilities, hzOilFlty, flOilFlty, clPipelines, hzOilPI, and flOilPI for data on the Oil tab,
 - d. clUtilFacilities, hzNaturalGasFlty, flNaturalGasFlty, clPipelines, hzNaturalGasPI, and flNaturalGasPI for data on the Natural Gas tab,
 - e. clUtilFacilities, hzElectricPowerFlty and flElectricPowerFlty for data on the Electric Power tab,
 - f. clUtilFacilities and hzCommunicationsFlty for data on the Communications tab,
- c. The data views are as follows:

Tab	Combo Selection	View
Potable Water	Potable Water Systems Facilities	absv_PotableWaterFacility
Potable Water	Potable Water Network System Pumps	absv_PotableWaterPumps
Potable Water	Control Vaults & Control Stations	absv_PotableWaterControlVaults

Tab	Combo Selection	View
Potable Water	Potable Water Network System Tanks	absv_PotableWaterTanks
Potable Water	Potable Water Network System Wells	absv_PotableWaterWells
Potable Water	Potable Water Pipelines Segments	absv_PotableWaterPI
Waste Water	Waste Water Treatment Plants	absv_WasteWaterTreatmentPlants
Waste Water	Waste Water Lift Stations	absv_WasteWaterLiftStations
Waste Water	Control Vaults & Control Stations	absv_WasteWaterCtrlVltsAndCtrlStns
Waste Water	Waste Water Pipelines	absv_WasteWaterPI
Oil	Oil Refineries	absv_OilRefineries
Oil	Oil Pumping Plants	absv_OilPumpingPlants
Oil	Oil Tank Farm	absv_OilTankFarm
Oil	Oil Control Vaults & Control Stations	absv_OilCtrlVaultsCtrlStns
Oil	Oil Pipelines	absv_OilPI
Natural Gas	Compressor Plants	absv_NaturalGasCompressorPlants
Natural Gas	Control Vaults & Control Stations	absv_NaturalGasCtrlVltsAndCtrlStns
Natural Gas	Natural Gas Pipelines	absv_NaturalGasPI
Electric Power	Power Plants	absv_PowerPlants
Electric Power	Power Substations	absv_ElectricPowerSubstations
Communications	Central Offices and Switching Stations	absv_CommCentralOfficesSwitchingStns
Communications	Control Vaults and Control Stations	absv_CommControlVaultsAndControlStations
Communications	Broadcast Facility	absv_CommBroadcastFlty

- d. The default tab is the Potable Water Tab. The Potable Water tab has the following appearance items:
- a. A single combo box labeled Table Type. Potable Water System Facilities is the default value upon opening of the dialog.
 - b. A single data grid labeled Potable Water.
- e. Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.
- a. When viewing Potable Water System Facilities columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, Class, Description, Usage, Cost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, YearUpgraded, SystemId, GClass, BUPower, Capacity, Demand, Latitude, Longitude, Comment.
 - b. When viewing Potable Water Network System Pumps columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, Class, Description, Usage, Cost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, YearUpgraded, SystemId, GClass, BUPower, Capacity, Demand, Latitude, Longitude, Comment.
 - c. When viewing Control Vaults & Control Stations columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, Class, Description, Usage, Cost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, YearUpgraded, SystemId, GClass, BUPower, Capacity, Demand, Latitude, Longitude, Comment.
 - d. When viewing Potable Water System Tanks columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, Class, Description, Usage, Cost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, YearUpgraded, SystemId, GClass, BUPower, Capacity, Demand, Latitude, Longitude, Comment.

- e. When viewing Potable Water Network System Wells columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, Class, Description, Usage, Cost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, YearUpgraded, SystemId, GClass, BUPower, Capacity, Demand, Latitude, Longitude, Comment.
- f. When viewing Potable Water Pipelines Segments columns are labeled: ID, Name, Owner, MaterialType, Class, Description, Cost, YearBuilt, VulnerabilityToScour, DamageFunction, Diameter, PipeLength, Joint, SourceId, CountyFIPS, Comment.
- f. The Flood Model produces damage and loss of function based on vulnerable electronic equipment for the various utility system components. The flood model does not produce any losses related to pipelines for any of the utility systems.
 - a. All other utility system features, either by default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- g. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- i. The dialog shall have command buttons labeled Close, Map, and Print.

- j. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- k. Selection of Map shall add the listed facilities to the map layer and table of contents.
- l. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.
- m. Table 3-12 maps the flood model Potable Water labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-12: Potable Water Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
PWPE	PWP1, PWP2	Pipelines	Exposed Transmission Pipeline Crossing	1	No	No	Yes
PWPB	PWP1, PWP2	Pipelines	Buried Transmission Pipeline Crossing	1	No	No	Yes
PWP	PWP1, PWP2	Pipelines	Pipelines (non-crossing)	1	No	No	No
PWSO	PWT1, PWT2	Water Treatment Plants	Small Water Treatment Plants Open/Gravity	30,000	Yes	Yes	Yes

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
PWMO	PWT3, PWT4	Water Treatment Plants	Medium Water Treatment Plants Open/Gravity	100,000	Yes	Yes	Yes
PWLO	PWT5, PWT6	Water Treatment Plants	Large Water Treatment Plants Open/Gravity	360,000	Yes	Yes	Yes
PWSC	PWT1, PWT2	Water Treatment Plants	Small Water Treatment Plants Closed/Pressure	30,000	Yes	Yes	Yes
PWMC	PWT3, PWT4	Water Treatment Plants	Medium Water Treatment Plants Closed/Pressure	100,000	Yes	Yes	Yes
PWLC	PWT5, PWT6	Water Treatment Plants	Large Water Treatment Plants Closed/Pressure	360,000	Yes	Yes	Yes
PPSB	PPP1, PPP2	Pumping Plants	Pumping Plants (Small) Below Grade	150	Yes	Yes	Yes
PPMB	PPP3, PPP4	Pumping Plants	Pumping Plants (Med/Large) Below Grade	525	Yes	Yes	Yes

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
PPSA	PPP1, PPP2	Pumping Plants	Pumping Plants (Small) Above Grade	150	Yes	Yes	Yes
PPMA	PPP3, PPP4	Pumping Plants	Pumping Plants (Med/Large) Above Grade	525	Yes	Yes	Yes
PCVS	N/A	Control Vaults and Stations	Control Vaults and Stations	50	Yes	No	Yes
PSTC	PST1, PST2	Water Storage Tanks	Water Storage Tanks At Grade Concrete	1,500	Yes	Yes	Yes
PSTS	PST3, PST4	Water Storage Tanks	Water Storage Tanks At Grade Steel	800	Yes	Yes	Yes
PSTW	PST6	Water Storage Tanks	Water Storage Tanks At Grade Wood	30	Yes	Yes	Yes
PSTE	PST5	Water Storage Tanks	Water Storage Tanks Elevated	800	Yes	Yes	Yes
PSTB	N/A	Water Storage Tanks	Water Storage Tanks Below Grade (all)	1,500	Yes	Yes	Yes
PWE	PWE1	Wells	Wells	400	No	No	No

*** All values are in thousands of dollars

3.2.5.3.7.1.1. Utility Systems Dialog: Wastewater Tab

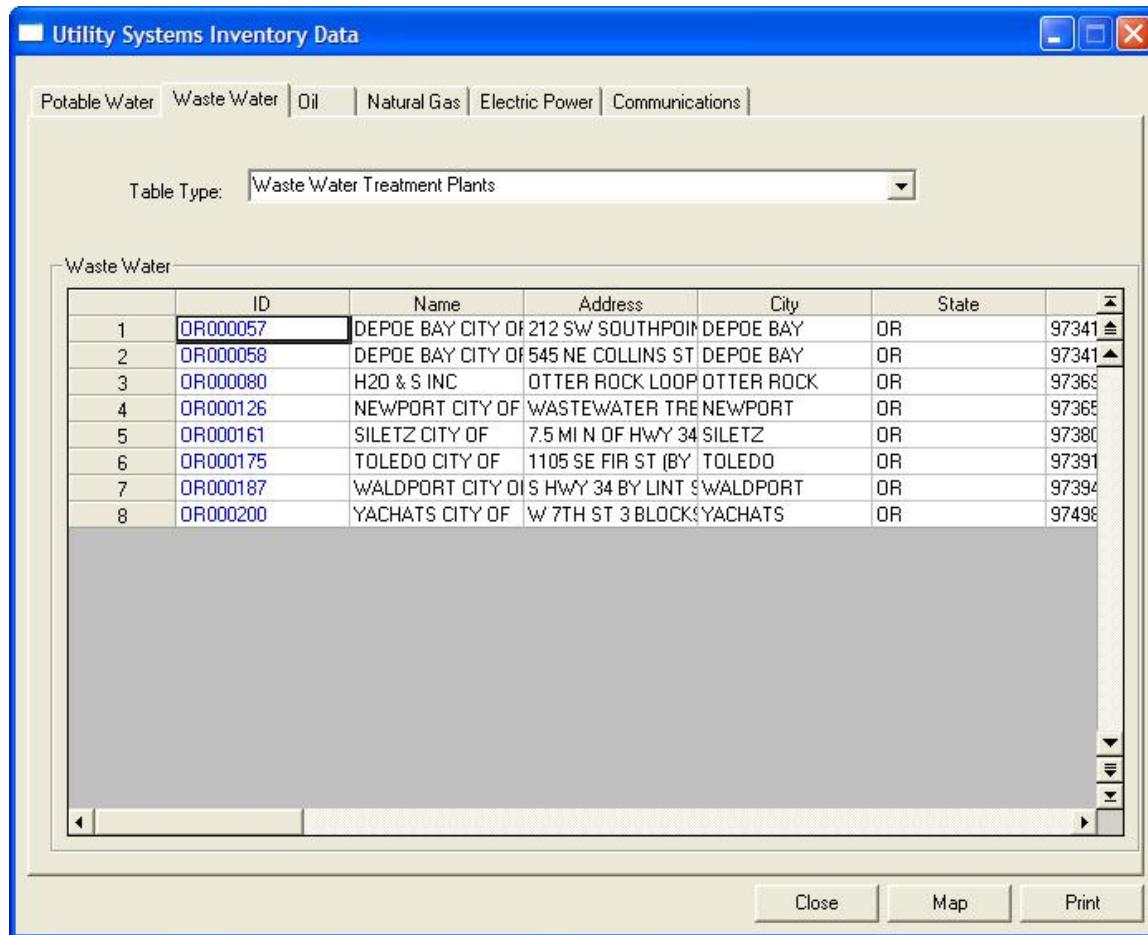


Figure 3-54: HAZUS Inventory Menu, Utility Systems Dialog, Wastewater Tab

- Selection of the Waste Water Tab allows the user to view data related to the waste water system within their study region. The Waste Water tab has the following appearance items:
 - A single combo box labeled Table Type. Waste Water Treatment Plants is the default value upon opening of the dialog.
 - A single data grid labeled Waste Water.
- Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.

- a. When viewing Waste Water Treatment Plants columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, UtilFcltyClass, Description, Usage, FacilityCost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, GClass, SystemId, YearUpgraded, BUPower, Capacity, Demand, Latitude, Longitude, Comment.
 - b. When viewing Waste Water Lift Stations columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, UtilFcltyClass, Description, Usage, FacilityCost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, GClass, SystemId, YearUpgraded, BUPower, Capacity, Demand, Latitude, Longitude, Comment.
 - c. When viewing Control Vaults & Control Stations columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, UtilFcltyClass, Description, Usage, FacilityCost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, GClass, SystemId, YearUpgraded, BUPower, Capacity, Demand, Latitude, Longitude, Comment.
 - d. When viewing Waste Water Pipelines columns are labeled: ID, Name, Owner, MaterialType, Class, Description, Cost, YearBuilt, VulnerabilityToScour, DamageFnId, Diameter, Length, Joint, SourceId, CountyFips, Comment.
- c. The Flood Model produces damage and loss of function based on vulnerable electronic equipment for the various utility system components. The flood model does not produce any losses related to pipelines for any of the utility systems.
- a. All other utility system features, either by default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.
- j. Table 3-13 maps the flood model Waste Water labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-13: Waste Water Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
WWPE	WWP1, WWP2	Sewers & Interceptors	Exposed Collector River Crossings	1	No	No	Yes
WWPB	WWP1, WWP2	Sewers & Interceptors	Buried Collector River Crossings	1	No	No	Yes
WWP	WWP1, WWP2	Sewers & Interceptors	Pipes (non-crossings)	1	No	No	No
WWTS	WWT1, WWT2	Wastewater Treatment Plants	Small Wastewater Treatment Plants	60,000	Yes	Yes	Yes
WWTM	WWT3, WWT4	Wastewater Treatment Plants	Medium Wastewater Treatment Plants	200,000	Yes	Yes	Yes
WWTL	WWT5, WWT6	Wastewater Treatment Plants	Large Wastewater Treatment Plants	720,000	Yes	Yes	Yes
WWCV	N/A	Control Vaults and Control Stations	Control Vaults and Control Stations	50	Yes	No	Yes
WLSW	WLS1, WLS2	Lift Stations	Lift Station (Small) Wet Well/Dry Well	300	Yes	Yes	Yes
WLMW	WLS3, WLS4	Lift Stations	Lift Station (Med/Large) Wet Well/Dry Well	1,050	Yes	Yes	Yes
WLSS	WLS1, WLS2	Lift Stations	Lift Station (Small) Submersible	300	Yes	Yes	Yes
WLMS	WLS3, WLS4	Lift Stations	Lift Station (Med/Large) Submersible	1,050	Yes	Yes	Yes

***All values are in thousands of dollars

3.2.5.3.7.1.2. Utility Systems Dialog: Oil Tab

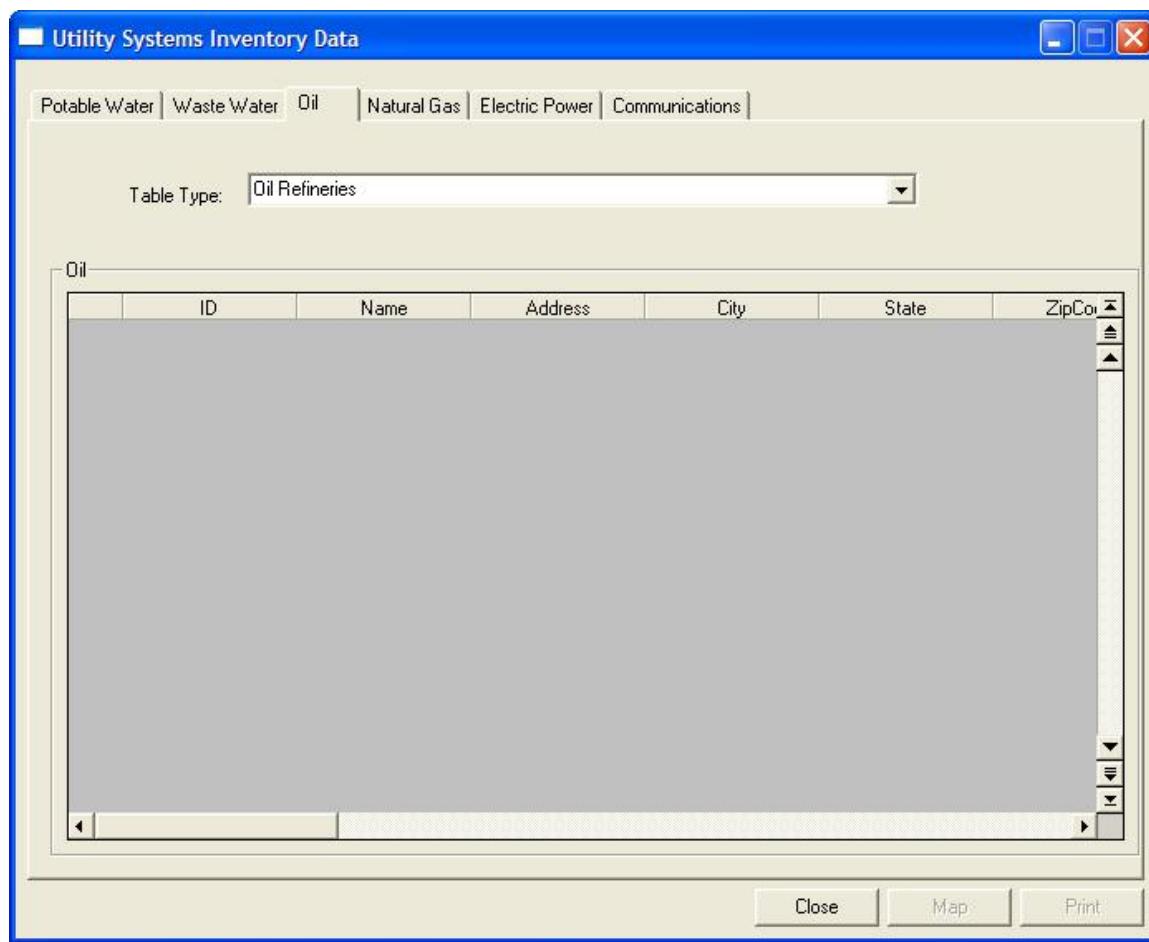


Figure 3-55: HAZUS Inventory Menu, Utility Systems Dialog, Oil Tab

- a. Selection of the Oil Tab allows the user to view data related to the waste water system within their study region. The Oil tab has the following appearance items:
 - a. A single combo box labeled Table Type. Oil Refineries is the default value upon opening of the dialog.
 - b. A single data grid labeled Oil.
- b. Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.

- a. When viewing Oil Refineries columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, UtilFcltyClass, Description, Usage, Cost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, BUPOWER, Capacity, Latitude, Longitude, Comment.
 - b. When viewing Oil Pumping Plants columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, UtilFcltyClass, Description, Usage, Cost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, BUPOWER, Capacity, Latitude, Longitude, Comment.
 - c. When viewing Oil Tank Farm columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, UtilFcltyClass, Description, Usage, Cost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, BUPOWER, Capacity, Latitude, Longitude, Comment.
 - d. When viewing Oil Control Vaults & Control Stations columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, UtilFcltyClass, Description, Usage, Cost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, BUPOWER, Capacity, Latitude, Longitude, Comment.
 - e. When viewing Oil Pipelines columns are labeled: ID, Name, Owner, MaterialType, Class, Description, Cost, YearBuilt, VulnerabilityToScour, DamageFnId, Diameter, Length, Joint, SourceId, CountyFips, Comment.
- c. The Flood Model produces damage and loss of function based on vulnerable electronic equipment for the various utility system components. The flood model does not produce any losses related to pipelines for any of the utility systems.
- a. All other utility system features, either by default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.

- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.
- j. Table 3-14 maps the flood model Oil labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-14: Oil Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
OIPE	OIP1, OIP2	Pipelines	Exposed Transmission Pipelines River Crossings	1	No	No	Yes
OIPB	OIP1, OIP2	Pipelines	Buried Transmission Pipelines River Crossings	1	No	No	Yes
OIP	OIP1, OIP2	Pipelines	Pipelines (non-crossing)	1	No	No	No
OPP	OPP1, OPP2	Pumping Plant	Pumping Plant	1,000	Yes	Yes	Yes
OTF	OTF1, OTF2	Tank Farm	Tank Farm	2,000	Yes	Yes	Yes
OCV	N/A	Oil Control Vault & Control Station	Oil Control Vault & Control Station	50	Yes	No	Yes
ORFS	ORF1, ORF2	Oil Refinery	Small Oil Refinery	175,000	Yes	Yes	Yes
ORFM	ORF3, ORF4	Oil Refinery	Medium Oil Refinery	750,000	Yes	Yes	Yes
ORFL	ORF3, ORF4	Oil Refinery	Large Oil Refinery	750,000	Yes	Yes	Yes

*** All values are in thousands of dollars

3.2.5.3.7.1.3. Utility Systems Submenu: Inventory Dialog, Natural Gas (NG) Tab

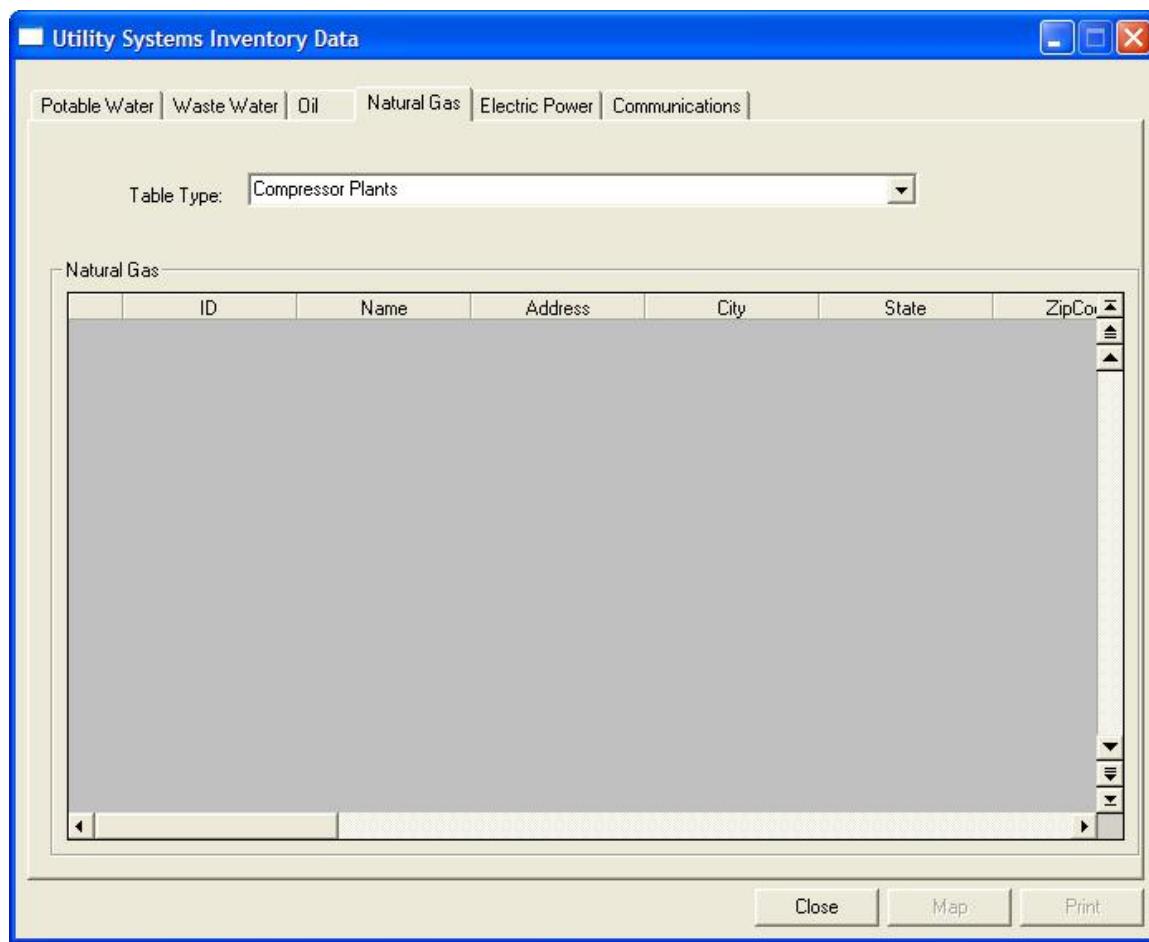


Figure 3-56: HAZUS Inventory Menu, Utility Systems Dialog, Natural Gas Tab

- a. Selection of the Natural Gas Tab allows the user to view data related to the waste water system within their study region. The Natural Gas tab has the following appearance items:
 - a. A single combo box labeled Table Type. Compressor Plants is the default value upon opening of the dialog.
 - b. A single data grid labeled Natural Gas.
- b. Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.

- a. When viewing Compressor Plants columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, Usage, UtilFcltyClass, Description, Cost, InstallYr, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, BUPOWER, Capacity, Latitude, Longitude, Comment.
 - b. When viewing Control Vaults and Control Stations columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, UtilFcltyClass, Usage, Description, Cost, InstallYr, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunction, BUPOWER, Capacity, Latitude, Longitude, Comment.
 - c. When viewing Natural Gas Pipelines columns are labeled: ID, Name, Owner, MaterialType, Class, Cost, YearBuilt, Vulnblty, DamageFnId, Diameter, Length, Joint, SourceId, CountyFips, Comment.
- c. The Flood Model produces damage and loss of function based on vulnerable electronic equipment for the various utility system components. The flood model does not produce any losses related to pipelines for any of the utility systems.
 - a. All other utility system features, either by default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
 - d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
 - e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.
- j. Table 3-15 maps the flood model Natural Gas labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-15: Natural Gas Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
NGPE	NGP1, NGP2	Pipelines	Exposed Transmission Pipelines River Crossings	1	No	No	Yes
NGPB	NGP1, NGP2	Pipelines	Buried Transmission Pipelines River Crossings	1	No	No	Yes
NGP	NGP1, NGP2	Pipelines	Pipelines (Non-crossing)	1	No	No	No
NGCV	N/A	Control Valves and Control Stations	Control Valves and Control Stations	50	Yes	No	Yes
NGC	NGC1, NGC2	Compressor Stations	Compressor Stations	1,000	Yes	Yes	Yes

***All values are in thousands of dollars

k. The user shall be able to access a context menu that allows the user to Add a record, Delete a record, Import a database, and View the Data Dictionary.

l. This menu item shall require the development of further methodology.

3.2.5.3.7.1.4. Utility Systems Dialog: Electric Power Tab

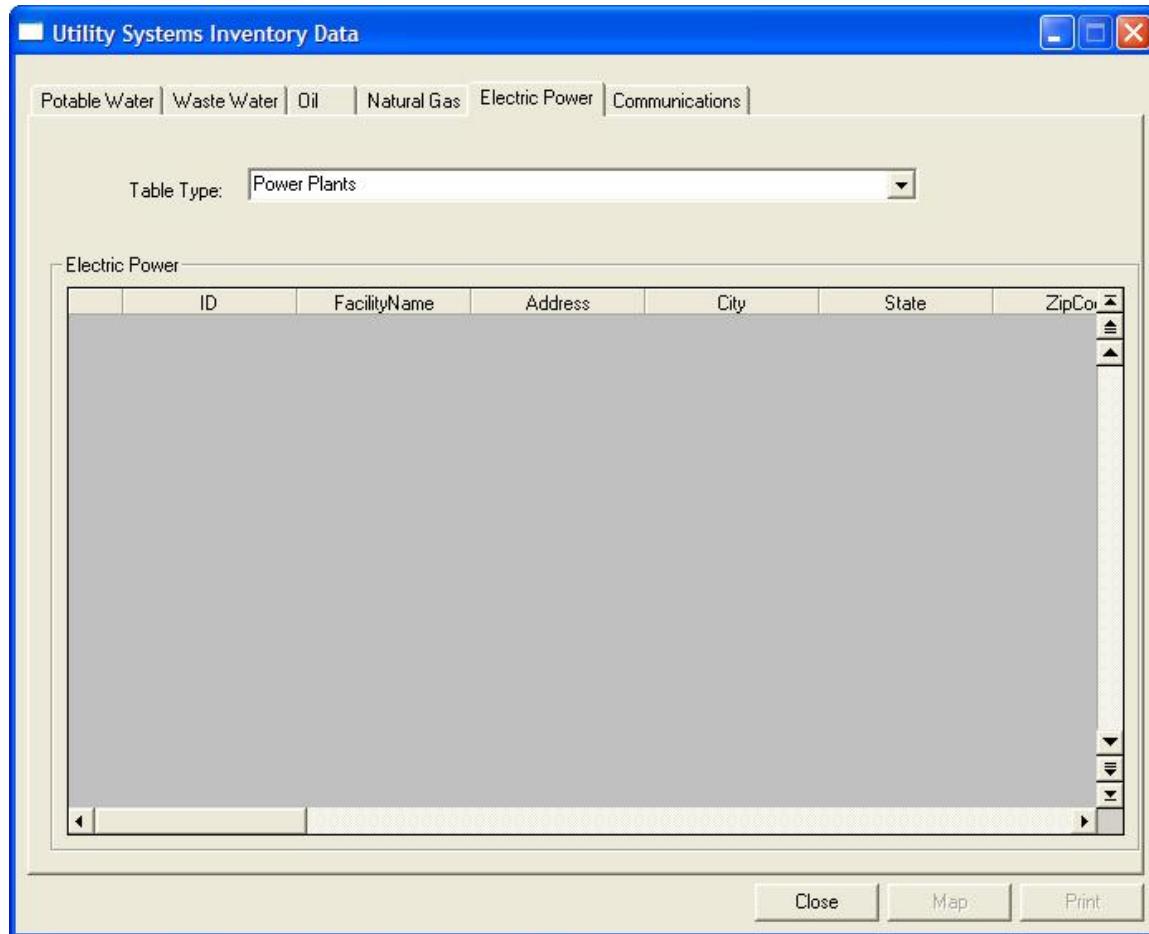


Figure 3-57: HAZUS Inventory Menu, Utility Systems Dialog, Electric Power Tab

- a. Selection of the Electric Power Tab allows the user to view data related to the waste water system within their study region. The Electric Power tab has the following appearance items:
- A single combo box labeled Table Type. Power Plants is the default value upon opening of the dialog.
 - A single data grid labeled Electric Power.

- b. Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.
- a. When viewing Power Plants columns are labeled: ID, FacilityName, Address, City, State, ZipCode, Owner, Contact, Phone, Class, Description, Usage, FacilityCost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunctionId, Capacity, Latitude, Longitude, Comment.
- b. When viewing Power Substations columns are labeled: ID, FacilityName, Address, City, State, ZipCode, Owner, Contact, Phone, Class, Description, Usage, FacilityCost, YearBuilt, Stories, FoundationType, EquipmentHeight, FloodProtection, DamageFunctionId, Capacity, Latitude, Longitude, Comment.
- c. The Flood Model produces damage and loss of function based on vulnerable electronic equipment for the various utility system components. The flood model does not produce any losses related to pipelines for any of the utility systems.
- a. All other utility system features, either default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.
- j. Table 3-16 maps the flood model Electric Power labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-16: Electric Power Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
ESSL	ESS1, ESS2	Substations	Low Voltage Substation	10,000	Yes	No	Yes
ESSM	ESS3, ESS4	Substations	Medium Voltage Substation	20,000	Yes	No	Yes
ESSH	ESS5, ESS6	Substations	High Voltage Substation	50,000	Yes	No	Yes
EDCE	EDC1, EDC2	Distribution Circuits	Distribution Circuits Elevated Crossings	3	No	No	Yes
EDCB	EDC1, EDC2	Distribution Circuits	Distribution Circuits Buried Crossings	3	No	No	Yes
EDC	EDC1, EDC2	Distribution Circuits	Distribution Circuits (non-crossing)	3	No	No	No
EPPS	EPP1, EPP2	Generation Plants	Small Power Plants	100,000	Yes	Yes	Yes

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
EPPM	EPP3, EPP4	Generation Plants	Medium Power Plants	500,000	Yes	Yes	Yes
EPPL	EPP3, EPP4	Generation Plants	Large Power Plants	500,000	Yes	Yes	Yes

***All values are in thousands of dollars

3.2.5.3.7.1.5. Utility Systems Dialog: Communications Tab

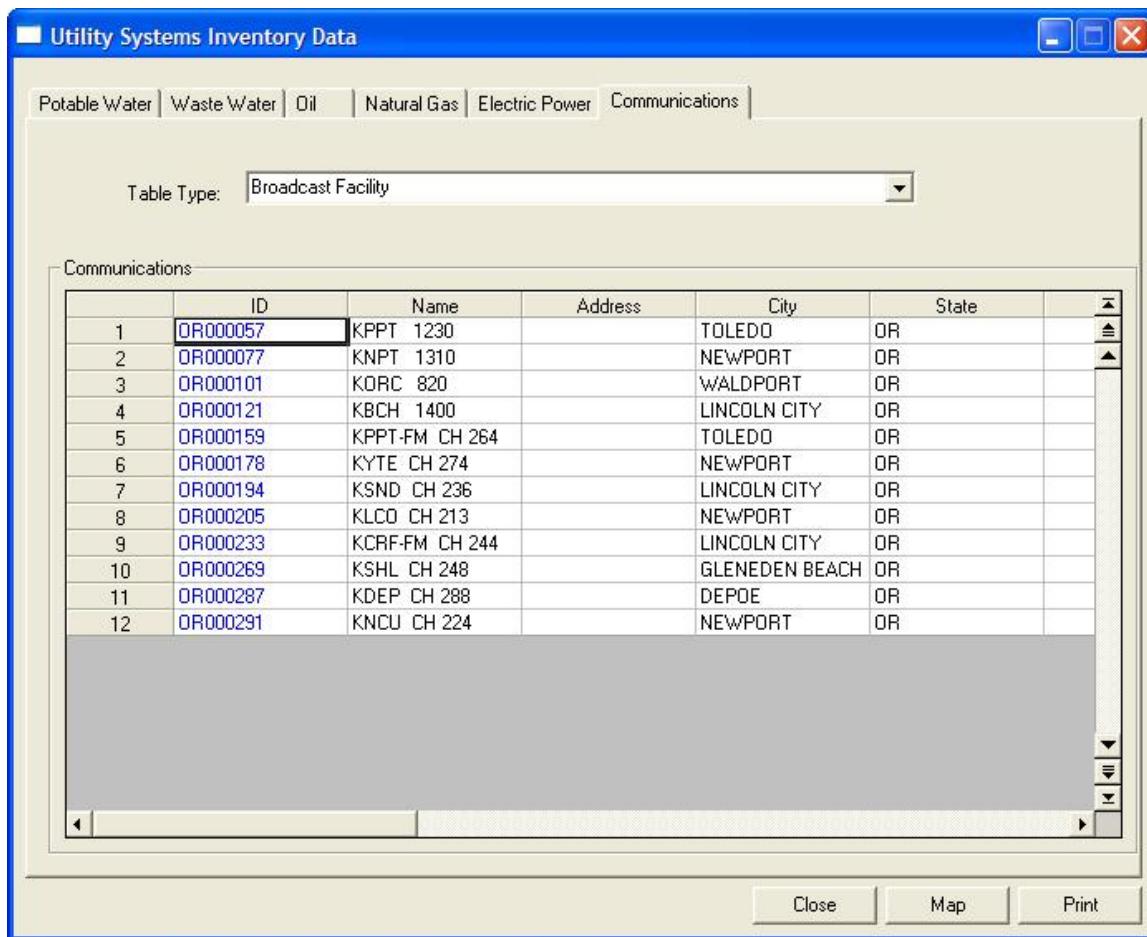


Figure 3-58: HAZUS Inventory Menu, Utility Systems Dialog, Communications Tab

- Selection of the Communications Tab allows the user to view data related to the waste water system within their study region. The Communications tab has the following appearance items:

- a. A single combo box labeled Table Type. Central Offices and Switching Stations is the default value upon opening of the dialog.
 - b. A single data grid labeled Communications.
- b. Data in the data grid is editable. The data grid columns names adjust depending on the selection in the Table Type combo box. Column labeled ID is not editable and is displayed in Blue text.
- a. When viewing Central Offices and Switching Stations columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, CentralOfficeSwitchingStationClass, Description, Usage, FacilityCost, InstallYr, BUPower, Latitude, Longitude, Comment.
 - b. When viewing Control Vaults and Control Stations columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, ControlVaultStationClass, Description, Usage, Cost, InstallYr, BUPower, Latitude, Longitude, Comment.
 - c. When viewing Broadcast Facility columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, BroadcastFltyClass, Description, Usage, Cost, InstallYr, BUPower, Latitude, Longitude, Comment.
- c. The Flood Model produces damage and loss of function based on vulnerable electronic equipment for the various utility system components. The flood model does not produce any losses related to pipelines for any of the utility systems.
- a. All other utility system features, either by default or added by the user, will be for reference and mapping purposes. No damage algorithms have been developed.
- d. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close, Map, and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Map shall add the listed facilities to the map layer and table of contents.
- i. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.
- j. Table 3-17 maps the flood model Communications labels to the earthquake model specific classification schemes. The software development team modified the original earthquake model classifications to account for differences between the hazards of flooding and earthquake.

Table 3-17: Communications Classifications, Valuation and Flood Model Analysis

Label	Earthquake Classification	General Occupancy	Specific Occupancy	Hazus Valuation	Damage (%)	Loss (\$)	Functionality
CCTE	N/A	Communications Lines	Exposed Communications Lines River Crossings	N/A	No	No	No
CCTB	N/A	Communications Lines	Buried Communications Lines River Crossings	N/A	No	No	No
CCT	N/A	Communications Lines	Communications Lines (non-crossings)	N/A	No	No	No
CCSV	N/A	Control Vault	Control Vault	50	No	No	No
CCS1	CCO1, CCO2, CCO3, CCO4	Switching Stations	Central Offices/Switching Stations Below Grade	5,000	No	No	No
CCS2	CCO1, CCO2, CCO3, CCO4	Switching Stations	Central Offices/Switching Stations At or Above Grade	5,000	No	No	No
CBR	CBR1, CBT1	Radio/TV Station	Radio/TV Stations or Transmitters	2,000	No	No	No
CBW	CBW1	Weather Station	Weather Stations or Transmitters	2,000	No	No	No
CBO	CBO1	Other Communication Facility	Other Communication Stations or Transmitters	2,000	No	No	No

*** All values are in thousands of dollars

3.2.5.4. Hazardous Materials

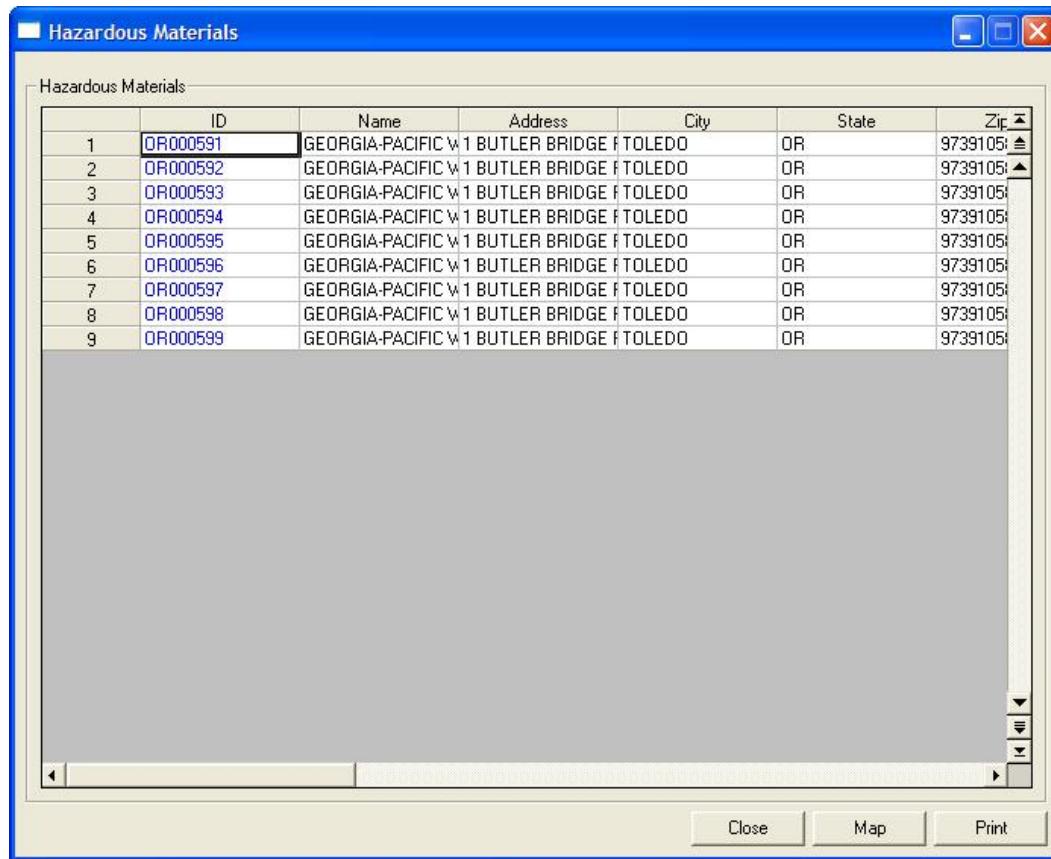


Figure 3-59: HAZUS Inventory Menu, Hazardous Materials Dialog

- a. Selection of the Hazardous Materials menu item on the Inventory menu allows the user to view data related to the EPA hazardous materials sites within their study region. The Hazard Materials dialog has the following appearance items:
 - a. The dialog has no tabs.
 - b. The dialog has no combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.

- f. The dialog has a single data grid that is editable.
- b. Data is stored in the hzTract and hzHazmat data tables.
- c. The data views for the Hazardous Materials dialog is absv_HazMat.
- d. Data in the data grid is editable. Data is displayed for all counties within the study region.
Column labeled ID is not editable and is displayed in Blue text.
 - a. Data columns are labeled: ID, Name, Address, City, State, ZipCode, Owner, Contact, Phone, Cas#, ChemicalName, ChemicalQuantity, SICCode, Class, YearBuilt, EPAID, PermitAmount, Latitude, Longitude, Comment.
- e. The Flood Model does not perform loss estimation on the Hazardous Material sites or perform any analysis on chemical spills, plume spread or other actions associated with the potential secondary losses.
 - a. The user can graphically plot the Hazardous Materials data and view those areas that might be within the projected inundation area and the associated depth of flooding as an indication of risk.
- f. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- g. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	Y
Delete Selected Records	Y
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- h. The dialog shall have command buttons labeled Close, Map, and Print.
- i. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- j. Selection of Map shall add the listed facilities to the map layer and table of contents.
- k. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.5. Demographics

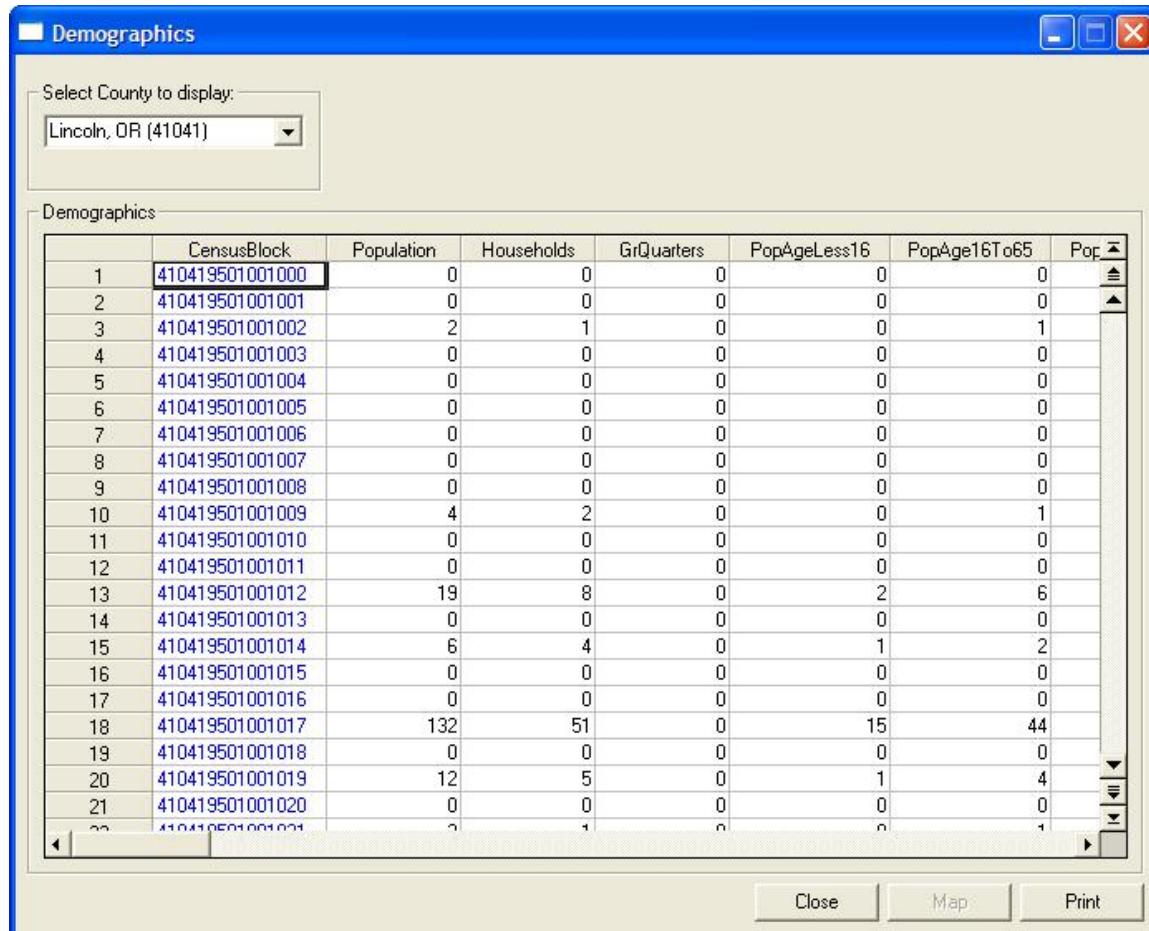


Figure 3-60: HAZUS Inventory Menu, Demographics Dialog

- a. Selection of the Demographics menu item on the Inventory menu allows the user to view data developed for HAZUS from the U.S. Census. The Flood Model displays data at the census block level, but does allow for the display data at the tract level when the radio button is available. The Demographics dialog has the following appearance items:
 - a. The dialog has no tabs.
 - b. The dialog has a single combo box labeled Select County to Display.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks (not required for the point level dialogs).
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is editable.
- b. Data is stored in the hzDemographicsB data table.
- c. The data views for the Demographics dialog is absv_Demographics.
- d. Data in the data grid is editable. Column labeled CensusBlock is not editable and is displayed in Blue text.
 - a. Data columns are labeled: CensusBlock, Population, Households, GrQuarters, PopAgeLess16, PopAge16To65, PopAgeOver65, WhitePopulation, BlackPopulation, NativeAmerican, AsianPopulation, HispanicPopulation, IncomeLessThan10K, IncomeBet10To15K, IncomeBet15To25K, IncomeBet25To35K, IncomeOver35K, PopResideAtDay, PopResideAtNight, PopWorkInCom, PopWorkInInd, PopCommAt5, OwnerSingleUnits, OwnerMultUnits, OwnerMultStruct, OwnerMHs, RentalSingleUnits, RentalMultUnits, RenterMultStructs, RentalMHs, VacantSingleUnits, VacantMultUnits, VacantMultStructs, VacantMHs, AvgRent, AvgValue.
- e. The Flood Model uses the demographics data in a number of calculations including shelter requirements, indirect economic losses, etc.

- f. Data validation will be performed to ensure that specific requirements such as the latitude and longitude are populated with proper values. An error message is given if required data is missing.
- g. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- h. The dialog shall have command buttons labeled Close, Map, and Print.
- i. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- j. Selection of Map shall add the listed facilities to the map layer and table of contents.
- k. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.6. Agricultural Products

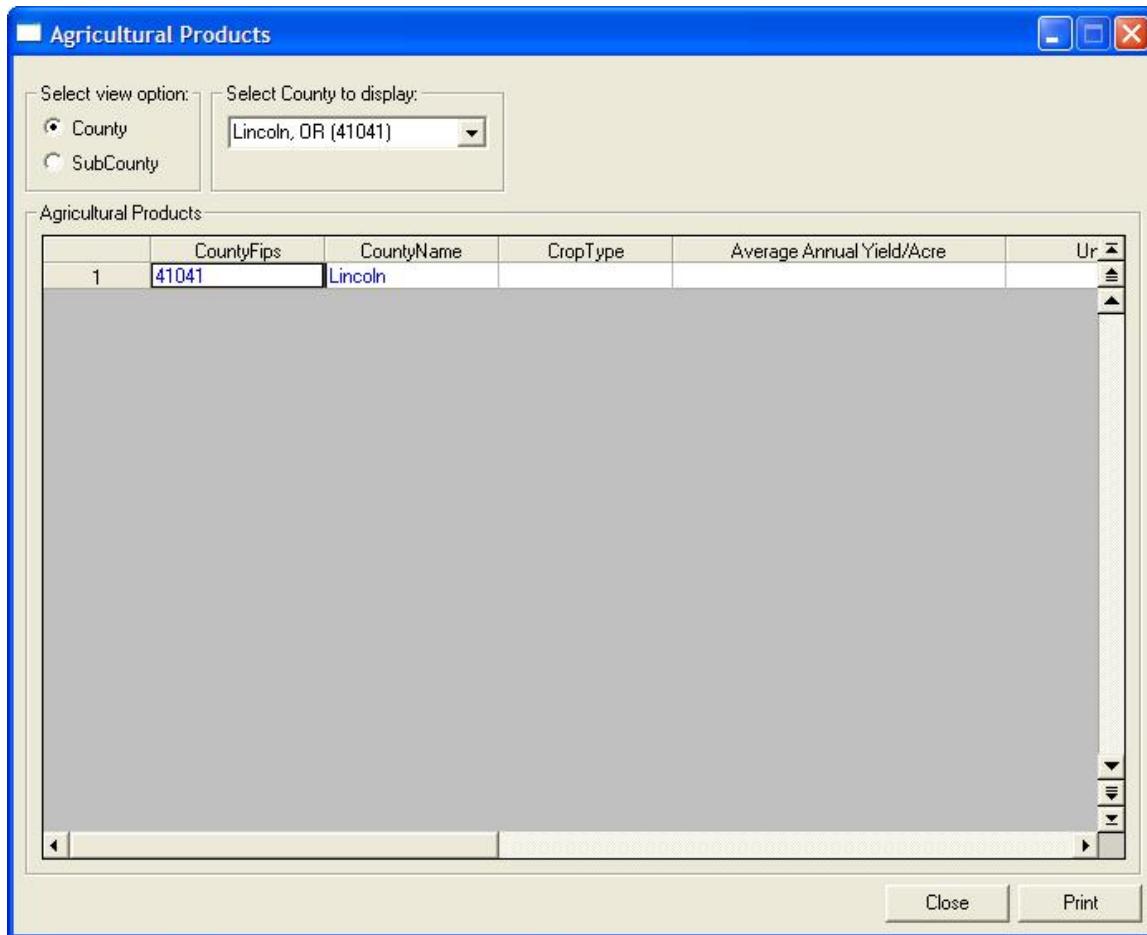


Figure: 3-61: HAZUS Inventory Menu, Agricultural Products, County View

- a. Selection of the Agricultural Products menu item on the Inventory menu allows the user to view data developed for HAZUS from the U.S. Department of Agriculture. The data is developed using the National Agricultural Statistical Survey (NASS) and the National Resources Inventory (NRI). The Flood Model displays data at the county level and at a subcounty level that is based on the geographic data that includes the 8 digit Hydrologic Unit Codes, County Boundaries, and NRI regions. The Agricultural Products dialog has the following appearance items:
 - a. The dialog has no tabs.
 - b. The number of combo boxes on the dialog varies depending on the radio button selection.

- c. The dialog has two radio buttons labeled County (default) and SubCounty respectively.
 - d. The dialog does not have a check box for study case blocks (agriculture products are not displayed or tied to census block or other census boundary).
 - e. The dialog has command buttons: Close and Print.
 - f. The dialog has a single data grid that is editable.
- b. Data is stored in the hzCounty, fIAgricultureInventory, and fIAG.mdb/fIAGMap data tables.
- c. The data views for the Agricultural Products dialog is absv_CountyAgriRegions when viewing County level and absv_SubCountyAgriRegions.
- d. When viewing the data with the County radio button selected, data in the data grid is editable. Columns labeled CountyFips and County Name are not editable and are displayed in Blue text.
- a. Data columns are labeled: CountyFips, CountyName, CropType, AverageAnnualYield/Acre, Unit, AverageUnitPrice, AverageHarvestCost.
- e. The Flood Model calculates losses for agriculture products using a modified U.S. Army Corps of Engineers Agricultural Damage methodology.
- f. When viewing the countywide data, the data shall not be editable as it contains a roll-up value from the sub-county polygons.
- g. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- h. The dialog shall have command buttons labeled Close and Print.
- i. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- j. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.6.1. Agricultural Products Dialog: SubCounty Radio Button

Selection of the sub-county option button shall change the dialog as seen in Figure 3-62.

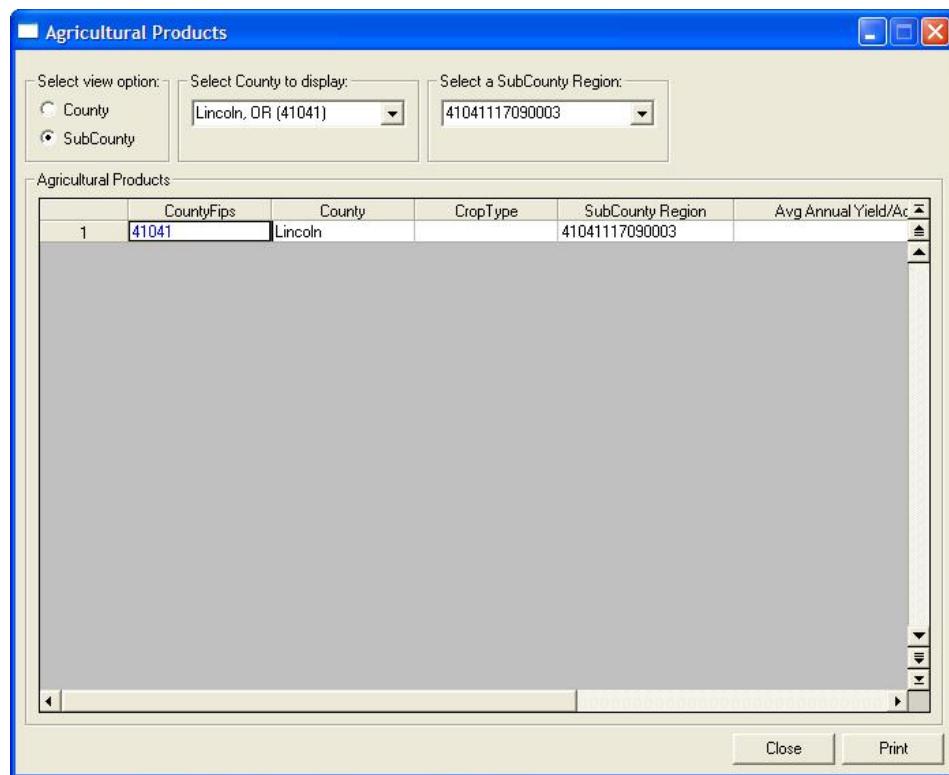


Figure 3-62: HAZUS Inventory Menu, Agriculture Dialog, Sub-County View

- a. Selection of the radio button labeled SubCounty shall alter the dialog to display as follows:
 - a. The dialog has no tabs.

- b. The dialog has two combo boxes labeled Select County to Display and Select a SubCounty Region.
 - c. The dialog has two radio buttons labeled County (default) and SubCounty respectively.
 - d. The dialog does not have a check box for study case blocks (agriculture products are not displayed or tied to census block or other census boundary).
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is editable.
-
- b. Selection of a subcounty polygon number in the second combo box allows the user to view agriculture product data for the smaller region within the county selected in the first combo box. The number of subcounty polygons will vary from county to county.
 - c. When viewing the sub-county regions, the data grid shall have columns labeled: CountyFips, County, CropType, SubCountyRegion, AverageAnnualYield/Acre, Unit, UnitPrice, and HarvestCost. Columns County FIPS and County are not editable and shall be displayed in blue text.
 - d. The data is editable and changes shall be saved upon selection of Close or selection of County-wide radio button after making changes, the user will see the standard save dialog.
 - e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close and Print.
- g. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- h. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.7. Vehicles Dialog

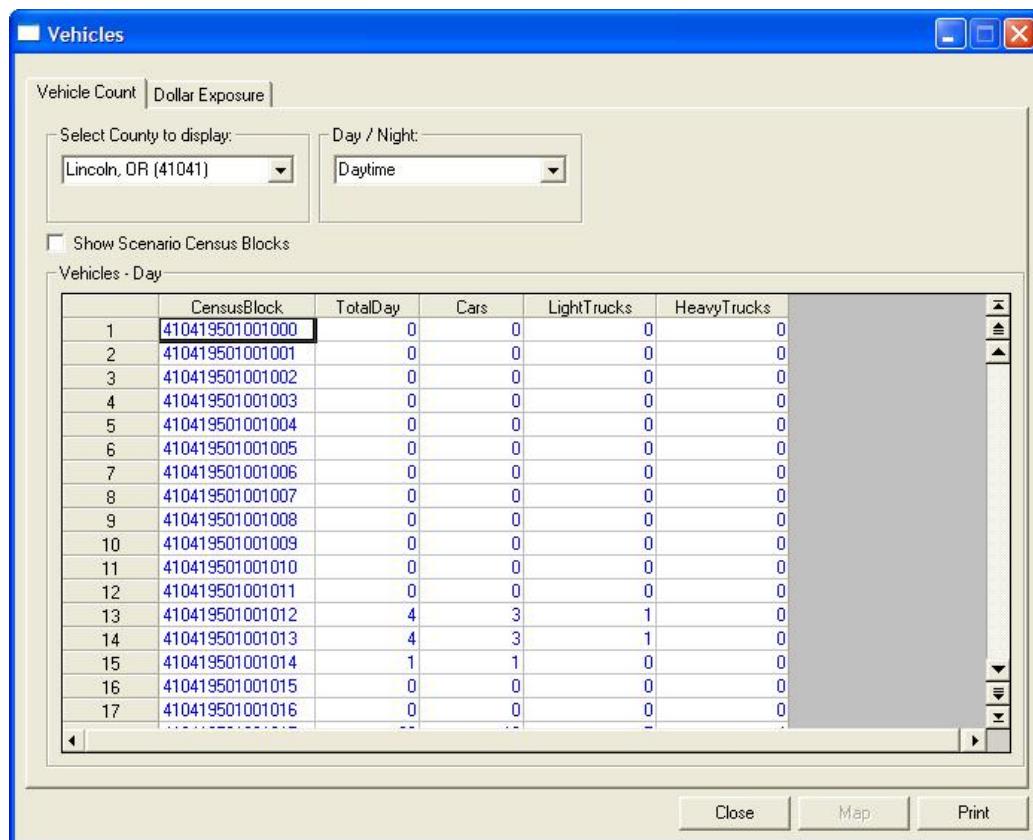


Figure 3-63: HAZUS Inventory Menu, Vehicle Dialog, Vehicle Count Tab

- a. Selection of the Vehicles menu item on the Inventory menu allows the user to view vehicle count and valuation data developed for HAZUS. The data was derived on standard Metropolitan Planning Organization counts for square footage of occupancy. Value was

developed from a number of sources that estimated average costs for vehicle types. The Vehicles dialog has the following appearance items:

- a. The dialog has two tabs labeled Vehicle Count and Dollar Exposure. The Vehicle Count is the default tab.
 - b. The dialog has a two combo boxes labeled Select County to Display and Day / Night.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a check box for study case blocks.
 - e. The dialog has command buttons Close, Map, and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. Data is stored in the f1DayVehicleInv and f1NightVehicleInv data tables.
- c. The data views for the Demographics dialog are as follows:

Tab	Day / Night Selection	View
Vehicle Count	Daytime	absv_DayVehicleInv
Vehicle Count	Nighttime	absv_NightVehicleInv
Dollar Exposure	Daytime	absv_DayVehicleDollarExposure
Dollar Exposure	Nighttime	absv_NightVehicleDollarExposure

- d. On the Vehicle Count tab the column names vary slightly whether viewing Daytime or Nighttime values in the Day / Night combo box.
- a. When viewing the Daytime values, the data columns are labeled: CensusBlock, TotalDay, Cars, LightTrucks, HeavyTrucks.
 - b. When viewing the Nighttime values, the data columns are labeled: CensusBlock, TotalNight, Cars, LightTrucks, HeavyTrucks.

- e. The Flood Model calculates losses and estimates the number of damaged cars based on the data provided in the above data tables.
- f. Through the use of a right mouse click user can access a submenu as noted in the table below. These items are enabled for all combo box selections on the Vehicle Count tab.
Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- g. The dialog shall have command buttons labeled Close, Map and Print.
- h. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.
- i. Selection of Map shall add the listed facilities to the map layer and table of contents.
- j. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.7.1. Vehicle Inventory Dialog: Dollar Exposure Tab

Selection of the Dollar Exposure tab opens the dialog shown below.

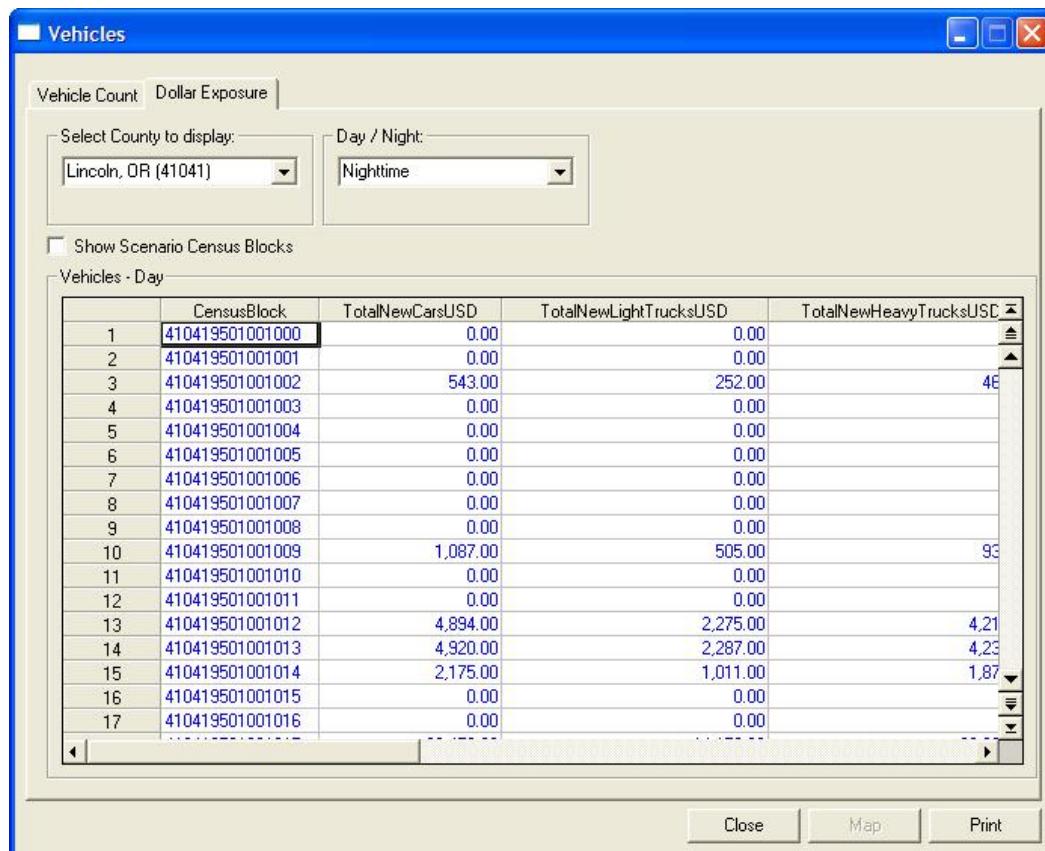


Figure 3-64: HAZUS Inventory Menu, Vehicle Inventory Dialog, Dollar Exposure Tab

- Selection of the Dollar Exposure Tab allows the user to view the estimated values of vehicles in their study region. The Dollar Exposure tab has the following appearance items:
 - The dialog has two tabs labeled Vehicle Count and Dollar Exposure. The Vehicle Count is the default tab.
 - The dialog has a two combo boxes labeled Select County to Display and Day / Night.
 - The dialog does not have radio buttons.
 - The dialog has a check box for study case blocks.
 - The dialog has command buttons Close, Map, and Print.

- f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. On the Dollar Exposure tab the column names vary slightly whether viewing Daytime or Nighttime values in the Day / Night combo box. Data is not editable and is displayed in blue text.
 - a. When viewing the Daytime values, the data columns are labeled: CensusBlock, TotalNewCarsUSD, TotalNewLightTrucksUSD, TotalNewHeavyTrucksUSD, TotalUsedCarsUSD, TotalUsedLightTrucksUSD, TotalUsedHeavyTrucksUSD, TotalVehiclesUSD.
 - b. When viewing the Daytime values, the data columns are labeled: CensusBlock, TotalNewCarsUSD, TotalNewLightTrucksUSD, TotalNewHeavyTrucksUSD, TotalUsedCarsUSD, TotalUsedLightTrucksUSD, TotalUsedHeavyTrucksUSD, TotalVehiclesUSD.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- d. The dialog shall have command buttons labeled Close, Map, and Print.
- e. Selection of Close closes the dialog. If the user has made modifications they will be queried as to whether or not they would like to save the changes. Changes will be applied throughout the study region. If the user selects no, the dialog shall close without saving changes.

- f. Selection of Map shall add the listed facilities to the map layer and table of contents.
- g. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8. View Classifications Submenu

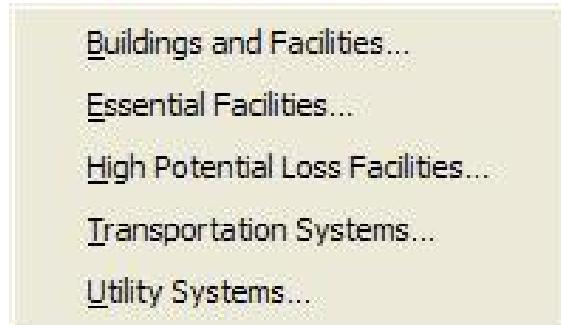
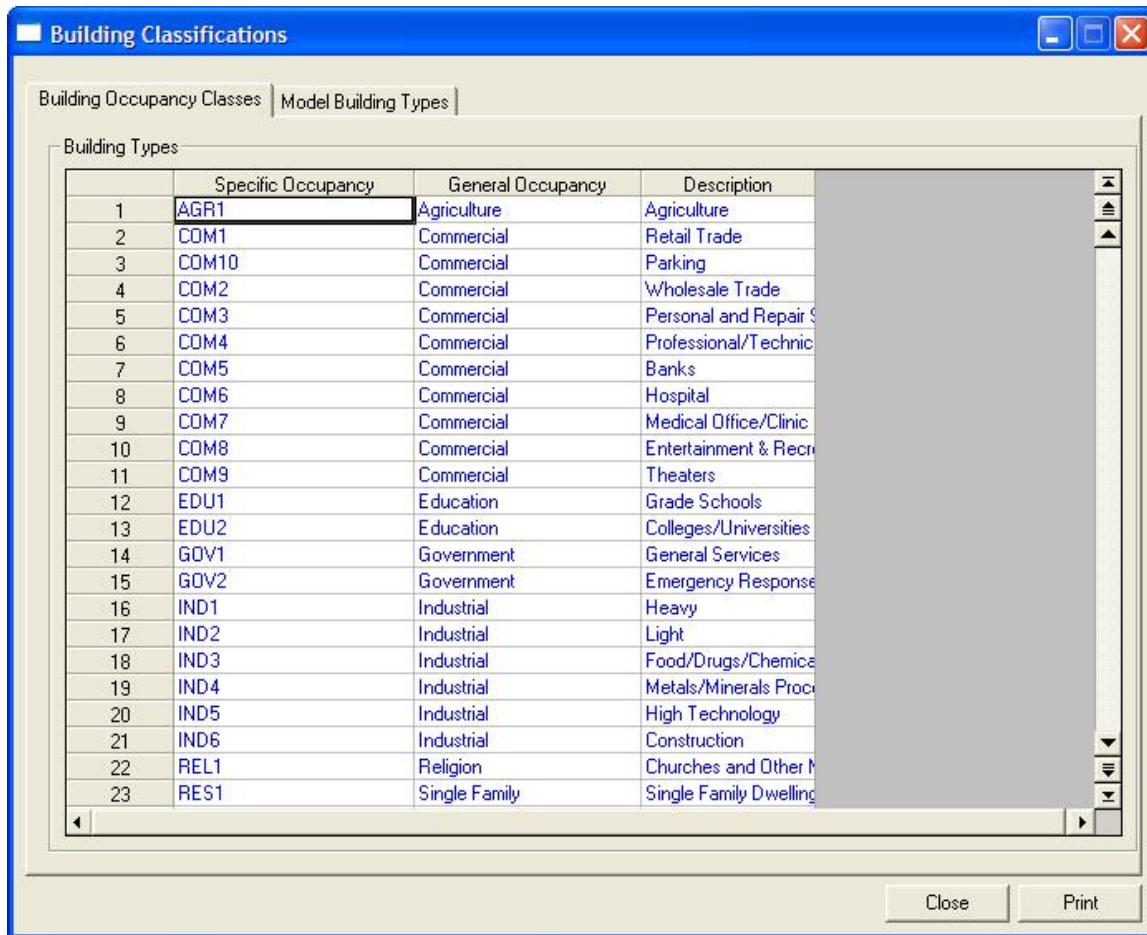


Figure 3-65: HAZUS Inventory Menu, View Classifications Submenu

- a. Cursor focus on the View Classifications selection on the Inventory menu brings up a submenu with the following options for the user: Buildings and Facilities, Essential Facilities, High Potential Loss Facilities, Transportation Systems, and Utility Systems.
- b. Selection of any given submenu item shall open a dialog allowing the user to view the definitions of the baseline classifications within the HAZUS model. This menu item allows the user to view those classifications common to all three models or those unique to the flood model. Those unique to the other two models will not be displayed.
- c. None of the data displayed on any of the browsers under this submenu are editable by the user. They represent the basic definitions of the HAZUS model.
- d. Each dialog has Close and Print allowing the user to return to the main menu or print the classifications for future reference.

3.2.5.8.1. View Classifications Submenu: Building Classifications



**Figure 3-66: HAZUS Inventory Menu, View Classifications Submenu,
Building Occupancy Classes Tab**

- Selection of the Buildings and Facilities menu item on the View Classifications submenu allows the user to view the HAZUS definitions of the building occupancy classifications, both general and specific, and the model building types. The Buildings and Facilities dialog has the following appearance items:
 - The dialog has two tabs labeled Building Occupancy Classes and Model Building Types. The Building Occupancy Classes is the default tab.
 - The dialog does not have combo boxes.
 - The dialog does not have radio buttons.

- d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons: Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. Data is stored in the clOccup, clSOccupancy, clGBldgType data tables.
- c. The data views for the Building and Facilities dialog are as follows:
- a. When viewing the Building Occupancy Classes tab the view is
absv_ViewClassOccup
 - b. When viewing the Model Building Types tab the view is
absv_ViewClassBldgType.
- d. On the Building Occupancy Classes tab the column names are Specific Occupancy, General Occupancy, and Description.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

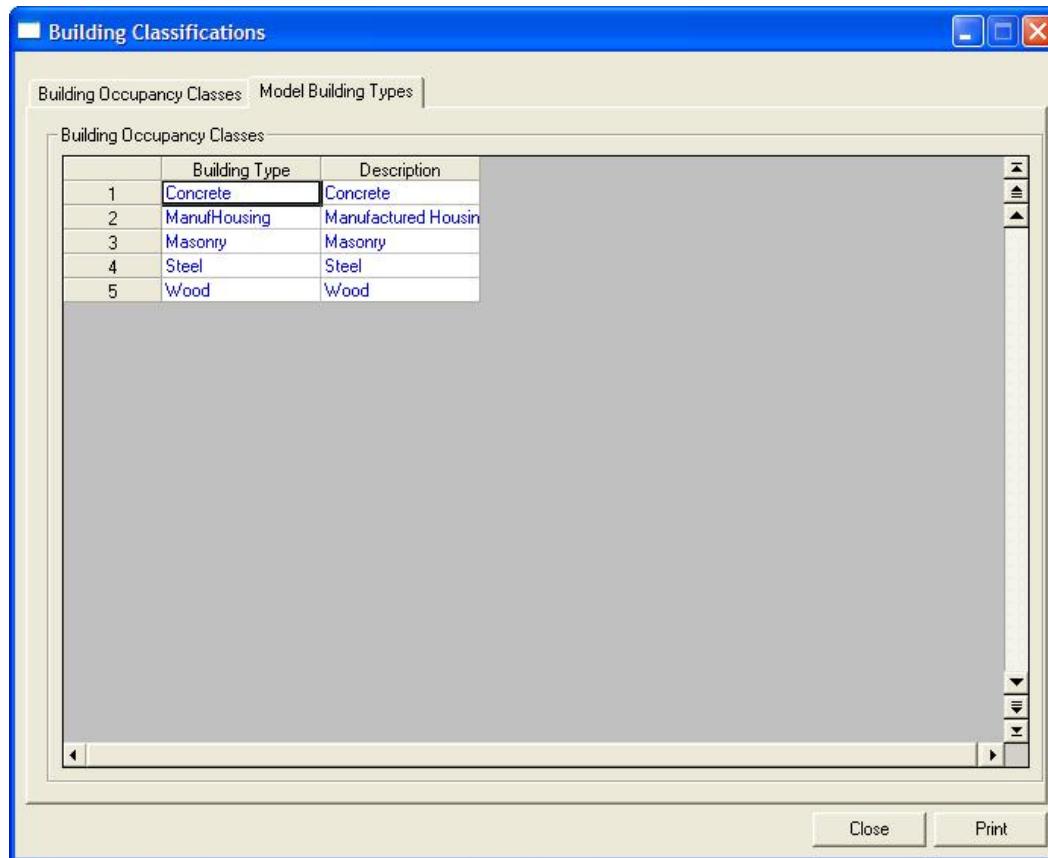
Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- f. The dialog shall have command buttons labeled Close and Print.
- g. Selection of Close closes the dialog.

- h. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.1.1. Building Classifications Dialog: Model Building Types Tab

Selection of the Model Building Type tab opens the dialog shown below.



**Figure 3-67: HAZUS Inventory Menu, View Classifications Submenu,
Model Building Types Tab**

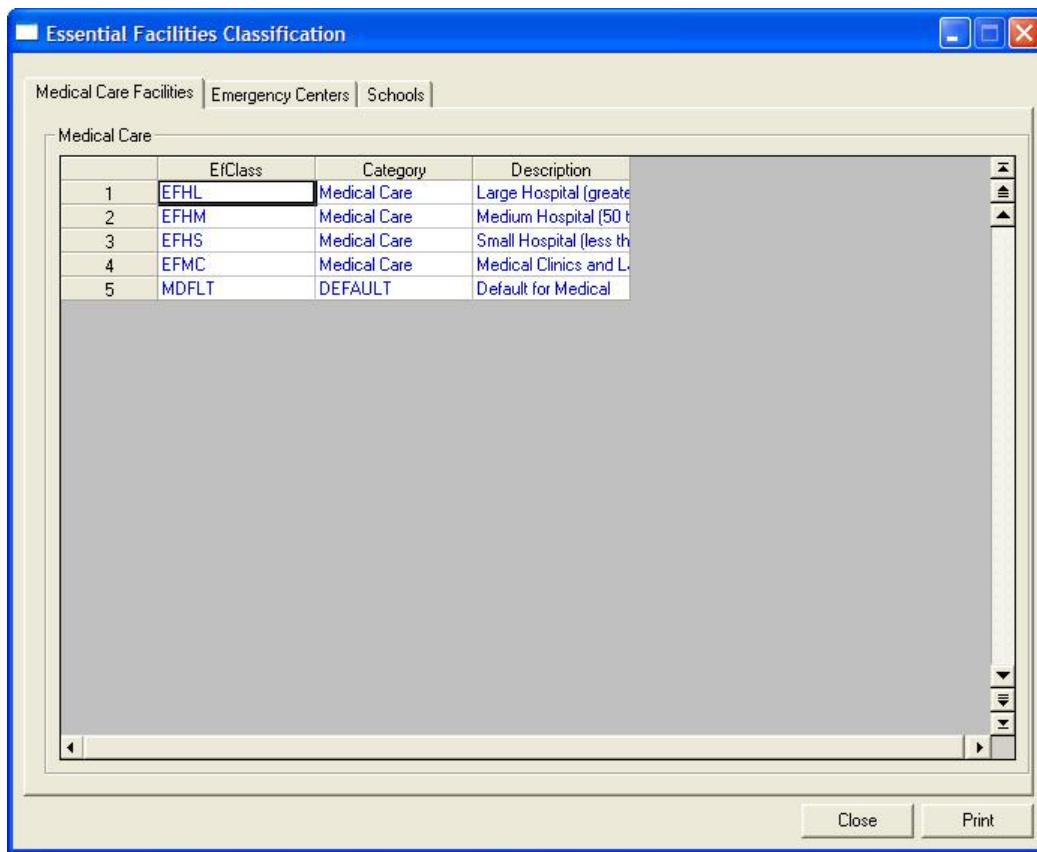
- a. The Model Building Classes dialog has the following appearance items:
- The dialog has two tabs
 - The dialog does not have combo boxes.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box for study case blocks.

- e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. On the Model Building Classes tab the column names are Building Type and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.2. View Classification Submenu: Essential Facilities



**Figure 3-68: HAZUS Inventory Menu, View Classifications Submenu
Essential Facilities Classification, Medical Care Facilities Tab**

- a. Selection of the Essential Facilities menu item on the View Classifications submenu allows the user to view the HAZUS definitions of the Essential Facility occupancy classifications. The Essential Facilities Classification dialog has the following appearance items:
 - a. The dialog has three tabs labeled Medical Care Facilities, Emergency Centers, and Schools. The Medical Care Facilities is the default tab.
 - b. Only the Essential Facilities Tab has a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons: Close and Print.

- f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. Data is stored in the cIEf data table.
- c. The data views for the Essential Facilities dialog are as follows:

Tab	Combo Box Selection	View Name
Medical Care Facilities	N/A	absv_ViewClassCareFlty
Emergency Centers	Emergency Centers	absv_ViewClassEmergencyCtr
Emergency Centers	Fire Stations	absv_ViewClassFireStation
Emergency Centers	Police Stations	absv_ViewClassPoliceStation
Schools	N/A	absv_ViewClassSchool

- d. On the Medical Care Facilities tab the column names are EfClass, Category, and Description.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close and Print.

- g. Selection of Close closes the dialog.
- h. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.2.1. View Classifications Submenu: Essential Facilities Classification Dialog, Emergency Centers Tab

Selection of the Emergency Centers tab opens the dialog shown below.

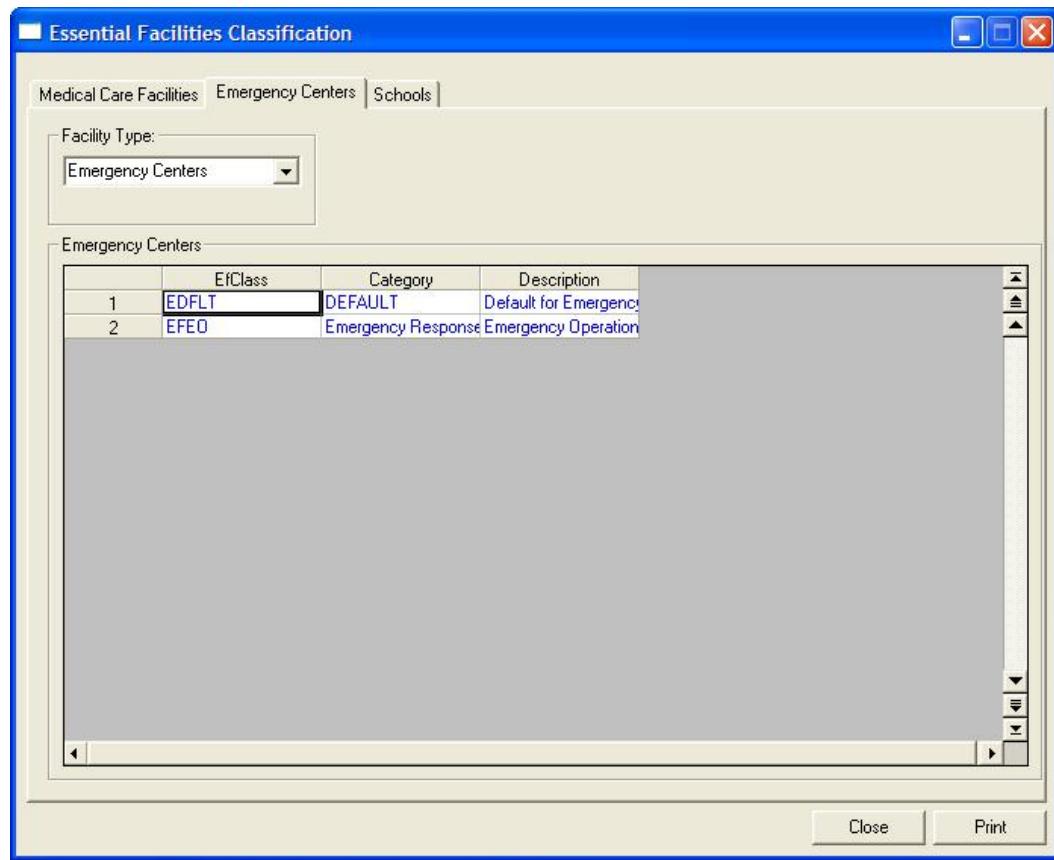


Figure 3-69: HAZUS Inventory Menu, View Classifications Submenu Essential Facilities Classification, Emergency Centers Tab

- a. The Emergency Centers tab dialog has the following appearance items:
 - a. The dialog has three tabs.
 - b. The dialog has a combo box labeled Facility Type. Emergency Centers is the default value.

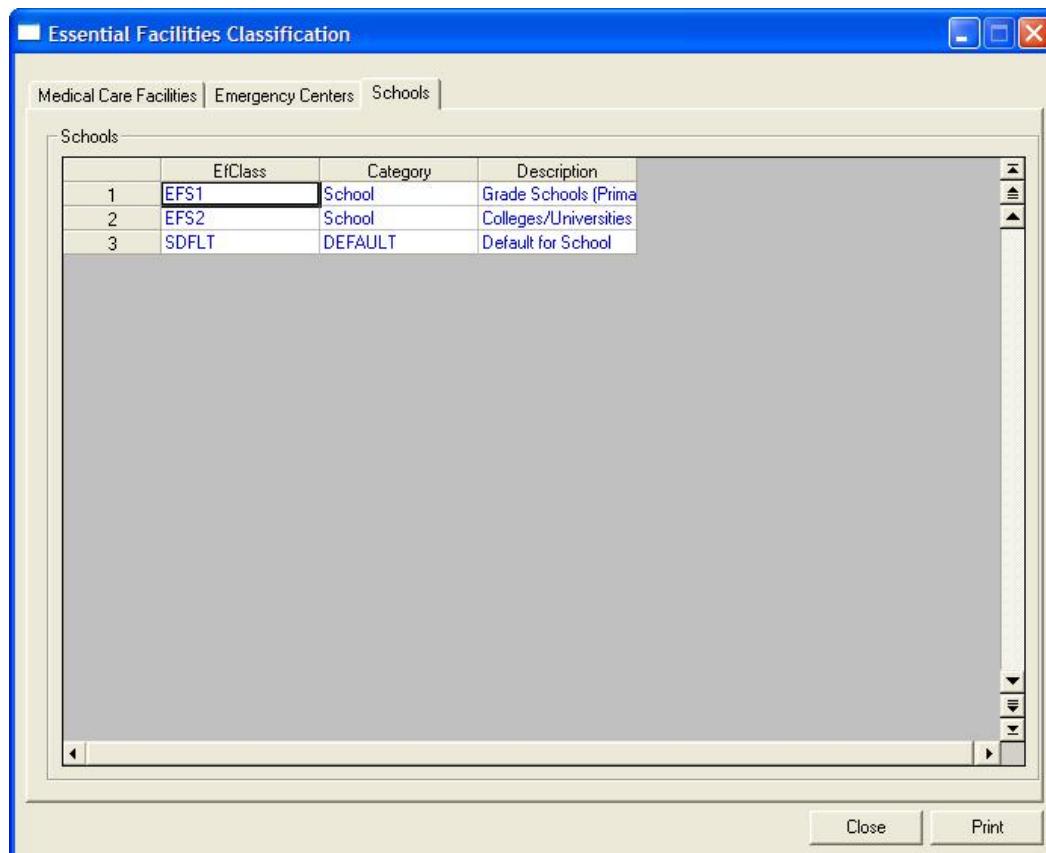
- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. On the Essential Facilities tab the column name are the same regardless of the selection in the combo box. The column names are as follows: EfClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.2.2. View Classifications Submenu, Essential Facilities Classification Dialog: Schools Tab

Selection of the Schools tab opens the dialog shown below.



**Figure 3-70: HAZUS Inventory Menu, View Classifications Submenu
Essential Facilities Classification, Schools Tab**

- a. The Schools tab dialog has the following appearance items:
 - a. The dialog has three tabs
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. On the Schools tab the column names as follows: EfClass, Category, and Description.

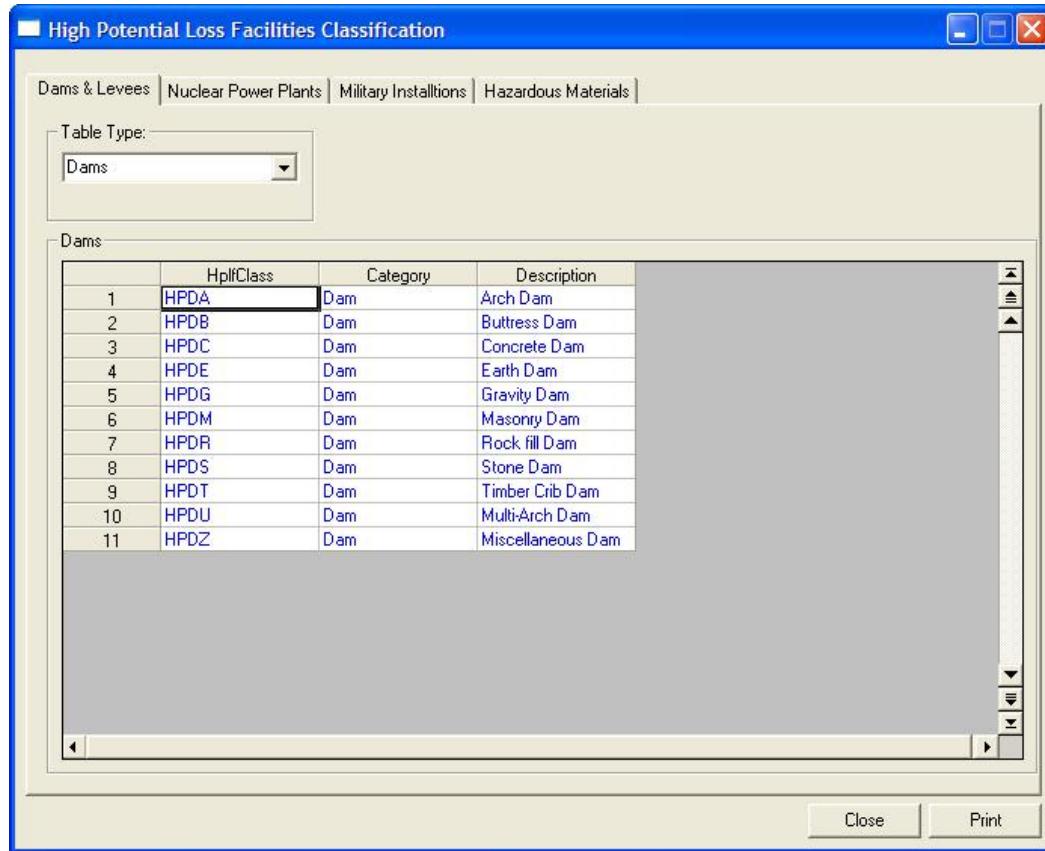
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.3. View Classifications Submenu: High Potential Loss Facilities

Classifications



**Figure 3-71: HAZUS Inventory Menu, View Classifications Submenu
High Potential Loss Facilities Classification, Dams and Levees Tab**

- a. Selection of the High Potential Loss Facilities menu item on the View Classifications submenu allows the user to view the HAZUS definitions of the High Potential Loss Facility occupancy classifications. The High Potential Loss Facilities Classification dialog has the following appearance items:
 - a. The dialog has four tabs labeled Dams & Levees, Nuclear Power Plants, Military Installations, and Hazardous Materials. The Dams & Levees tab is the default tab.
 - b. Only the Dams & Levees Tab has a combo box. The combo box is labeled Table Type. ‘Dams’ is the default value.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. Data is stored in the clHplf data table.
- c. The data views for the High Potential Loss Facilities dialog are as follows:

Tab	Combo Box Selection	View Name
Dams & Levees	Dams	absv_ViewClassDams
Dams & Levees	Levees	absv_ViewClassLevee
Nuclear Power Plants	N/A	absv_ViewClassNuclear
Military Installations	N/A	absv_ViewClassMilitary
Hazardous Materials	N/A	absv_ViewClassHazMat

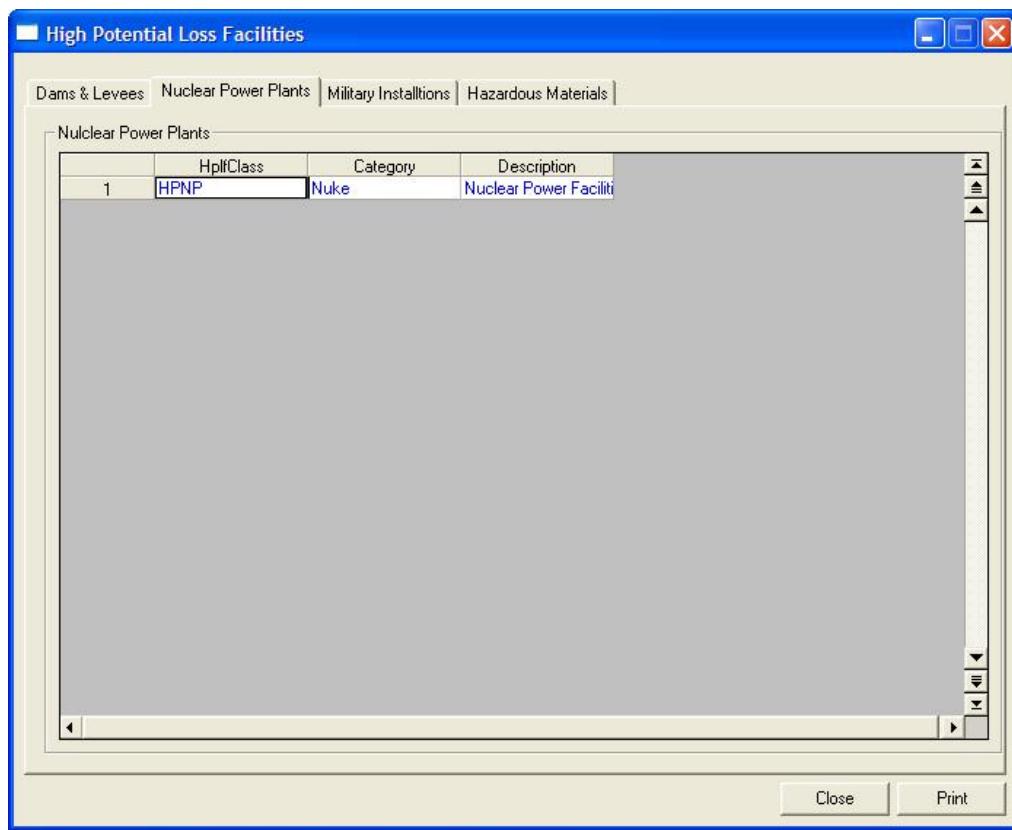
- d. On the Dams & Levees tab the column names are the same regardless of selection in the Table Type combo box. The column names are as follows: HplfClass, Category, and Description.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close and Print.
- g. Selection of Close closes the dialog.
- h. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

**3.2.5.8.3.1. High Potential Loss Facilities Classifications Dialog:
Nuclear Power Plants Tab**

Selection of the Nuclear Power Plants tab opens the dialog shown below.



**Figure 3-72: HAZUS Inventory Menu, View Classifications Submenu
High Potential Loss Facilities Classification, Nuclear Power Plants Tab**

- a. The Nuclear Power Plants tab dialog has the following appearance items:
 - a. The dialog has four tabs
 - b. The dialog does not have a combo box.

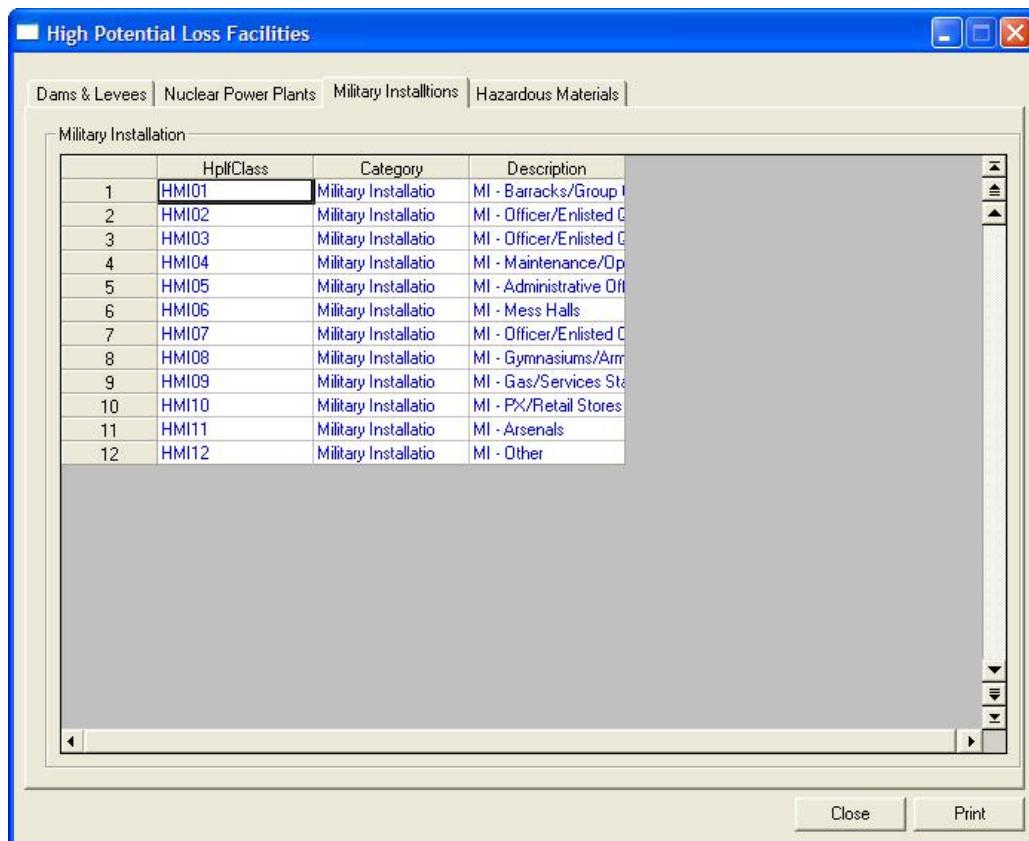
- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons: Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. The column names are as follows: HplfClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.3.2. High Potential Loss Facilities Classifications Dialog: Military Installations Tab

Selection of the Military Installations tab opens the dialog shown below.



**Figure 3-73: HAZUS Inventory Menu, View Classifications Submenu
High Potential Loss Facilities Classification, Military Installations Tab**

- a. The Military Installations tab dialog has the following appearance items:
 - a. The dialog has four tabs
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons: Close and Print.
- f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

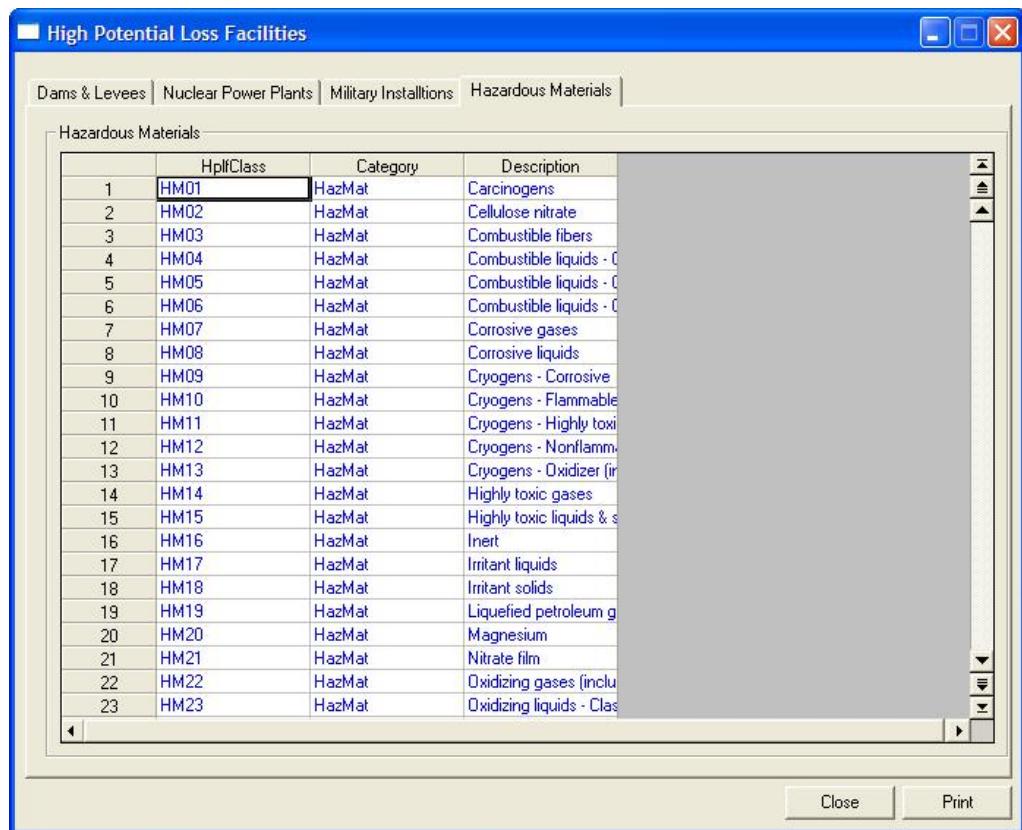
- b. On the Military Installations tab the column names as follows: HplfClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.3.3. High Potential Loss Facilities Classifications Dialog: Hazardous Materials Tab

Selection of the Hazardous Materials tab opens the dialog shown below.



**Figure 3-74: HAZUS Inventory Menu, View Classifications Submenu
High Potential Loss Facilities Classification, Hazardous Materials Tab**

- g. The Hazardous Materials tab dialog has the following appearance items:
 - a. The dialog has four tabs
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons: Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

h. On the Hazardous Materials tab the column names as follows: HplfClass, Category, and Description.

i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

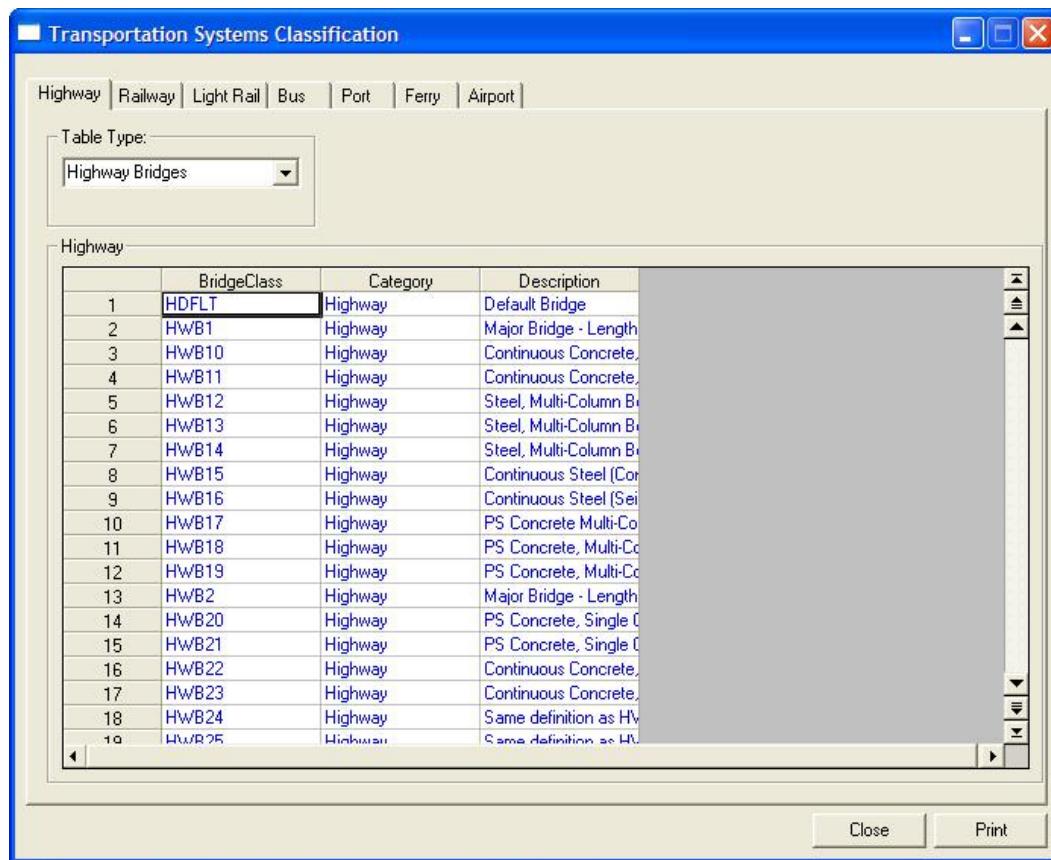
Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

j. The dialog shall have command buttons labeled Close and Print.

k. Selection of Close closes the dialog.

l. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.4. View Classifications Submenu: Transportation Systems Classifications



**Figure 3-75: HAZUS Inventory Menu, View Classifications Submenu
Transportation Systems Classification, Highway Tab**

- Selection of the Transportation Systems menu item on the View Classifications submenu allows the user to view the HAZUS definitions of the various transportation system occupancy classifications. The Transportation System Classification dialog has the following appearance items:
 - The dialog has seven tabs labeled Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport. The Highway tab is the default tab.
 - Various tabs have a combo box.
 - The Highway, Railway, Light Rail and Airport tabs have a single combo box labeled Table Type. On the Highway Tab, the default is Highway Bridges.

- ii. The Bus, Port and Ferry tabs do not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons: Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. Data is stored in the clBridges, clTunnels, clSegments, and clTranspFacilities data tables.
 - c. The data views for the High Potential Loss Facilities dialog are as follows:

Tab	Combo Box Selection	View Name
Highway	Highway Bridges	absv_ViewClassHwyBridge
Highway	Highway Tunnels	absv_ViewClassHwyTunnels
Highway	Highway Segments	absv_ViewClasshwySegments
Railway	Railway Bridges	absv_ViewClassRailwayBridge
Railway	Railway Facilities	absv_ViewClassRailwayFlty
Railway	Railway Tunnels	absv_ViewClassRailwayTunnels
Railway	Railway Segments	absv_ViewClassRailwaySegments
Light Rail	Light Rail Bridges	absv_ViewClassLightRailBridge
Light Rail	Light Rail Facilities	absv_ViewClassLightRailFlty
Light Rail	Light Rail Tunnels	absv_ViewClassLightRailTunnels
Light Rail	Light Rail Segments	absv_ViewClassLightRailSegments
Bus	N/A	absv_ViewClassBusFlty
Port	N/A	absv_ViewClassPortFlty
Ferry	N/A	absv_ViewClassFerryFlty
Airport	Airport Runways	absv_ViewClassAirportRunway
Airport	Airport Facilities	absv_ViewClassAirportFlty

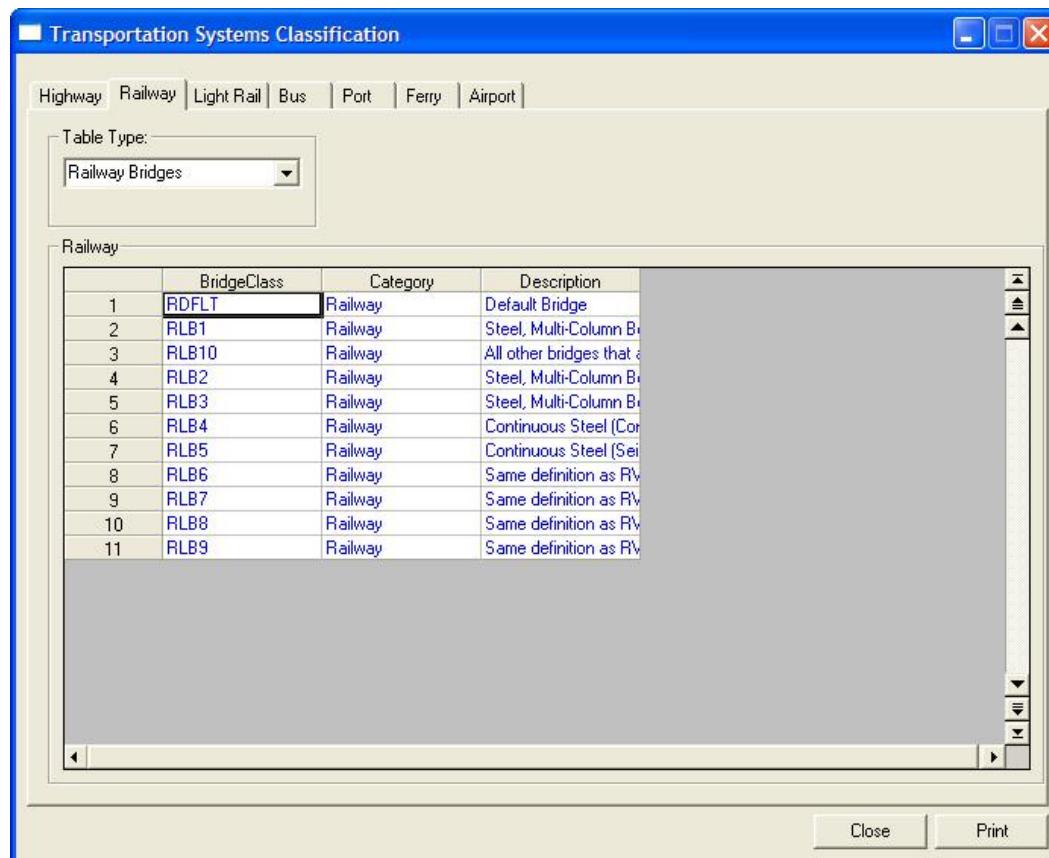
- d. On the Highway tab the column names vary depending on the Table Type combo box selection. The column names are as follows:
- a. When viewing Highway Bridges - BridgeClass, Category, and Description.
 - b. When viewing Highway Tunnels – TunnelClass, Category, and Description.
 - c. When viewing Highway Segments – SegmentClass, Category, and Description.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close and Print.
- g. Selection of Close closes the dialog.
- h. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.4.1. Transportation Systems Classification Dialog: Railway Tab

Selection of the Railway Tab opens the dialog shown below.



**Figure 3-76: HAZUS Inventory Menu, View Classifications Submenu
Transportation Systems Classification, Railway Tab**

- The Railway tab dialog has the following appearance items:
 - The dialog has seven tabs
 - The dialog has a combo box labeled Table Type. Railway Bridges is the default selection.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box for study case blocks.
 - The dialog has command buttons Close and Print.
 - The dialog has a single data grid that is not editable. All data is displayed in blue text.

- b. The data grid column names vary depending on the selection in the Table Type combo box.
Column names are as follows:

- a. When viewing Railway Bridges - BridgeClass, Category, and Description.
 - b. When viewing Railway Facilities - TranspFcltyClass, Category, and Description.
 - c. When viewing Railway Tunnels - TunnelClass, Category, and Description.
 - d. When viewing Railway Segments - SegmentClass, Category, and Description
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

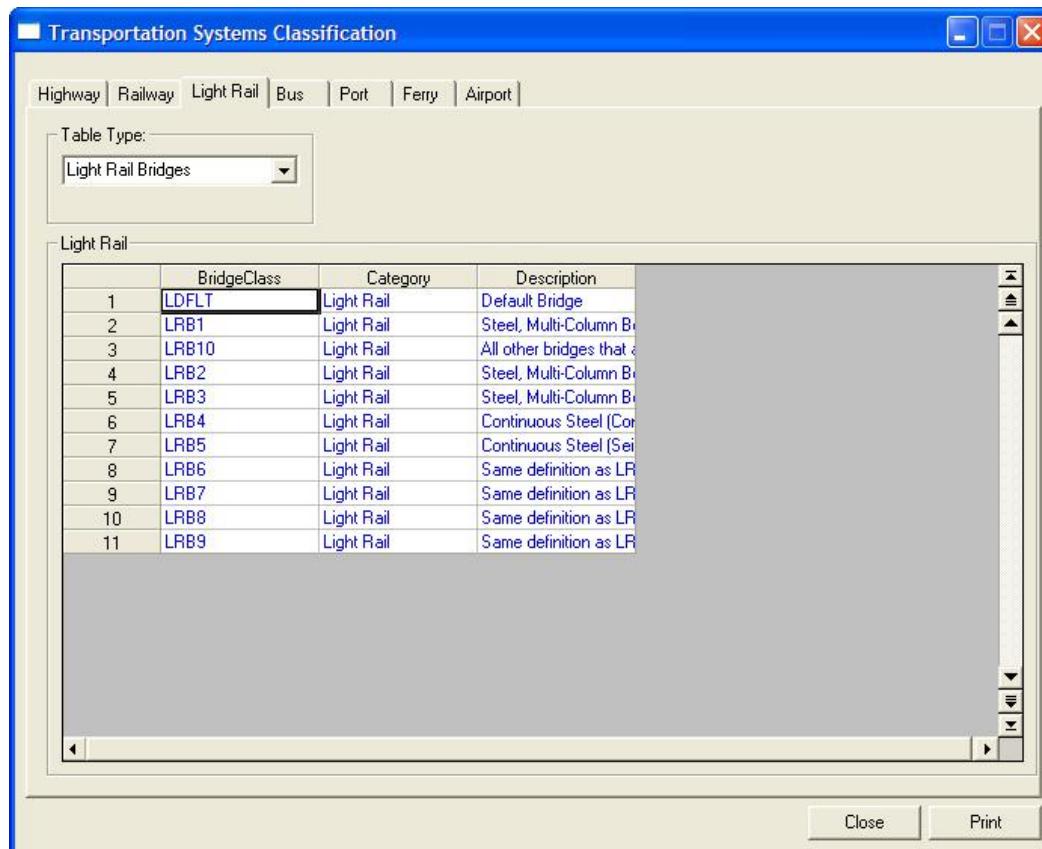
Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
e. Selection of Close closes the dialog.

Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.4.2. Transportation Systems Classification Dialog: Light Rail

Selection of the Light Rail tab opens the dialog shown below.



**Figure 3-77: HAZUS Inventory Menu, View Classifications Submenu
Transportation Systems Classification, Light Rail Tab**

- The Light Rail tab dialog has the following appearance items:
 - The dialog has seven tabs
 - The dialog has a combo box labeled Table Type. Light Rail Bridges is the default selection.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box for study case blocks.
 - The dialog has command buttons Close and Print.
 - The dialog has a single data grid that is not editable. All data is displayed in blue text.

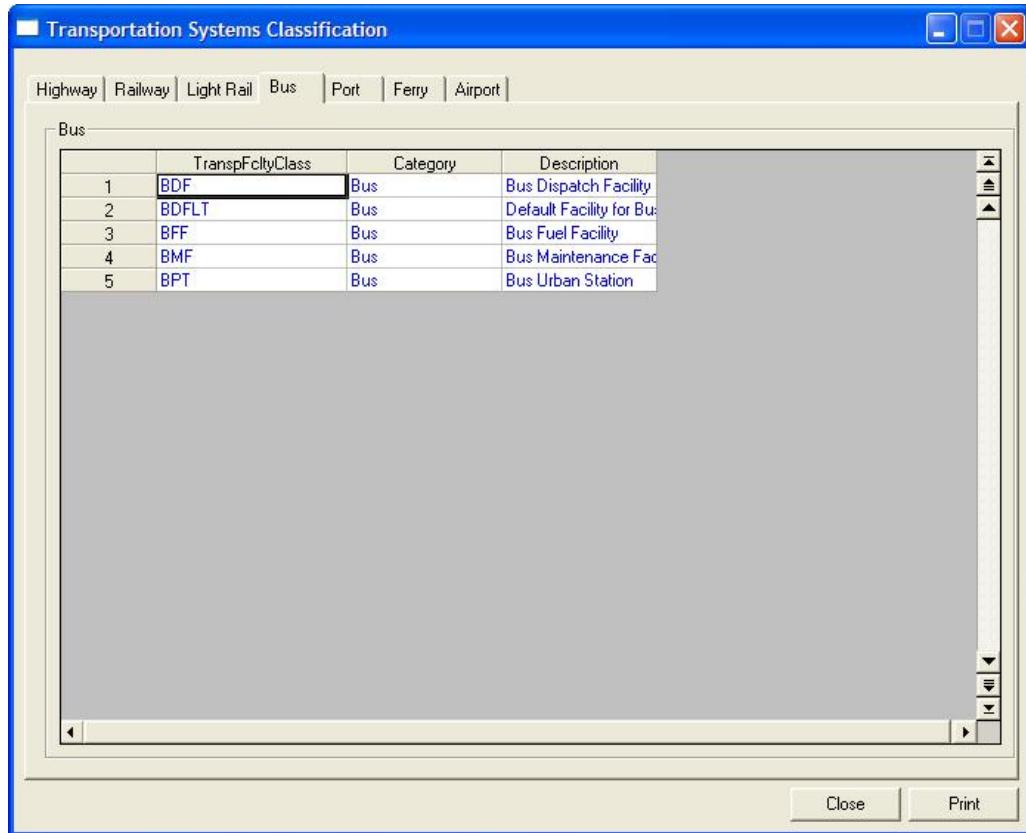
- b. The data grid column names vary depending on the selection in the Table Type combo box. Column names are as follows:
- a. When viewing Light Rail Bridges - BridgeClass, Category, and Description.
 - b. When viewing Light Rail Facilities - TranspFclyClass, Category, and Description.
 - c. When viewing Light Rail Tunnels - TunnelClass, Category, and Description.
 - d. When viewing Light Rail Segments - SegmentClass, Category, and Description
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.4.3. Transportation Systems Classifications Dialog: Bus

Selection of the Bus tab opens the dialog shown below



**Figure 3-78: HAZUS Inventory Menu, View Classifications Submenu
Transportation Systems Classification, Bus Tab**

- a. The Bus tab dialog has the following appearance items:
 - a. The dialog has seven tabs
 - b. The dialog does not have a combo box
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

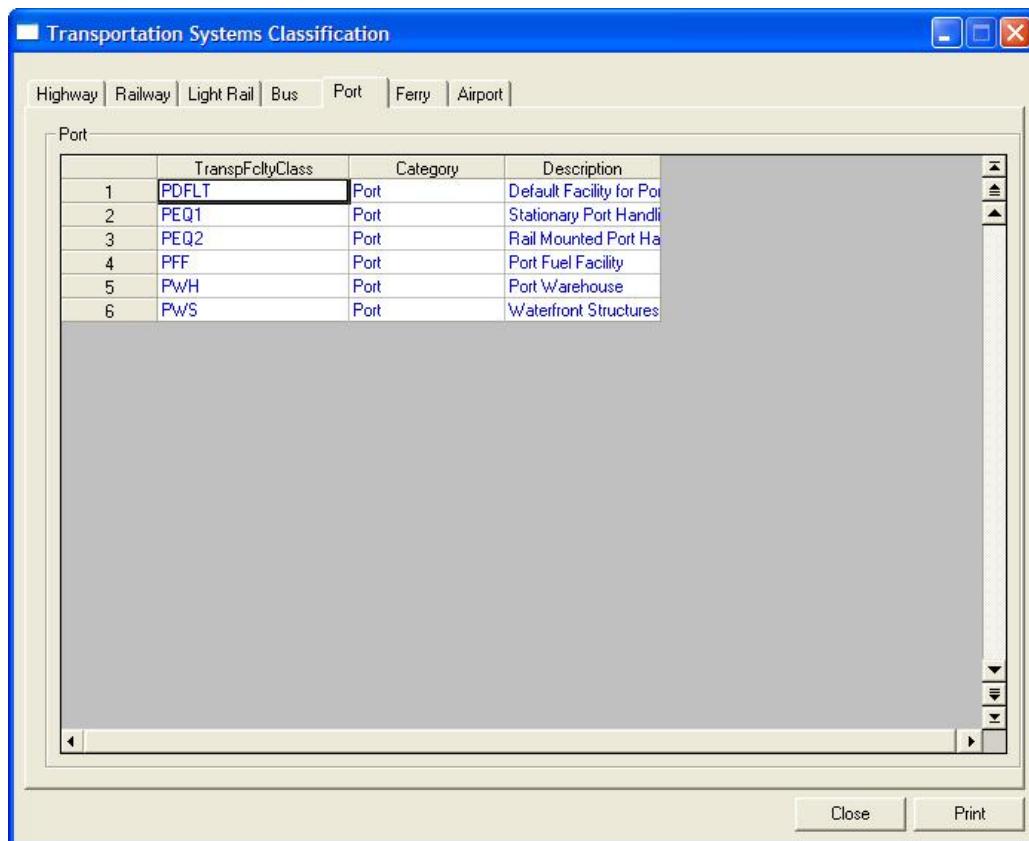
- b. On the Bus tab the column names are as follows: TranspFcltyClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.4.4. Transportation Systems Classification Dialog: Port Tab

Selection of the Port tab opens the dialog shown below.



**Figure 3-79: HAZUS Inventory Menu, View Classifications Submenu
Transportation Systems Classification, Port Tab**

- a. The Port tab dialog has the following appearance items:
 - a. The dialog has seven tabs
 - b. The dialog does not have a combo box
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

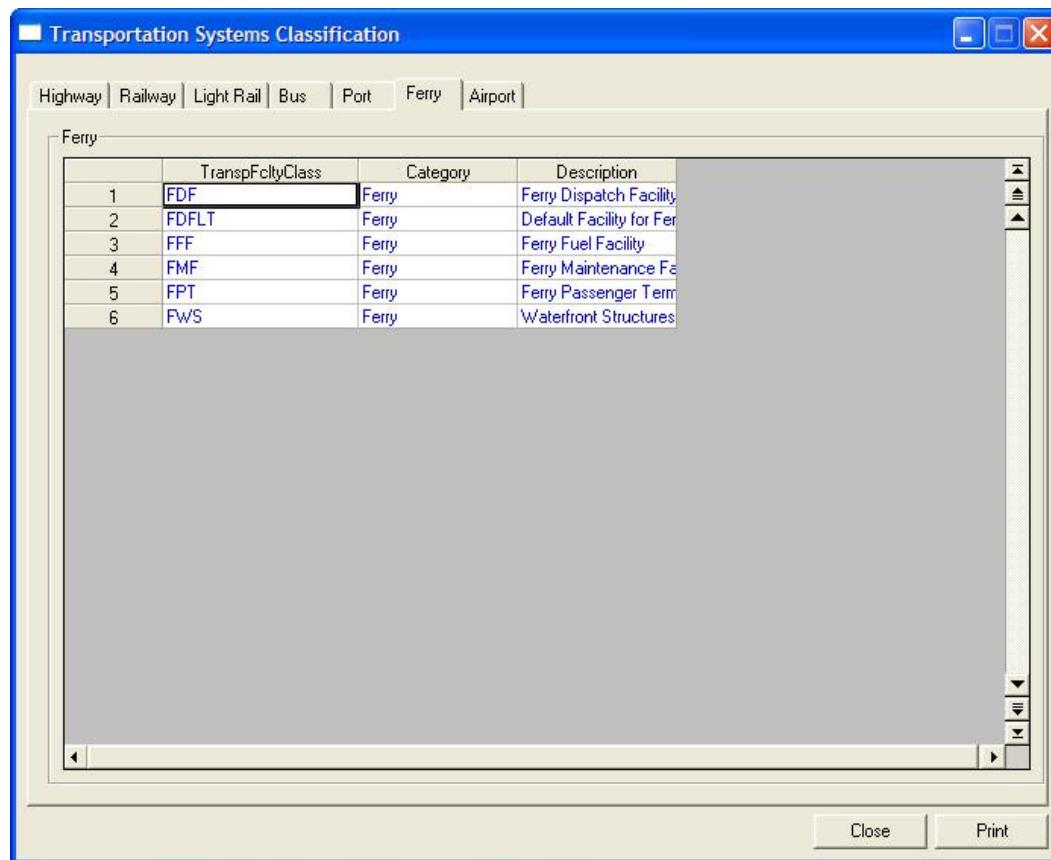
- b. On the Port tab the column names are as follows: TranspFcltyClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.4.5. Transportation Systems Classification Dialog: Ferry Tab

Selection of the Ferry tab opens the dialog shown below.



**Figure 3-80: HAZUS Inventory Menu, View Classifications Submenu
Transportation Systems Classification, Ferry Tab**

- a. The Ferry tab dialog has the following appearance items:
 - a. The dialog has seven tabs
 - b. The dialog does not have a combo box
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

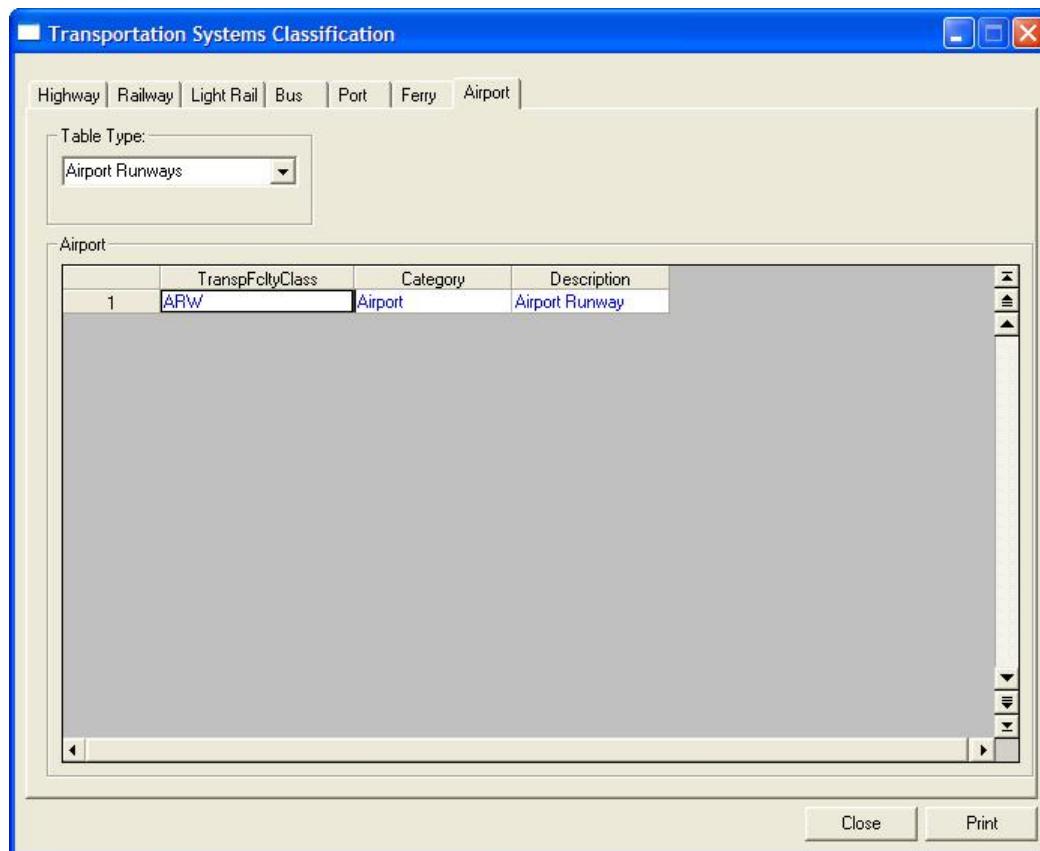
- b. On the Ferry tab the column names are as follows: TranspFclyClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.4.6. Transportation Systems Classification Dialog: Airport Tab

Selection of the Airport tab opens the dialog shown below.



**Figure 3-81: HAZUS Inventory Menu, View Classifications Submenu
Transportation Systems Classification, Airport Tab**

- a. The Airport tab dialog has the following appearance items:
 - a. The dialog has seven tabs
 - b. The dialog has a combo box labeled Table Type. Airport Runways is the default selection.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

- b. Regardless of the selection in the Table Type combo box, the data grid on the Airport tab has the following column names: TranspFclyClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.5. View Classification Submenu: Utility Systems Classification

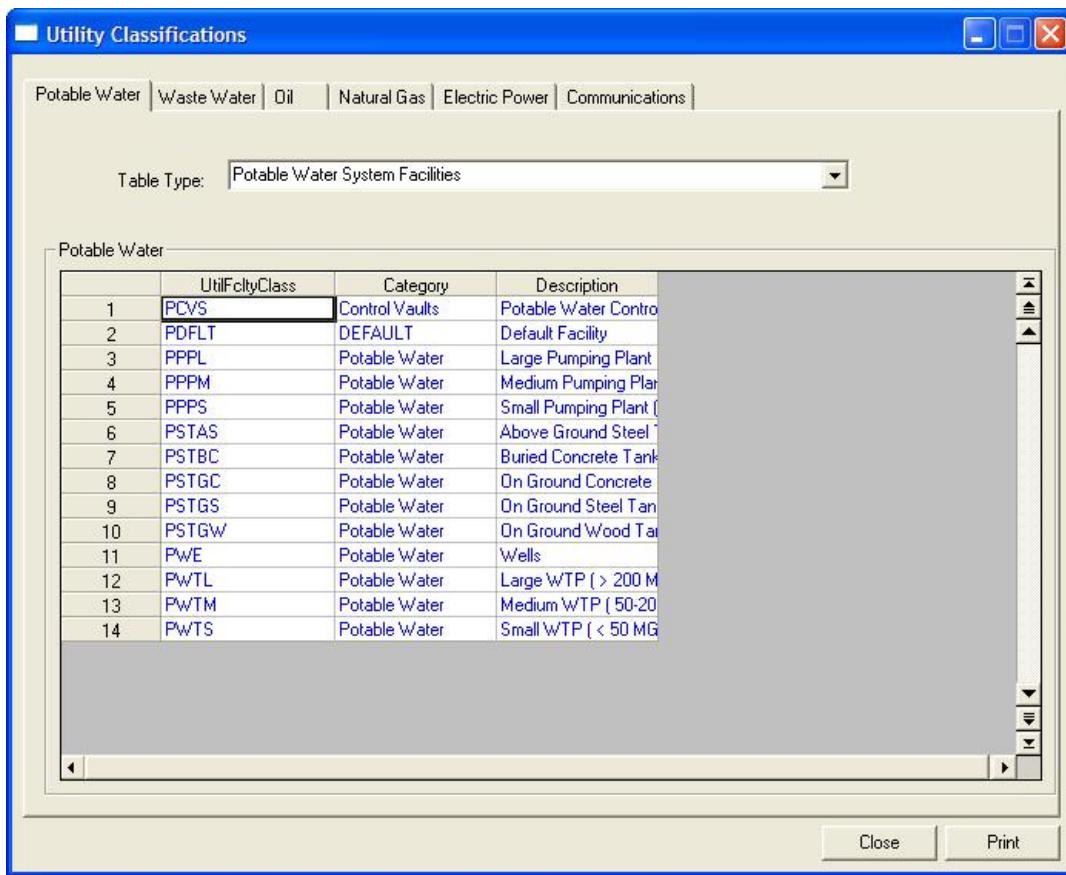


Figure 3-82: HAZUS Inventory Menu, View Classifications Submenu

Utility Systems Classification, Potable Water Tab

- a. Selection of the Utility Systems menu item on the View Classifications submenu allows the user to view the HAZUS definitions of the various transportation system occupancy classifications. The Utility System Classification dialog has the following appearance items:
 - a. The dialog has seven tabs labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. The Potable Water tab is the default tab.
 - b. Various tabs have a combo box.
 - i. The Potable Water, Waste Water, Oil, and Natural Gas tabs have a single combo box labeled Table Type. On the Potable Water Tab, the default is Potable Water System Facilities.

- ii. The Electric Power and Communications tabs do not have a combo box.
- c. The dialog does not have radio buttons.
- d. The dialog does not have a check box for study case blocks.
- e. The dialog has command buttons: Close and Print.
- f. The dialog has a single data grid that is not editable. All data is displayed in blue text.
- b. Data is stored in the clUtilFacilities and clPipelines data tables.
- c. The data views for the High Potential Loss Facilities dialog are as follows:

Tab	Combo Box Selection	View Name
Potable Water	Potable Water System Facilities	absv_ViewClassPotableWaterFlty
Potable Water	Potable Water Pipelines	absv_ViewClassPotableWaterPl
Waste Water	Waste Water System Facilities	absv_ViewClassWasteWaterFlty
Waste Water	Waste Water Pipelines	absv_ViewClassWasteWaterPl
Oil	Oil Refineries	absv_ViewClassOilFlty
Oil	Oil Pipelines	absv_ViewClassOilPl
Natural Gas	Natural Gas Facilities	absv_ViewClassNaturalGasFlty
Natural Gas	Natural Gas Pipelines	absv_ViewClassNaturalGasPl
Electric Power	N/A	absv_ViewClassElectricPowerFlty
Communications	N/A	absv_ViewClassCommFlty

- d. On the Potable Water tab the column names vary depending on the Table Type combo box selection. The column names are as follows:
 - a. When viewing Potable Water System Facilities - UtilFcntyClass, Category, and Description.

- b. When viewing Potable Water Pipelines – PipelinesClass, Category, and Description.
- e. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

- f. The dialog shall have command buttons labeled Close and Print.
- g. Selection of Close closes the dialog.
- h. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.5.1. Utility Systems Classifications Dialog: Waste Water Tab

Selection of the Waste Water tab opens the dialog shown below.

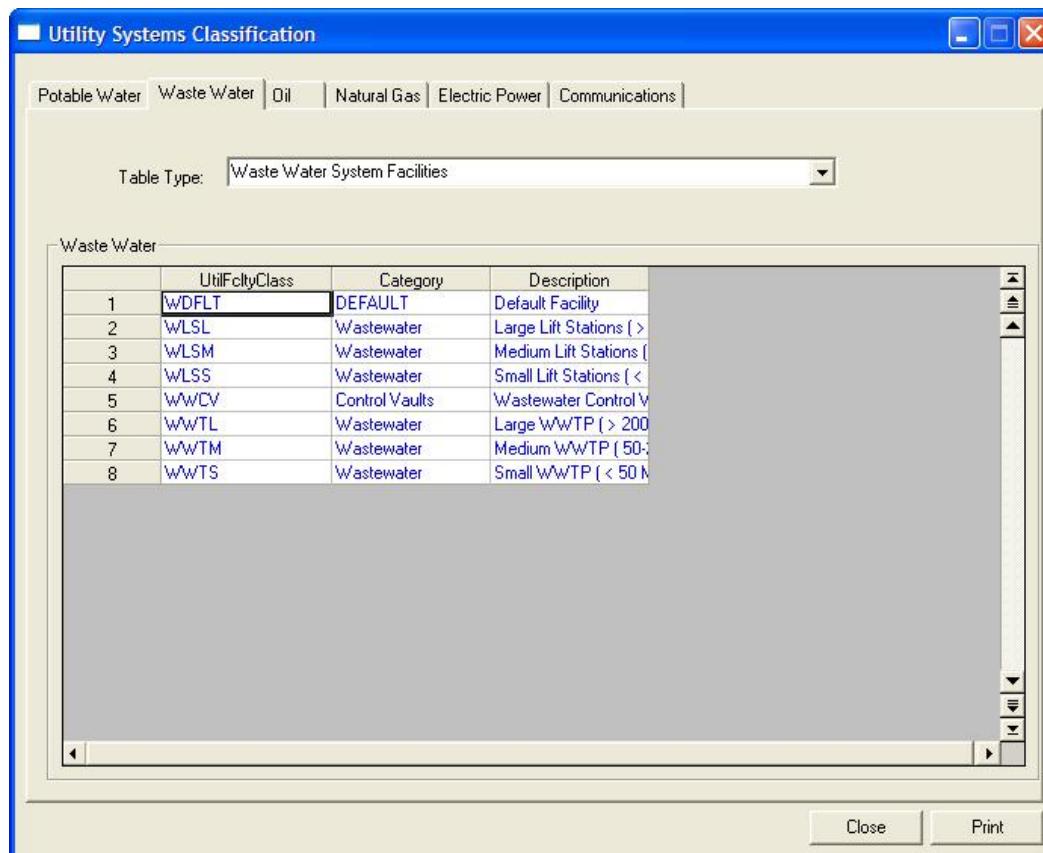


Figure 3-83: HAZUS Inventory Menu, View Classifications, Submenu Utility Systems Classification, Waste Water Tab

- a. The Railway tab dialog has the following appearance items:
 - a. The dialog has six tabs
 - b. The dialog has a combo box labeled Table Type. Waste Water System Facility is the default selection.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

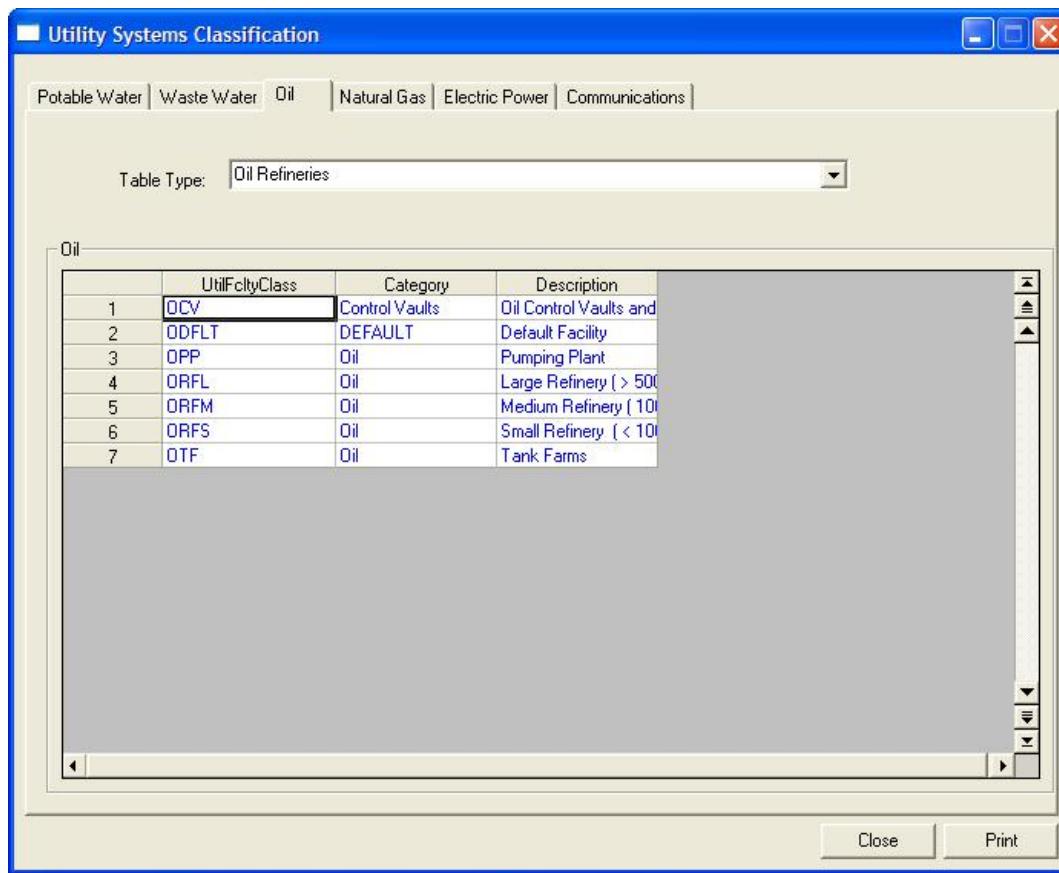
- b. On the Waste Water tab the column names vary depending on the Table Type combo box selection. The column names are as follows:
- a. When viewing Waste Water System Facilities - UtilFcltyClass, Category, and Description.
 - b. When viewing Waste Water Pipelines – PipelinesClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.5.2. Utility Systems Classifications Dialog: Oil Tab

Selection of the Oil tab opens the dialog shown below.



**Figure 3-84: HAZUS Inventory Menu, View Classifications,
Submenu Utility Systems Classification, Oil Tab**

- a. The Oil tab dialog has the following appearance items:
 - a. The dialog has six tabs
 - b. The dialog has a combo box labeled Table Type. Oil Refineries is the default selection.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

- b. On the Oil tab the column names vary depending on the Table Type combo box selection.

The column names are as follows:

- a. When viewing Oil Refineries - UtilFcltyClass, Category, and Description.
- b. When viewing Oil Pipelines – PipelinesClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.5.3. Utility Systems Classification Dialog: Natural Gas

Selection of the Natural Gas tab opens the dialog shown below.

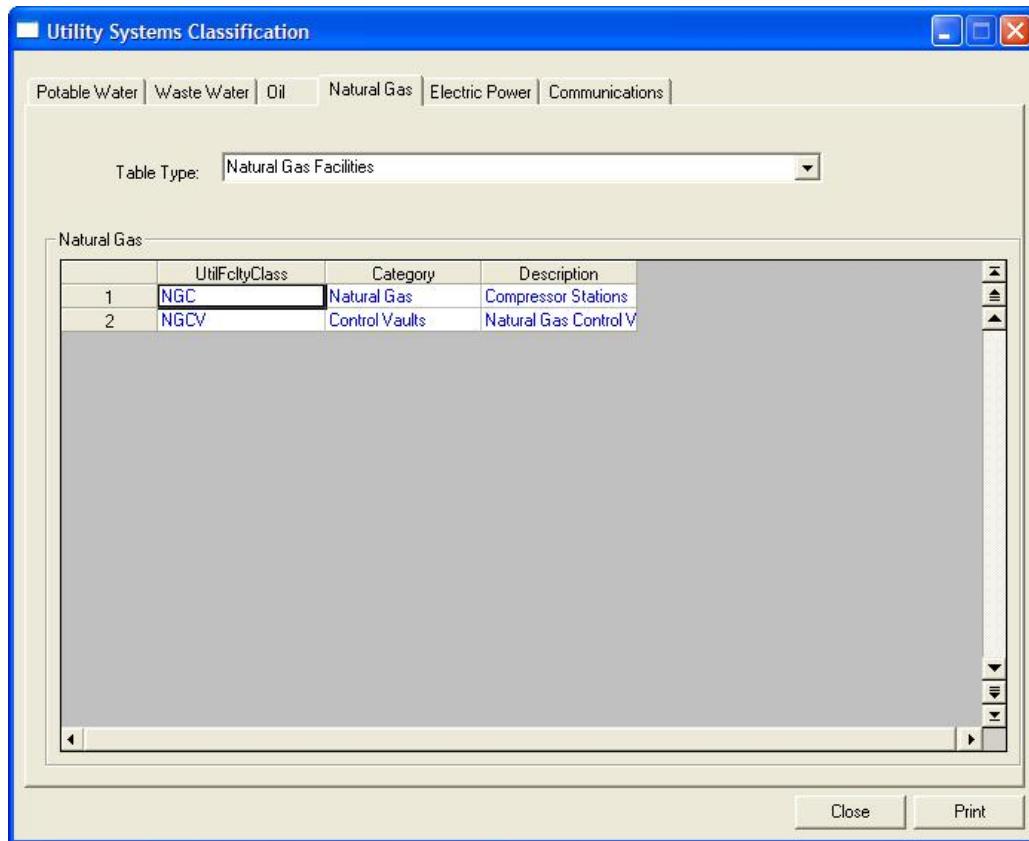


Figure 3-85: HAZUS Inventory Menu, View Classifications, Submenu Utility Systems Classification, Natural Gas Tab

- a. The Oil tab dialog has the following appearance items:
 - a. The dialog has six tabs
 - b. The dialog has a combo box labeled Table Type. Natural Gas Facilities is the default selection.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

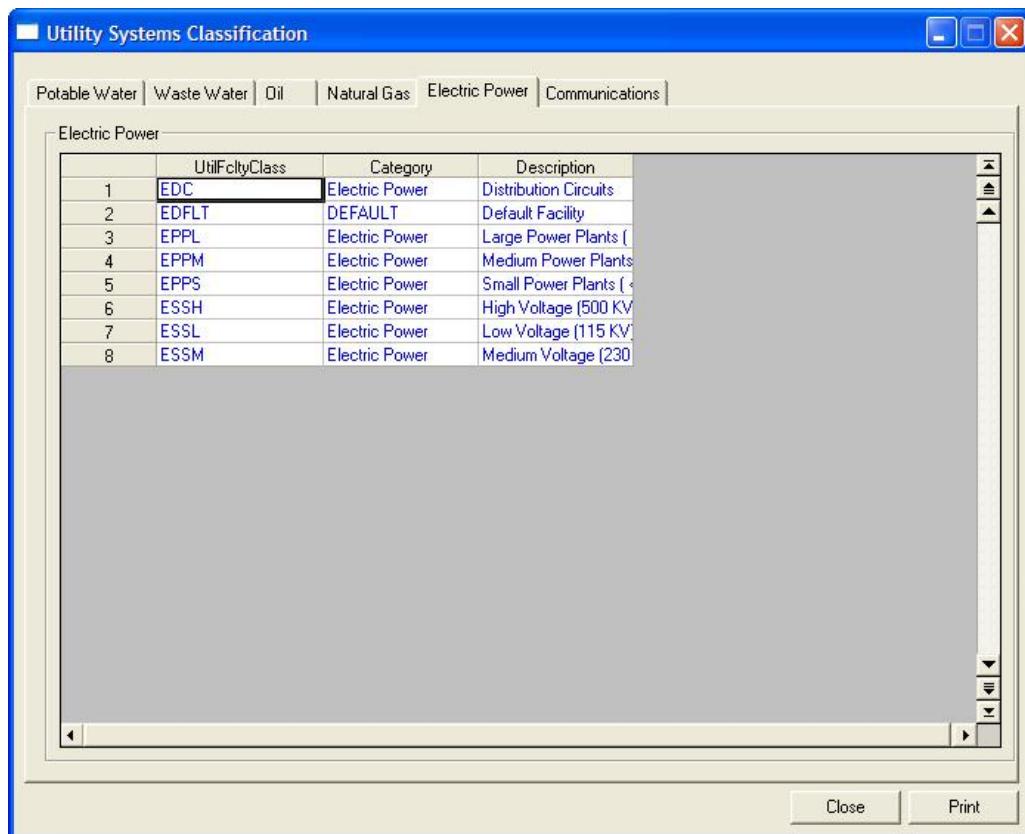
- b. On the Natural Gas tab the column names vary depending on the Table Type combo box selection. The column names are as follows:
- a. When viewing Natural Gas Facilities - UtilFclyClass, Category, and Description.
 - b. When viewing Natural Gas Pipelines – PipelinesClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.5.4. Utility Systems Classification Dialog: Electric Power Tab

Selection of the Electric Power tab opens the dialog shown below.



**Figure 3-86: HAZUS Inventory Menu, View Classifications
Submenu Utility Systems Classification, Electric Power Tab**

- a. The Electric Power tab dialog has the following appearance items:
 - a. The dialog has six tabs
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons: Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

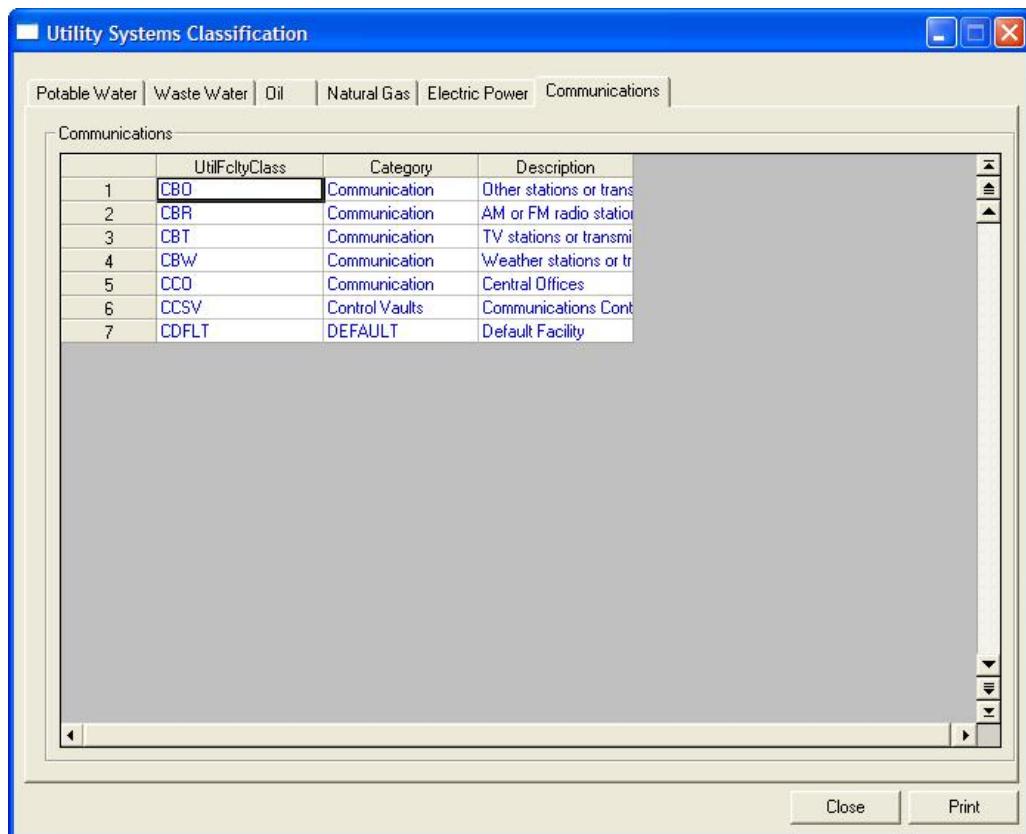
- b. On the Electric Power tab the column names as follows: UtilFcltyClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.8.5.5. Utility Systems Classification Dialog: Communications Tab

Selection of the Communications tab opens the dialog shown below.



**Figure 3-87: HAZUS Inventory Menu, View Classifications Submenu
Utility Systems Classification, Communications Tab**

- a. The Communications tab dialog has the following appearance items:
 - a. The dialog has six tabs
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons: Close and Print.
 - f. The dialog has a single data grid that is not editable. All data is displayed in blue text.

- b. On the Communications tab the column names as follows: UtilFcltyClass, Category, and Description.
- c. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

- d. The dialog shall have command buttons labeled Close and Print.
- e. Selection of Close closes the dialog.
- f. Selection of Print shall open a standard print dialog allowing the user to print the table seen in the active tab.

3.2.5.9. Inventory Menu Organization

The HAZUS flood model has recommended changes to the organization of the Inventory menu which (1) makes the menu more intuitive, (2) moves tertiary functions to primary locations to ease the user's efforts, and (3) takes advantage of the underlying Regional Data Base Management System (RDBMS) and the capability of creating dynamic queries and tables.

The HAZUS flood model shall have the following menu organization:

- General Building Stock and the associated sub-menu shall be Square Footage, Building Count, Occupancy Mapping Wizard, Single-Family Garage Distribution, Dollar Exposure, and Building Import Tool.
- Essential Facilities shall have only the inventory sub-menu because the flood model shall not need the occupancy classifications in a separate menu.

- High Potential Loss Facilities and the associated sub-menu shall be Inventory and Occupancy Mapping.
- Similar to Essential Facilities, User-Defined Structures shall have only an Inventory sub-menu.
- Transportation Systems and the associated sub-menu shall be Inventory and Dollar Exposure.
- Utility Systems and the associated sub-menu shall be Inventory and Dollar Exposure.
- Hazardous Materials.
- Demographics.
- Agriculture.
- Vehicles.
- Show Classifications.

Table 3-18 summarizes the major feature attributes related to the HAZUS Inventory Menu for the flood model. For a complete description of attributes, see Appendix A.

Table 3-18: HAZUS Inventory Menu for the Flood Model

Reference No.	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Inventory Menu	A	C			
General Building Stock	A	C			
Square Footage	A	C			
Building Count	A	C			
General Building Stock Building Square Footage Factors	A	C			
Dollar Exposure	A	C			New functionality
Dollar Exposure Means Cost Models	A	C			New functionality
Dollar Exposure Means Location Factor	A	C			New functionality
Dollar Exposure Single-Family Garage Distributions	A	C			New functionality
Dollar Exposure Basement Distribution	A	C			New functionality

Reference No.	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Dollar Exposure Number of Stories (Height) Distribution	A	C			New functionality
Structure Type Distribution	A	C			New functionality
Age Distribution	A	C			New functionality
Design Level Distributions	A	C			New functionality
Foundation Type Distribution	A	C			New functionality
Structure Type Distribution	A	C			New functionality
BIT	A	C			
Essential Facilities	A	C			
Essential Facilities Inventory Data	A	C			
Essential Facilities Inventory Data Pop-up Menu	A	C			
Add Record	A	C			
Delete Selected Record(s)	A	C			
Import Database	A	C			
Edit Results	A	C			Remove current functionality
Dictionary	A	C			
Essential Facilities Occupancy Mapping	A	C			Remove current functionality
High Potential Loss Facilities	A	C			
High Potential Loss Facilities Inventory Data	A	C			
High Potential Loss Facilities Inventory Data Pop-up Menu	A	C			
High Potential Loss Facilities Occupancy Mapping	A	C			Remove current functionality
User-Defined Structures	A	C			
User-Defined Inventory Data	A	C			InCAST field definitions/relationships assumed
User-Defined Data Inventory Pop-up Menu	A	C			
Use- Defined Occupancy Mapping	A	C			Remove current functionality
Transportation Systems	A	C			
Transportation Systems Inventory Data	A	C			
Transportation Systems Highway Tab	A	C			Limited to bridges
Transportation Systems Railway Tab	A	C			Limited to bridges
Transportation Systems Light Rail Tab	A	C			Limited to bridges
Transportation Systems Bus	D	I			No flood model loss estimation capabilities in HAZUS03.
Transportation Systems Port	D	I			No flood model loss estimation capabilities in HAZUS03.
Transportation Systems Ferry	D	I			No flood model loss estimation capabilities in HAZUS03

Reference No.	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Transportation Systems Airport	D	I			No flood model loss estimation capabilities in HAZUS03.
Transportation Inventory Data Pop-up Menu	A	C			
Transportation Systems Dollar Exposure	A	C			Further discussion with DTI and ARA is required to determine agreed valuation approach.
Utility Systems	A	C			Specific critical and vulnerable components and facilities only.
Utility Systems Inventory Data	A	C			
Utility Systems Potable Water Tab	A	C			
Potable Water Systems Treatment Plants Pull-down	A	C			Only select critical components shall be developed for HAZUS03.
Potable Water System Treatment Plants Inventory Data Pop-up Menu	A	C			
Potable Water Systems Pumping Stations Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Potable Water System Pumping Stations Inventory Data Pop-up Menu	A	C			
Potable Water Systems Control Vaults and Control Stations Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Potable Water System Control Vaults and Control Stations Inventory Data Pop-up Menu	A	C			
Potable Water Network System	A	C			Only River crossings shall be developed for HAZUS03.
Potable Water Network System Transmission/Distribution Exposed River Crossing Pop-up Menu	A	C			
Potable Water Network System Transmission/Distribution Buried River Crossing Pull-down Menu	A	C			Only River crossings shall be developed for HAZUS03.
Potable Water Network System Transmission/Distribution Buried River Crossing Pop-up Menu	A	C			
Utility Systems Wastewater Tab	A	C			
Wastewater Systems Treatment Plants Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Wastewater System Treatment Plants Inventory Data Pop-up Menu	A	C			
Wastewater Systems Lift/Pump Stations Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Wastewater System Lift/Pump Stations Inventory Data Pop-up Menu	A	C			
Wastewater Systems Control Vaults and Control Stations Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.

Reference No.	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Wastewater System Control Vaults and Control Stations Inventory Data Pop-up Menu	A	C			
Wastewater Network Collection System Exposed River Crossing Pull-down Menu	A	C			Only river crossings shall be developed for HAZUS03.
Wastewater Network Collection System Exposed River Crossing Pop-up Menu	A	C			
Wastewater Network Collection System Buried River Crossing Pull-down Menu	A	C			Only river crossings shall be developed for HAZUS03.
Wastewater Network Collection System Buried River Crossing Pop-up Menu	A	C			
Utility Systems Oil Tab	A	C			
Oil Pumping Stations Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Oil Pumping Stations Inventory Data Pop-up Menu	A	C			
Oil Systems Control Vaults and Control Stations Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Oil System Control Vaults and Control Stations Inventory Data Pop-up Menu	A	C			
Oil Transmission and Distribution System Exposed River Crossing Pull-down Menu	A	C			Only river crossings shall be developed for HAZUS03.
Oil Transmission and Distribution System Exposed River Crossing Pop-up Menu	A	C			
Oil Transmission and Distribution System Buried River Crossing Pull-down Menu	A	C			Only river crossings shall be developed for HAZUS03.
Oil Transmission and Distribution System Buried River Crossing Pop-up Menu	A	C			
Utility Systems Natural Gas Tab	A	C			
Natural Gas Control Vaults and Control Stations Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Natural Gas Control Vaults and Control Stations Inventory Data Pop-up Menu	A	C			
Natural Gas Compressor Stations Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Natural Gas Compressor Station Pop-up Menu	A	C			
Natural Gas Transmission and Distribution System Exposed River Crossing Pull-down Menu	A	C			Only river crossings shall be developed for HAZUS03.
Natural Gas Transmission and Distribution System Exposed River Crossing Pop-up Menu	A	C			

Reference No.	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Natural Gas Transmission and Distribution System Buried River Crossing Pull-down Menu	A	C			Only river crossings shall be developed for HAZUS03.
Natural Gas Transmission and Distribution System Buried River Crossing Pop-up Menu	A	C			
Electric Power	A	C			
Electric Power Substations Pop-up Menu	A	C			Only select critical components shall be developed for HAZUS03.
Electric Power Substations Pop-up Menu	A	C			
Utility Systems Communication Tab	A	C			
Communication Switching Stations Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Communication Switching Stations Pop-up Menu	A	C			
Communications Control Vaults Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Communications Control Vaults Inventory Data Pop-up Menu	A	C			
Communication Transmission System Exposed River Crossing Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Communications Transmission System Exposed River Crossing Pop-up Menu	A	C			
Communications Transmission System Buried River Crossing Pull-down Menu	A	C			Only select critical components shall be developed for HAZUS03.
Communications Transmission and Distribution System Buried River Crossing Pop-up Menu	A	C			
Utility Dollar Exposure	A	C			
Hazardous Materials	A	I			No flood model loss estimation capabilities in HAZUS03.
Hazardous Materials Inventory Data Pop-up Menu	A	I			No flood model loss estimation capabilities in HAZUS03.
Demographics	A	C			
Demographics Data Pop-up Menu	A	C			
Agricultural Products	A	C			
Agricultural Products Pop-up Menu	A	C			
Vehicles	A	C			
Vehicles Pop-up Menu	A	C			
View Classifications	A	I			Flood model classifications shall be shown when inside the flood model.
View Classifications Building and Facilities	A	I			

Reference No.	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
View Classifications Building Occupancy	A	C			
View Classifications Essential Facilities	A	C			
View Classifications High Potential Loss Facilities	A	C			
View Classifications Model Building Types	A	C			
View Classifications User-Defined Structures	A	C			
Transportation Systems	A	C			
View Classification Highway	A	C			
View Classification Railway	A	C			
View Classification Light Rail	A	C			
View Classification Bus	A	C			
View Classification Port	A	C			
View Classification Ferry	A	C			
View Classification Airport	A	C			
Utility Systems	A	C			
View Classification Potable Water	A	C			
View Classification Wastewater	A	C			
View Classification Crude and Refined Oil	A	C			
View Classification Natural Gas	A	C			
View Classification Electric Power	A	C			
View Classification Communications	A	C			
Inventory Menu Organization	A	I	L	L	

3.2.6 Hazard Menu

3.2.6.1. Hazard Menu Available in Earthquake Model

This menu provides options that allow the user to define an earthquake event and manage it.

The user shall be able to specify the location of geotechnical data maps, define the earthquake scenario to be used for the analysis, and review the scenario information on the currently selected scenario.

3.2.6.1.1. Scenario Definition

- a. The user shall be able to define a new scenario or open an existing scenario from a list of pre-defined scenarios.
- b. The user shall be able to save each new scenario with a specific name. Only one scenario can be current at a time.
- c. The user shall be able to define three types of scenarios:
 - Deterministic: These could be based on some historical event, or on some specific fault or any user-specified epicenter. For every scenario, the user picks an attenuation function and provides a magnitude as major information.
 - Probabilistic: The user can select any of eight return periods and associate a magnitude to it.
 - User-Defined: The user shall provide spectral acceleration, peak ground acceleration, and peak ground velocity contour maps as the definition of the scenario.
- d. This selection shall allow the user to define an earthquake scenario for analysis by HAZUS-MH.
- e. The user shall be able to choose among the following types of earthquake scenarios:
 - Historical Epicenter
 - Fault Source (Western U.S. only)

- Arbitrary Event
 - Probabilistic Event
 - User-Defined Event
- f. The user shall be able to define a new earthquake scenario or recall a previously defined scenario.
- g. The scenario selection dialog shall also allow the user to change the attenuation function that is used to compute the ground shaking demand. The selection is allowed through a pull-down menu.

3.2.6.1.2. Show Current Scenario

- a. The user shall be able to view the summary of the current scenario and be able to map it using the two tabs provided.
- b. The user shall have the ability to review the currently defined earthquake scenario.
- c. The table shall have buttons that allow the user to close the window and map either the earthquake epicenter (Eastern and Midwestern U.S.) or fault rupture (Western U.S.).

There is no context menu associated with this menu option.

Table 3-19 summarizes the major feature attributes related to the HAZUS Hazard Menu for the earthquake model. For a complete description of the attributes, see Appendix A.

Table 3-19: Earthquake Model Hazard Menu Attributes Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Scenario Definition	A	C	H	L	
Show Current Scenario	A	U	L	L	

3.2.6.2. Hazard Menu Available in Hurricane Model

The hazard menu shall offer the options described below.

3.2.6.2.1. Scenario

- a. The user shall be able to define a new scenario or open an existing scenario from a list of pre-defined scenarios.
- b. For a new scenario, the user shall select one of the following options:
 - A deterministic, user-defined scenario
 - A probabilistic scenario
 - (Deferred) A pre-defined deterministic scenario from a list of historical hurricane events.
- c. For user-defined scenarios, the user shall specify the following parameters at each point on the storm track:
 - Time (hours) or forward speed (m/s)
 - Geographic coordinates (latitude and longitude) of the center of the storm entered by typing the coordinates in a table and viewing a map of the track, or drawn as a series of straight lines directly on a map.
 - Radius to maximum winds (km)
 - Two of the following:
 - Maximum wind (mph at 10 m height)
 - Central pressure (mbar)
 - Profile parameter
- d. For a probabilistic scenario, no additional parameters shall be required.
- e. The user shall be required to provide a name for each new storm scenario.
- f. The user shall be able to save each new scenario.
- g. The user shall be able to delete, duplicate, or edit a scenario.

- h. The user shall be able to set up multiple scenarios during a single analysis session.
- i. The user shall be able to run only one scenario at a time.
- j. The user shall be able to view a summary of the current scenario

3.2.6.2.2. Current Scenario

- a. The user shall be able to view the current active scenario.

Table 3-20 summarizes the major feature attributes related to the HAZUS Hazard menu for the hurricane model. For a complete description of the attributes, see Appendix A.

Table 3-20: Hurricane Model Hazard Menu Attributes Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Scenario Definition	A	C	H	L	
Show Current Scenario	A	U	L	L	

3.2.6.3. Hazard Menu Available in Flood Model

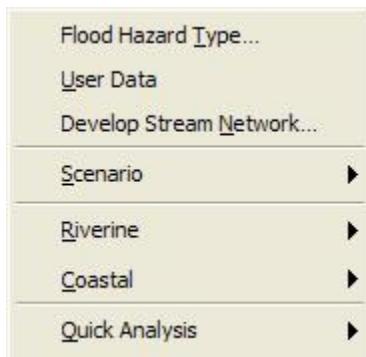


Figure 3-88: HAZUS Hazard Menu

- a. Selection of the Hazard Menu displays information as seen in Figure 3-88. The user then has the opportunity to access menu items at their choosing.
- b. Menu items include Flood Hazard Type, User Data, Develop stream Network, Scenario, Riverine, Coastal, and Quick Analysis.
- c. Menu items Scenario, Riverine, Coastal and Quick Analysis have submenus requiring additional user selection.

- d. Scenario menu item has submenu items for New, Open, Save As, Edit, Close, and Delete.
- e. Riverine menu item has submenu items Hydrology, Delineate Floodplain, Levee, Velocity, and Flow Regulation.
- f. Coastal menu item has submenu items Delineate Floodplain, Long Term Erosion, and Shore Protection. Items Long Term Erosion and Shore Protection are not yet functional in the HAZUS Flood Model.
- g. Quick Analysis menu item has submenu items.

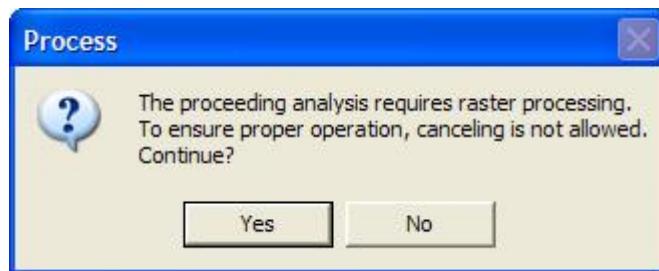


Figure 3-89: HAZUS Hazard Menu Raster Processing Confirmation Dialog

- h. Due to the length of some raster analysis processes, the user is always asked to confirm that they want the raster analysis launched. The standard dialog is shown above.
 - a. Selection of the command button labeled Yes launches the raster operations.
 - b. Selection of the command button Labeled No shall close the Process confirmation dialog and return the user to the prior HAZUS dialog.

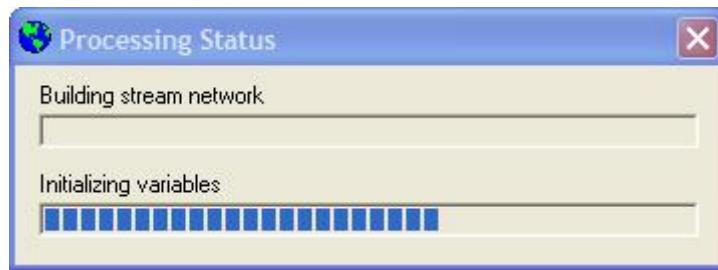


Figure 3-90: HAZUS Hazard Menu, Raster Processing Status Bar

- i. During all raster operations, HAZUS has typical process status bars that are displayed and updated for the user. An example is shown above.

3.2.6.3.1. Flood Hazard Type



Figure 3-91: HAZUS Hazard Menu, Flood Hazard Type Dialog

- a. Selection of the menu item Flood Hazard Type opens the dialog shown above. The Flood Hazard Type dialog is not a standard HAZUS dialog. The Flood Hazard Type dialog has the following appearance items:
 - a. The dialog does not have tabs
 - b. The dialog does not have a combo box.
 - c. The dialog has three radio buttons. Radio buttons are labeled Riverine Only, Coastal Only, and Riverine and coastal.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons OK and Cancel.
 - f. The dialog does not have a data grid.
- b. The dialog is designed to provide data management control for the flood model. Selection of the flood hazard type by the user controls what subsequent menus and submenus are enabled.

- a. Selection of Riverine only enables menu items required to perform a riverine flood analysis and associated “What if” scenarios. Required DEM extent is limited to the County boundary and all HUCs that intersect with the boundary.
- b. Selection of Coastal only enables menu items required to perform a costal flood analysis and associated “What if” scenarios. Required DEM is limited to a select mask developed from the County boundary and the HAZUS shoreline.
- c. Selection of Riverine and coastal enables all menu items on the Hazard menu to allow the user to perform both. The flood model is designed to manage and present the controlling hazard for the users Study Case. Required DEM satisfies the DEM requirements of both the Riverine and Coastal hazards. That is the County boundary, the HUCs and the HAZUS shoreline.
- d. Selection of OK closes the dialog and enables the necessary menus and submenus. The user’s selections are stored in .ini files that are used to enable menu and dialog options.
- e. Once a user has processed new scenarios and attempts to change the Hazard Type, the following error message is provided.



Figure 3-92: HAZUS Hazard Menu, Flood Hazard Type Change Error Dialog

- a. Selection of the menu item Flood Hazard Type after the creation and analysis of flood hazard scenarios causes the above dialog to pop-up. The Flood Hazard Type Error dialog is not a standard HAZUS dialog. The Flood Hazard Type dialog has the following appearance items:

- a. The dialog does not have tabs
- b. The dialog does not have a combo box.
- c. The dialog does not have radio buttons.
- d. The dialog does not have a check box for study case blocks.
- e. The dialog has command buttons OK. Selection of OK closes the Hazard Type Error dialog and returns the user to the Hazard Type dialog.
- f. The dialog does not have a data grid.

3.2.6.3.2. User Data

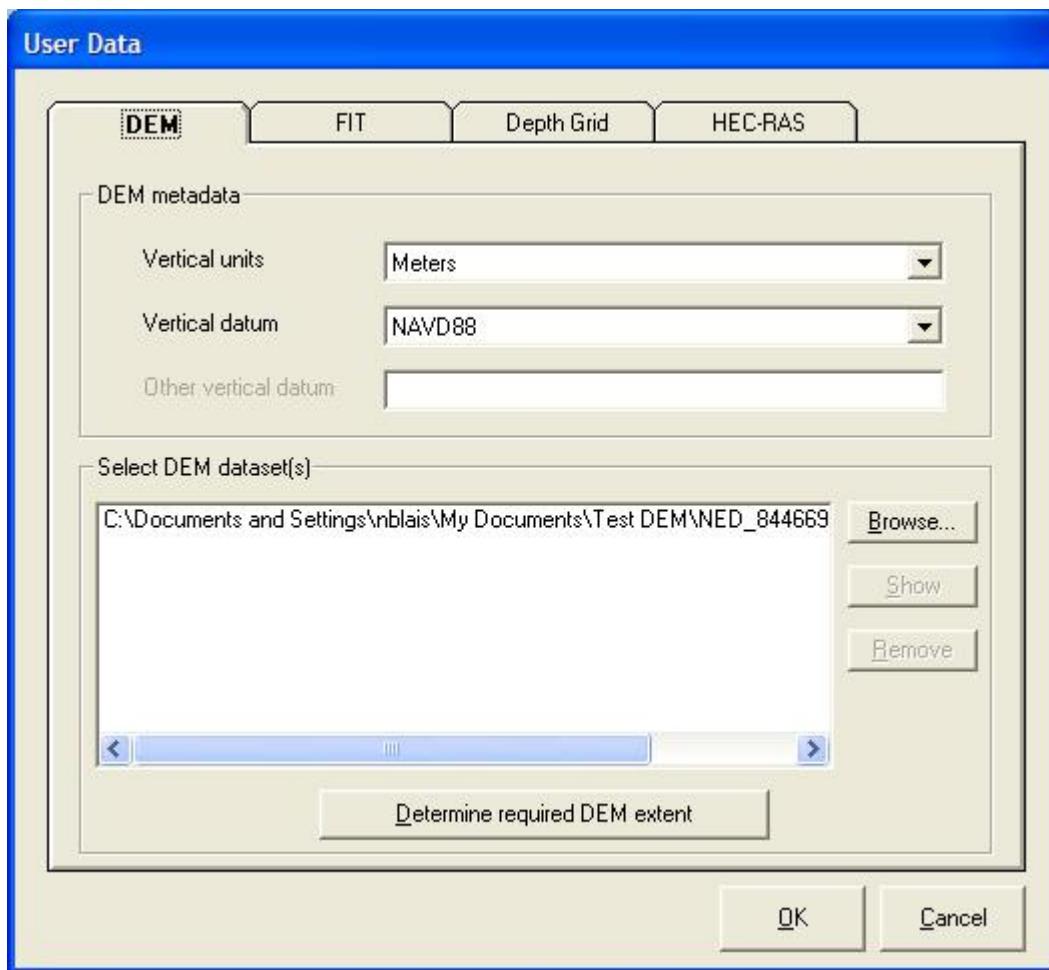


Figure 3-93: HAZUS Hazard Menu, User Data Dialog

- a. Selection of the menu item User Data opens the dialog shown above. The User Data dialog is not a standard HAZUS dialog. The dialog allows the user to identify the locations of necessary data files and working folders for the flood model. The User Data dialog has the following appearance items:
 - a. The dialog has four tabs. The tabs are labeled DEM, FIT, Depth Grid, and HEC-RAS. The default is the DEM tab.
 - b. The dialog has two combo boxes on the DEM Tab only. The FIT and Depth Grid tabs do not have combo boxes. The combo boxes on the DEM tab are labeled Vertical Units, and Vertical Datum.
 - c. The dialog does not have any radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons OK and Cancel. Additionally, command buttons near the data viewer vary depending on the tab selected.
 - f. On the DEM tab, the dialog has text box. The text box is labeled Other Vertical Datum.
 - g. The dialog has a data viewer. The viewer shows the user the location of their selected data set.
 - h. The dialog is designed to receive input from the Hazard Type dialog. Functionality varies by the user's selection as noted below.
 - i. Selection of Riverine only enables the riverine tabs on the FIT and Depth Grid tabs. The coastal tab is not displayed for the user.
 - j. Selection of Coastal only enables the coastal tabs on the FIT and Depth Grid tabs. The riverine tab is not displayed for the user.
 - k. Selection of Riverine and coastal enables both the riverine and the coastal tabs on the FIT and Depth Grid tabs.

- b. The combo box labeled Vertical units allows the user to identify the units of their DEM. Options in the combo box are Feet and Meters. The default value is meters since the default DEM for the Level 1 user is assumed to be the National Elevation Dataset.
- c. Selection of Feet causes the HAZUS flood model to perform the conversion of data to meters.
- d. The Combo box labeled Vertical datum allows the users to identify the Vertical datum of their DEM. Options in the combo box are NAVD88, NGVD29, and Other. The default value is NAVD88 since the default EM for the Level 1 user is in this datum.
- e. Selection of other vertical datum forces the HAZUS flood model to convert the vertical datum to the NAVD88 for subsequent analysis.
- f. Selection of the Other option enables the text box labeled Other Vertical Datum for the user to input the necessary data information that HAZUS requires.
- g. The command buttons near the Select DEM dataset location are labeled Browse, Show and Remove.
 - a. The Browse command button is always enabled.
 - b. The Show and Remove command buttons are enabled only when a raster dataset is selected in the Select DEM dataset location window.
 - c. Selection of Browse opens a standard ArcGIS ArcCatalog data browser window that allows the user to view and select raster grid datasets.

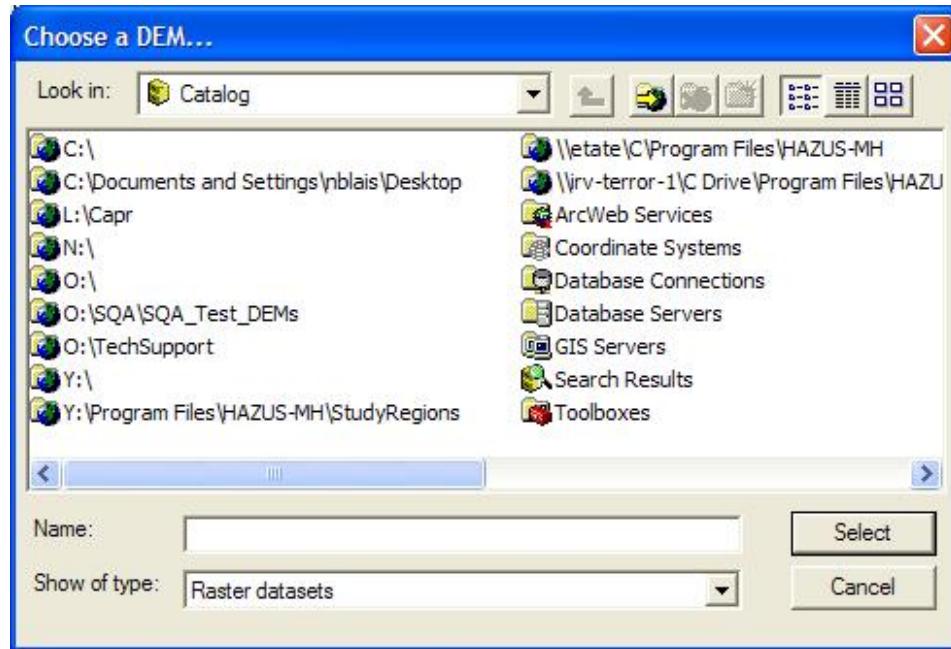


Figure 3-94: ArcCatalog Open Dialog When Browsing for DEM Raster Dataset

- d. Selection of Show adds the selected DEM to the map layers and displays the DEM for the user.
- e. Selection of Remove shall remove the selected DEM from the User data dialog.
- h. Selection of the Determine required DEM extent command button launches the flood model in a short analysis to overlay the Hydrologic Unit Codes (HUCs) and the study region bounding polygon to ensure a properly sized DEM is requested from the National Elevation dataset. For Riverine analysis, the DEM will extend to the maximum extent of the county boundary and the intersecting baseline HUCs provided with HAZUS. For Coastal, the dataset needs to extend beyond the county boundary into the ocean by a buffered amount.
 - a. The dialog for the NED download is discussed in the next subsection.
- i. Selection of OK closes the dialog and returns the user to the HAZUS ArcGIS view.
 - a. The model checks the users DEM against the default Hydrologic Unit Codes HUCs and study region bounding polygon to ensure the DEM is properly sized. If not, an error message tells the user that the DEM is not large enough to perform an analysis.

- b. The model automatically re-projects all raster datasets into the Albers Equal Area projection for calculations. The NED is un projected (decimal degrees) and is re-projected by the model.
- j. Selection of Cancel closes the dialog and returns the user to the base view.

3.2.6.3.2.1. User Data, DEM Tab, Determine DEM Coordinated Dialog

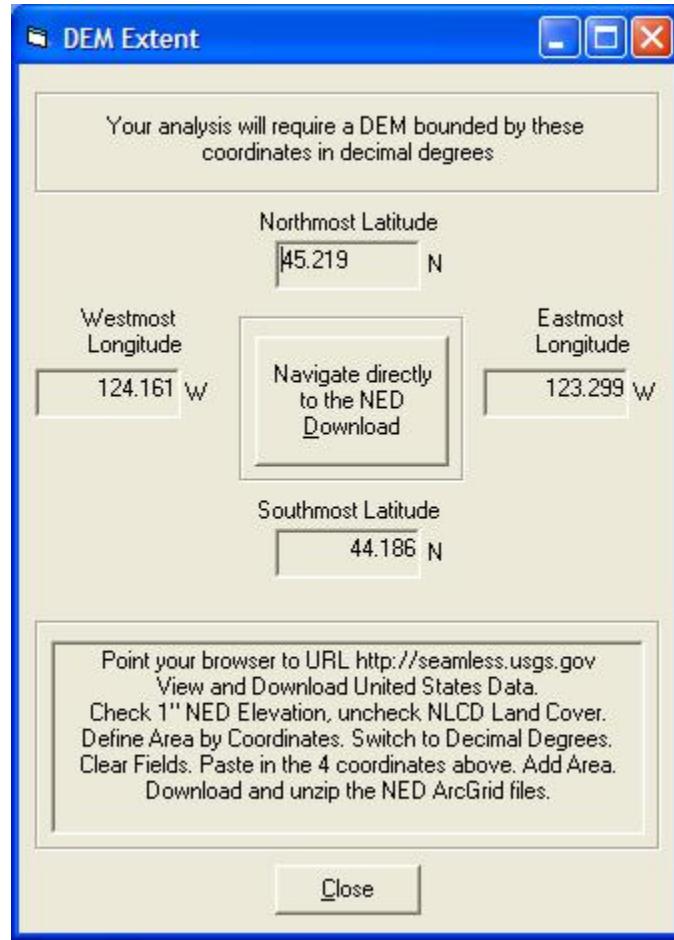


Figure 3-95: HAZUS Hazard Menu, User Data, DEM Tab, Determine DEM Coordinates Dialog

- a. Selection of the command button Determine required DEM extent opens the dialog shown above. The dialog is a flood model custom dialog with the following features:
 - a. The dialog has 5 non-editable text boxes.
 - b. The dialog has two command buttons.

- b. Four of the text boxes display the bounding coordinates for the DEM in decimal degrees. The boxes are labeled Westmost Longitude, Northmost Latitude, Eastmost Longitude, and Southmost Latitude.
 - a. The text boxes displaying the bounding coordinates surround the command button labeled Navigate Directly to the NED Download.
- c. The fifth text box shall display the message:
 - a. Point your browser to URL <http://seamless.usgs.gov> View and Download United States Data. Check 1" NED Elevation, uncheck NLCD Land Cover. Define Area by Coordinates. Switch to Decimal Degrees. Clear Fields. Past in the 4 coordinates above. Add Area, Download and unzip the NED ArcGrid files.
- d. Selection of the Navigate Directly to the NED Download launches the user's internet and sends the user to the USGS NED site to extract the required DEM.
 - a. The User is required to access the internet to download the USGS NED. If the user has their own DEM, they can bypass this step and use the User data dialog to point to their DEM, but the extent must be at least equivalent to the bounding coordinates indicated earlier.
 - i. The user is warned if the DEM is sufficiently large enough to impact processing time.
 - ii. The user is warned that they cannot proceed with a DEM that is insufficient.
- e. Selection of the Close command button closes the dialog and returns the user to the User Data dialog, the DEM tab.

3.2.6.3.2.2. User Data, DEM Tab, Determine DEM Coordinates Dialog, NED website (REFERENCE)

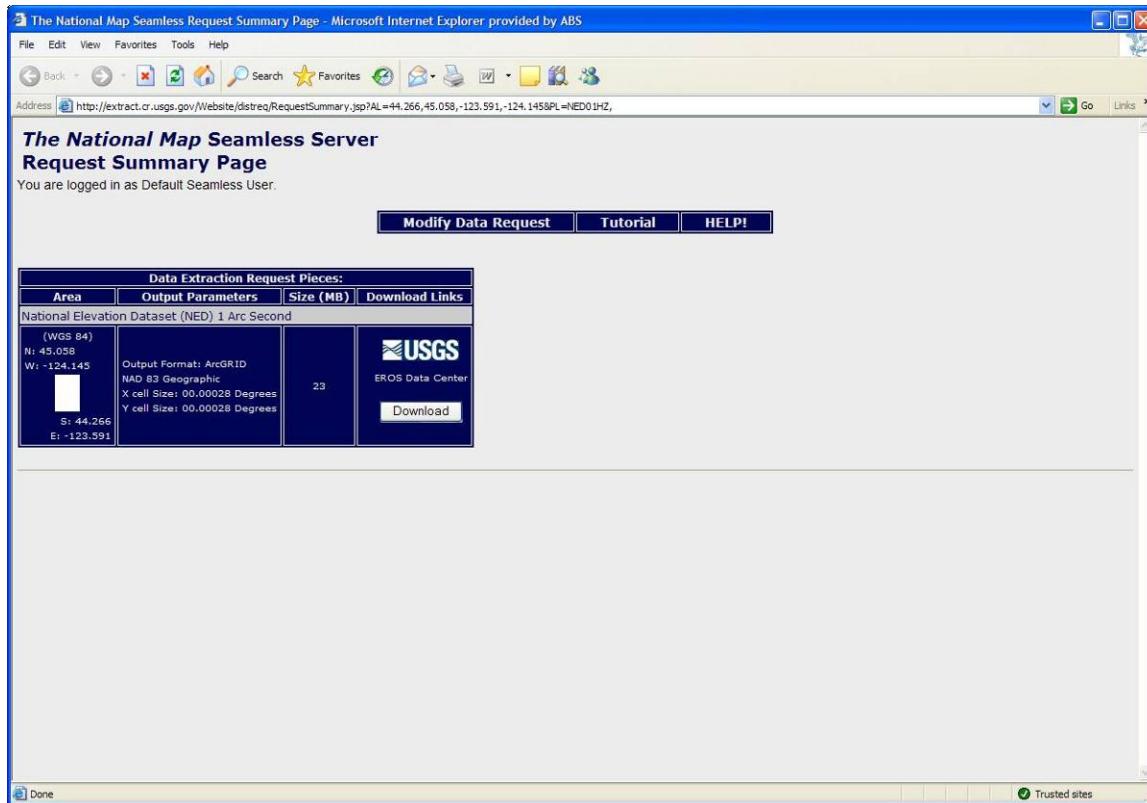


Figure 3-96: HAZUS Hazard Menu, User Data DEM Tab, Determine DEM Coordinates Dialog, NED Web Site

- a. The above dialog is provided by the USGS and is not under the control of the HAZUS project. This dialog is provided for reference purposes. Reader is referred to the HAZUS Flood Model User Manual for a discussion on how to navigate on the USGS NED site.

3.2.6.3.2.3. User Data, FIT Tab

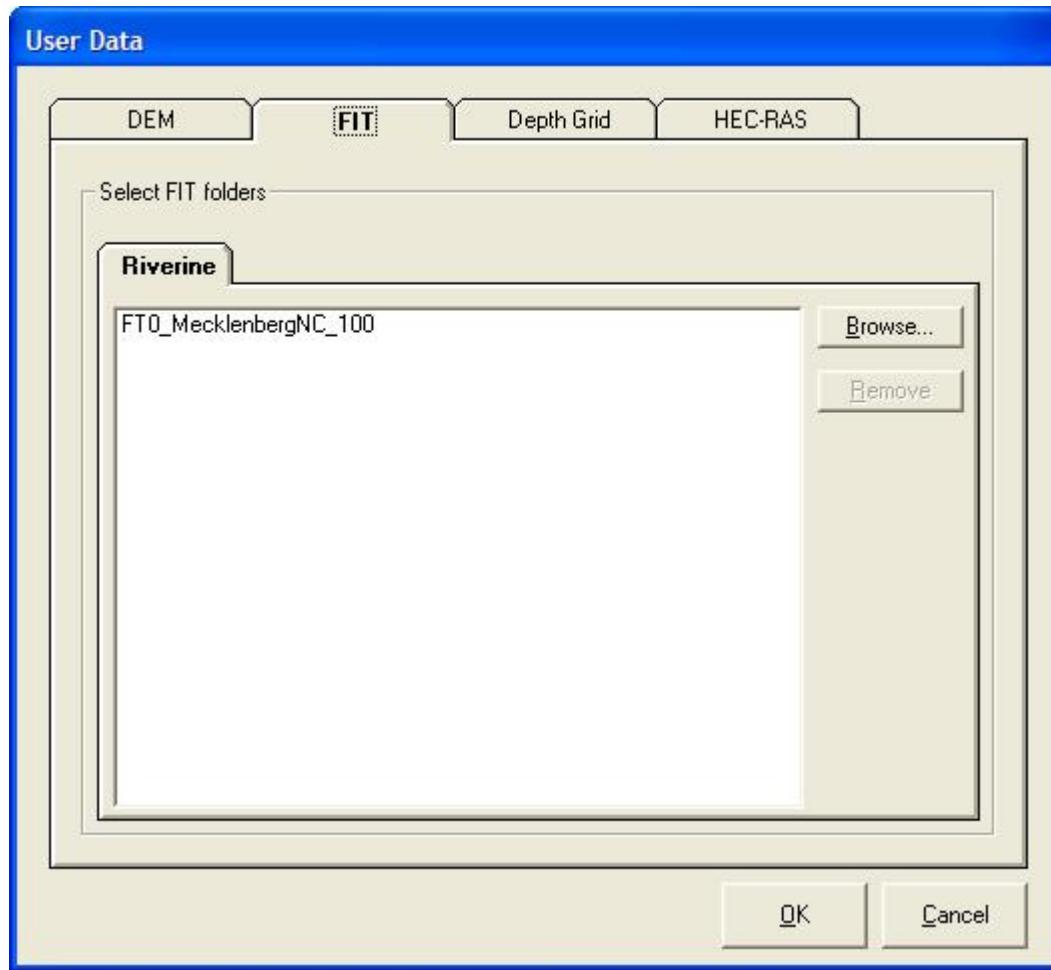


Figure 3-97: HAZUS Hazard Menu, User Data, FIT Tab, Riverine Tab Dialog

- a. Selection of the FIT tab on the User Data dialog opens the dialog shown above. The User Data dialog is not a standard HAZUS dialog. The dialog allows the user to identify the locations of necessary data files and working folders for the flood model. The User Data dialog has the following appearance items:
 - a. The dialog has four tabs. The tabs are labeled DEM, FIT, Depth Grid, and HEC-RAS. The default is the DEM tab.
 - b. The FIT dialog also has two tabs within the data viewer labeled Riverine and Coastal. Tab behavior is associated with user input from the Hazard Type dialog as discussed below. Riverine tab is default when both are displayed.

- c. The FIT tab does not have any combo boxes.
 - d. The dialog does not have any radio buttons.
 - e. The dialog does not have a check box for study case blocks.
 - f. The dialog has command buttons OK and Cancel. Additionally, command buttons near the data viewer vary depending on the tab selected.
 - g. The dialog does not have any text boxes.
 - h. The dialog has a data viewer. The viewer shows the user the location of their selected data set.
- b. Depending on the user input from the Hazard Type dialog. Functionality varies by the user's selection as noted below.
- a. Selection of Riverine only enables the riverine tabs on the FIT and Depth Grid tabs. The coastal tab is not displayed for the user.
 - b. Selection of Coastal only enables the coastal tabs on the FIT and Depth Grid tabs. The riverine tab is not displayed for the user.
 - c. Selection of Riverine and coastal enables both the riverine and the coastal tabs on the FIT and Depth Grid tabs.
- c. The command buttons near the Select FIT dataset data viewer are labeled Browse and Remove.
- a. The Browse command button is always enabled.
 - b. The Remove command buttons are enabled only when a FIT dataset is selected in the Select FIT dataset location window.
 - c. Selection of Browse opens a standard ArcGIS ArcCatalog data browser window that allows the user to view and HAZUS FIT folders.
 - d. Selection of Remove removes the selected FIT folder from the User data dialog.

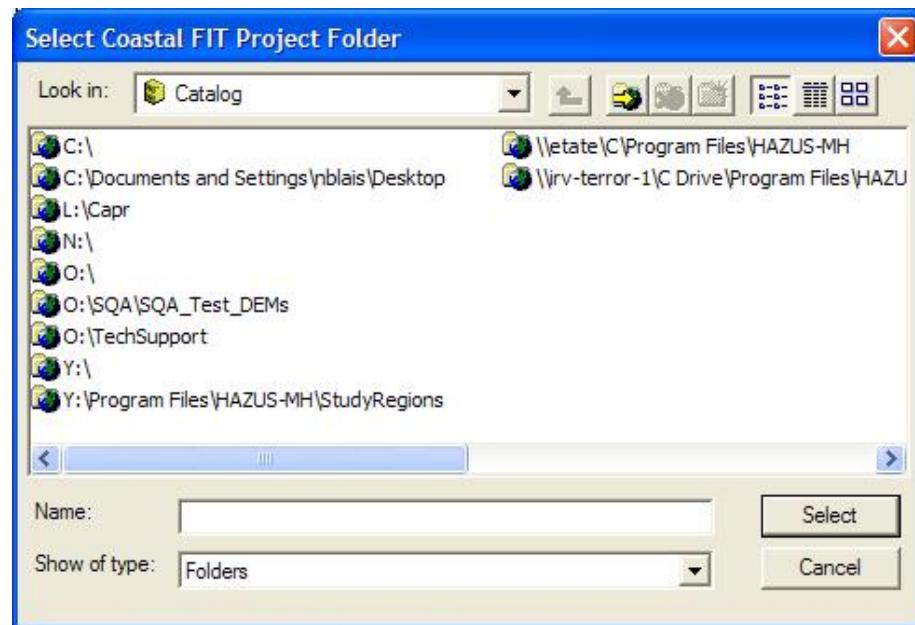


Figure 3-98: ArcCatalog Open Dialog When Browsing for FIT Project Folder

- e. The model looks for the metadata associated with the FIT data selected by the user and validates that all of the necessary FIT information is available.
- d. Selection of OK closes the dialog returns the user to the ArcGIS window.
- e. Selection of Cancel closes the dialog and returns the user to the ArcGIS window.

3.2.6.3.2.3.1. User Data, FIT Tab, Coastal Tab

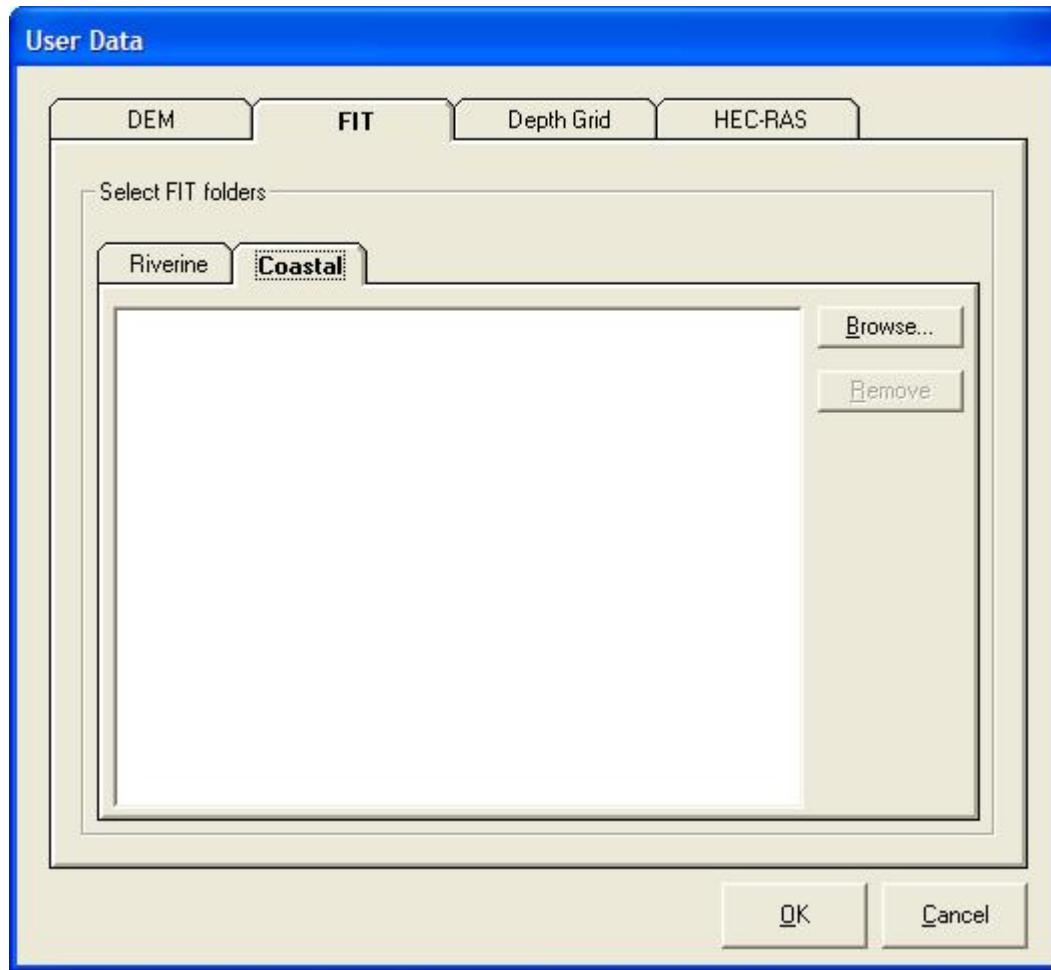


Figure 3-99: HAZUS Hazard Menu, User Data, FIT Tab, Coastal Tab Dialog

- a. Selection of the Coastal tab on the FIT tab data viewer opens the dialog shown above. All features and performance is the same as the Riverine tab discussed above.

3.2.6.3.2.4. User Data, Depth Grid Tab

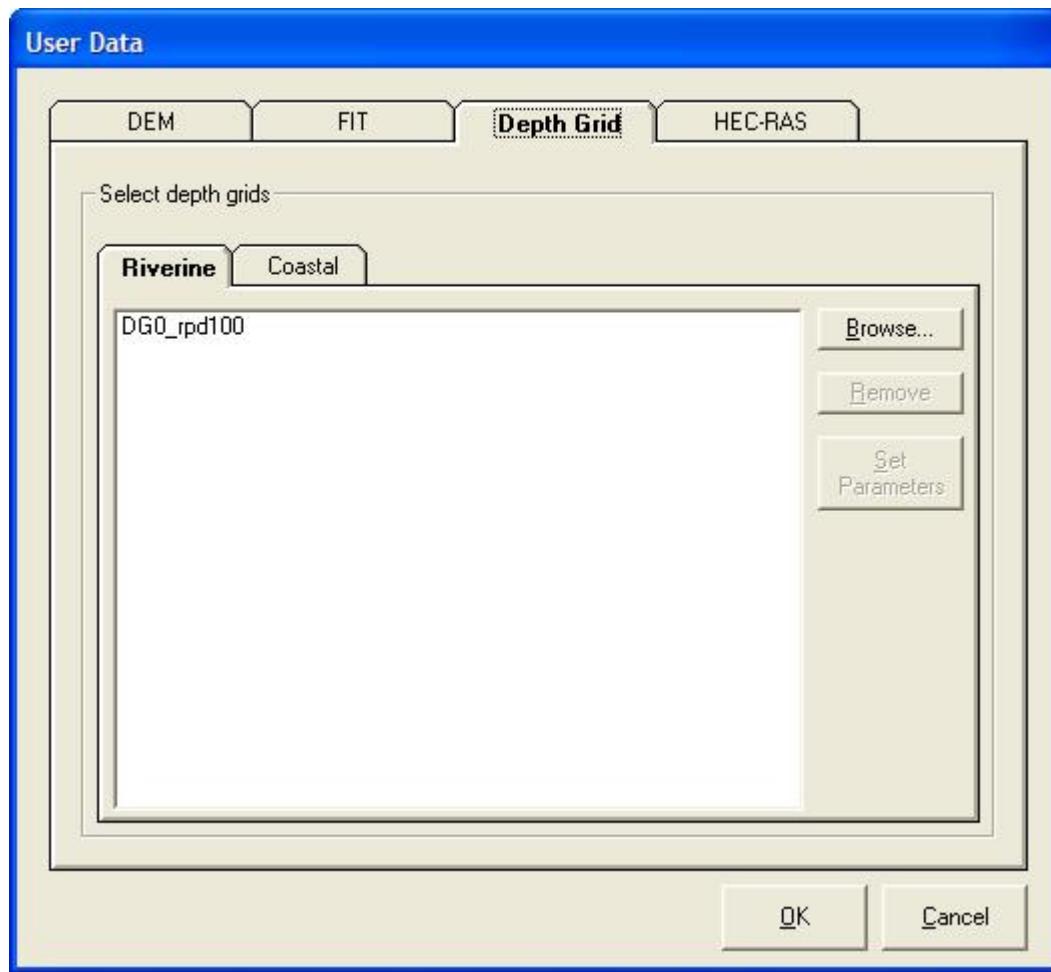


Figure 3-100: HAZUS Hazard Menu, User Data, Depth Grid Tab, Riverine Tab Dialog

- a. Selection of the Depth Grid tab on the User Data dialog opens the dialog shown above. The User Data dialog is not a standard HAZUS dialog. The dialog allows the user to identify the locations of necessary data files and working folders for the flood model. The User Data dialog has the following appearance items:
 - a. The dialog has four tabs. The tabs are labeled DEM, FIT, Depth Grid, and HEC-RAS. The default is the DEM tab.
 - b. The Depth Grid tab does not have any combo boxes.
 - c. The dialog does not have any radio buttons.

- d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons OK and Cancel. Additionally, command buttons near the data viewer vary depending on the tab selected.
 - f. The dialog does not have any text boxes.
 - g. The dialog has a data viewer. The viewer shows the user the location of their selected data set.
- b. Depending on the user input from the Hazard Type dialog. Functionality varies by the user's selection as noted below.
- a. Selection of Riverine only enables the riverine tabs on the FIT and Depth Grid tabs. The coastal tab is not displayed for the user.
 - b. Selection of Coastal only enables the coastal tabs on the FIT and Depth Grid tabs. The riverine tab is not displayed for the user.
 - c. Selection of Riverine and coastal enables both the riverine and the coastal tabs on the FIT and Depth Grid tabs.
- c. The command buttons near the Select Depth Grid dataset data viewer are labeled Browse, Remove, and Set Parameters.
- d. The Browse command button is always enabled.
- a. The Remove command buttons are enabled only when a raster dataset is selected in the Select Depth Grids dataset location window.
 - b. Selection of Browse opens a standard ArcGIS ArcCatalog data browser window that allows the user to view and select raster grid datasets.

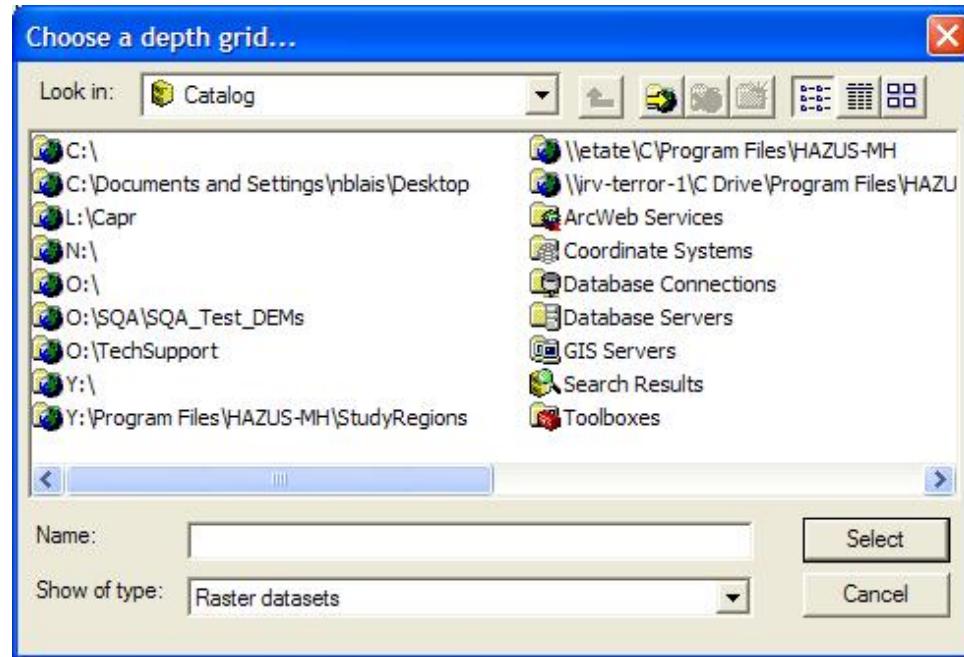


Figure 3-101: ArcCatalog Open Dialog When Browsing for Depth Grid Dataset

- c. Selection of Remove removes the selected raster dataset from the User data dialog.
- d. Selection of the Set Parameters button opens a dialog allowing the user to set the vertical units and return period for each new floating-point binary file. The vertical units can be Feet or Meters. The return period is optional integer and if not set, will default to value of 0.

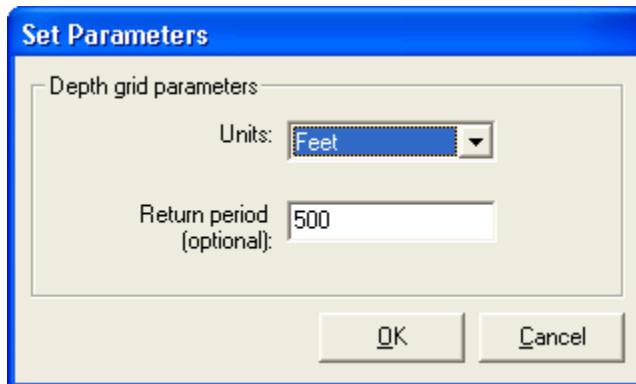


Figure 3-102: Set Parameters Dialog

- e. The model looks for the metadata associated with the FIT data selected by the user and validates that all of the necessary FIT information is available.
- e. Selection of OK closes the dialog returns the user to the ArcGIS window.
- f. Selection of Cancel closes the dialog and returns the user to the base view.
- g. Once the data has been added by the user, the data is opened and added to the map layer as shown below.

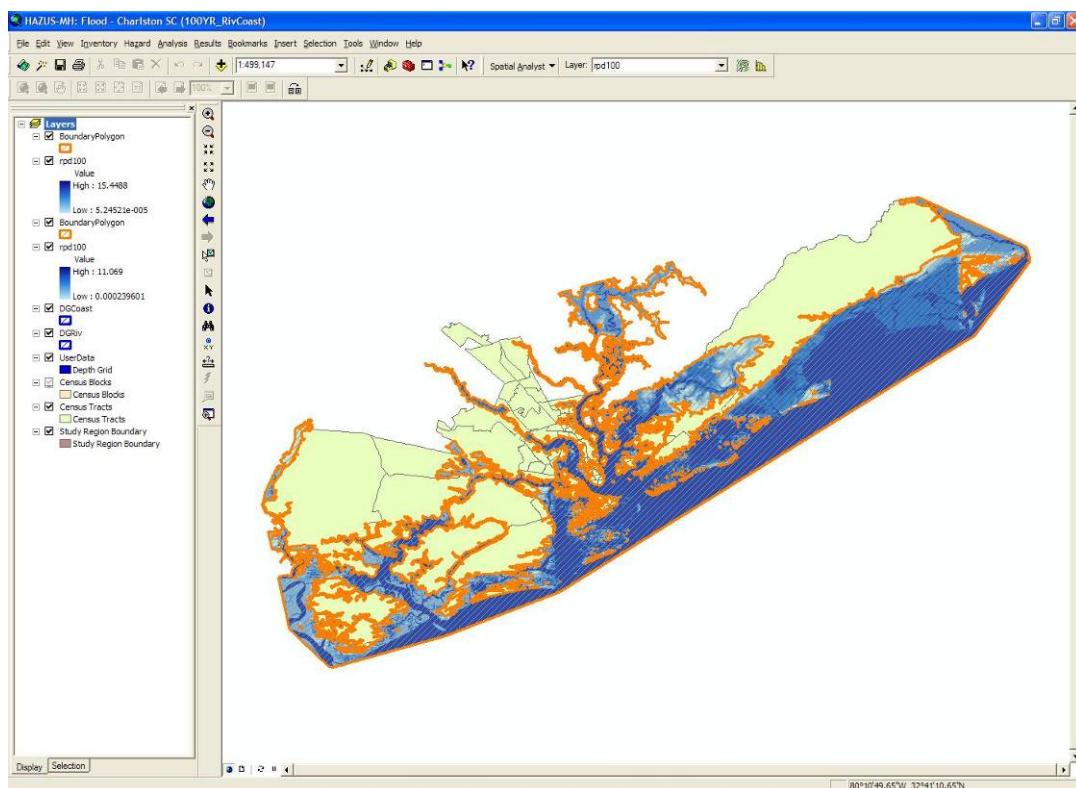


Figure 3-103: Map View of User Supplied Depth Grids

3.2.6.3.2.4.1. User Data, Depth Grid Tab, Coastal Tab

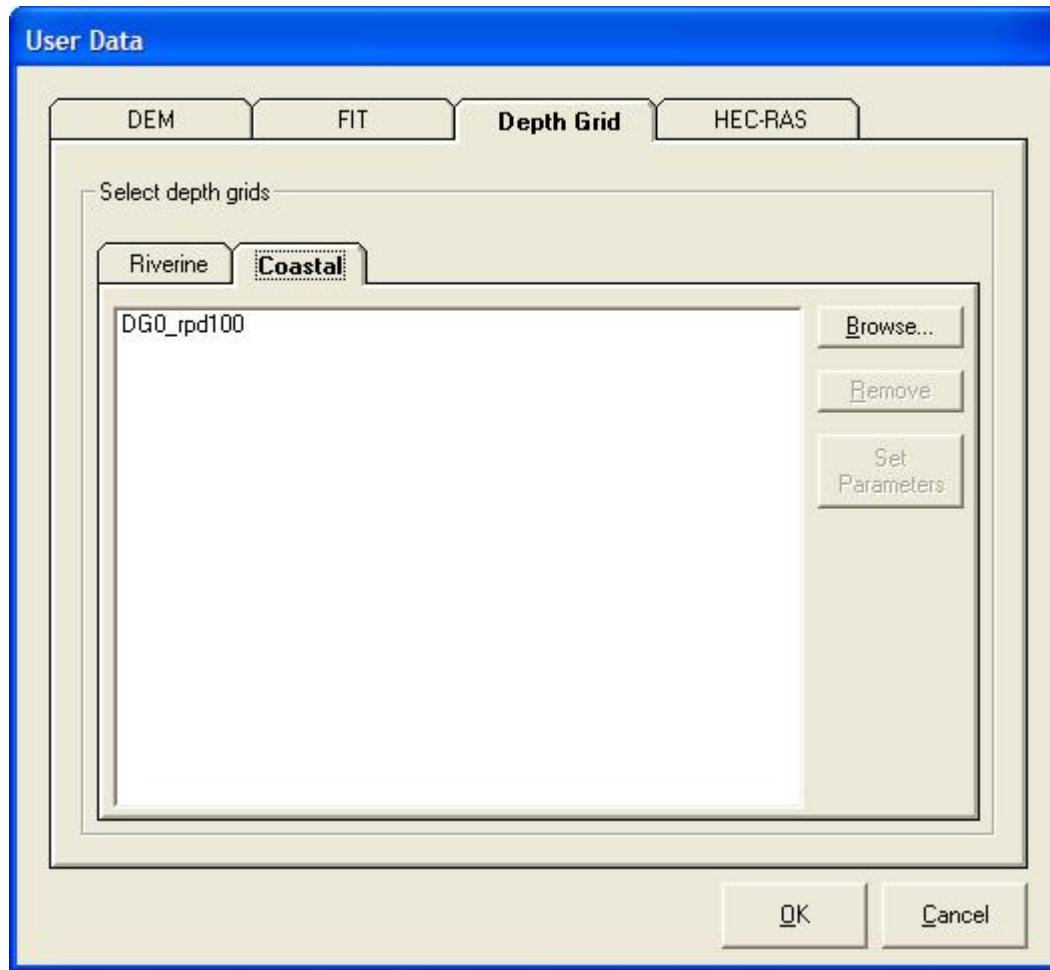


Figure 3-104: HAZUS Hazard Menu, User Data, Depth Grid Tab, Coastal Tab Dialog

- a. Selection of the Coastal tab on the Depth Grid tab data viewer opens the dialog shown above. All features and performance is the same as the Riverine tab discussed above.

3.2.6.3.2.5. User Data, HEC-RAS Tab

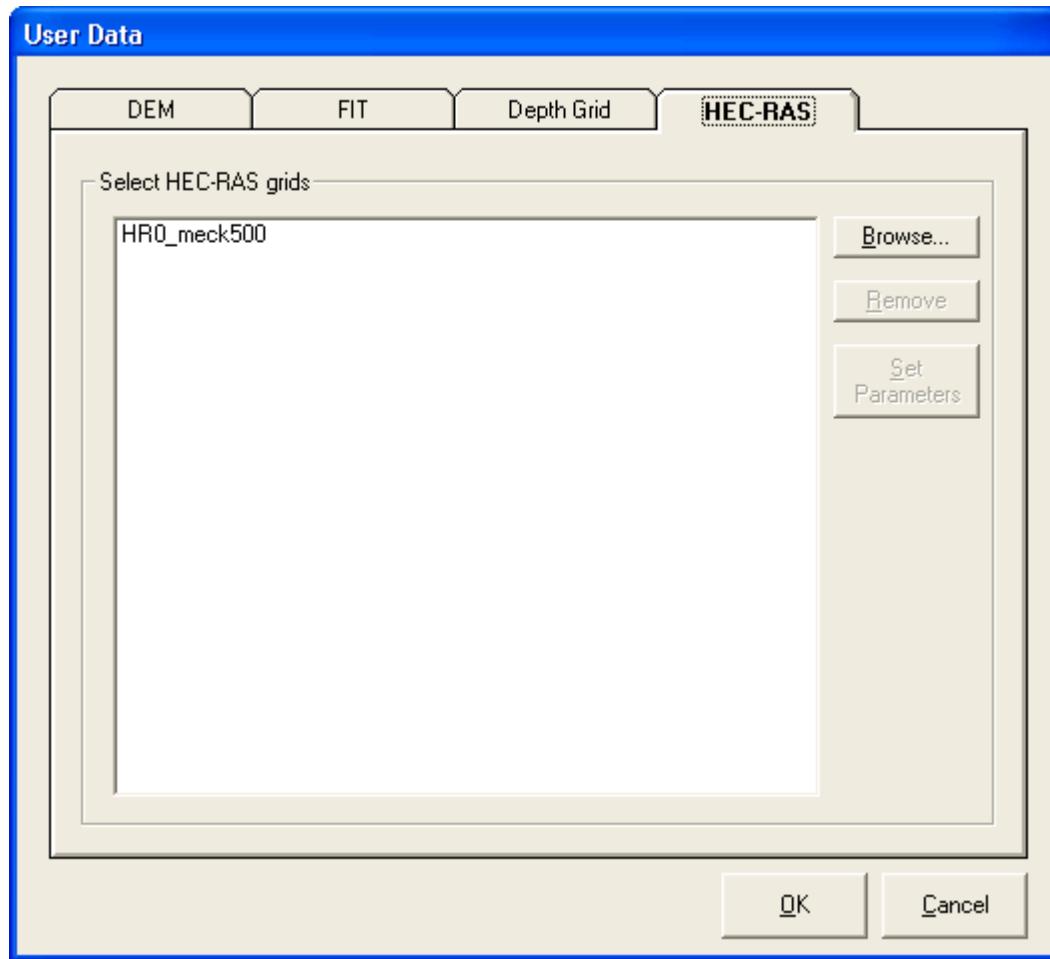


Figure 3-105: HAZUS Hazard Menu, User Data, HEC-RAS Dialog

- a. Selection of the HEC-RAS (Hydrologic Engineering Center's River Analysis System) tab on the User Data dialog opens the dialog shown above. The User Data dialog is not a standard HAZUS dialog. The dialog allows the user to import HEC-RAS (via RAS Mapper) hydraulic output floating-point binary (.FLT) grids to be used in the Flood Model. The HEC-RAS FLT depth grids are implicitly treated as Riverine.
- b. The User Data dialog has the following appearance items:
 - a. The dialog has four tabs. The tabs are labeled DEM, FIT, Depth Grid, and HEC-RAS. The default is the DEM tab.
 - b. The HEC-RAS tab does not have any combo boxes.

- c. The dialog does not have any radio buttons.
 - d. The dialog does not have a check box for study case blocks.
 - e. The dialog has command buttons OK and Cancel. Additionally, command buttons near the data viewer vary depending on the tab selected.
 - f. The dialog does not have any text boxes.
 - g. The dialog has a data viewer. The viewer shows the user the location of their selected data set.
- c. The command buttons near the Select HEC-RAS dataset data viewer are labeled Browse, Remove, and Set Parameters.
- a. The Browse command button is always enabled.
 - b. The Remove command buttons are enabled only when a raster dataset is selected in the Select HEC-RAS dataset location window.
 - c. Selection of Browse opens a standard Windows browser dialog that allows the user to select HEC-RAS (produced via RAS Mapper) hydraulic output floating-point binary (.FLT) depth grids.

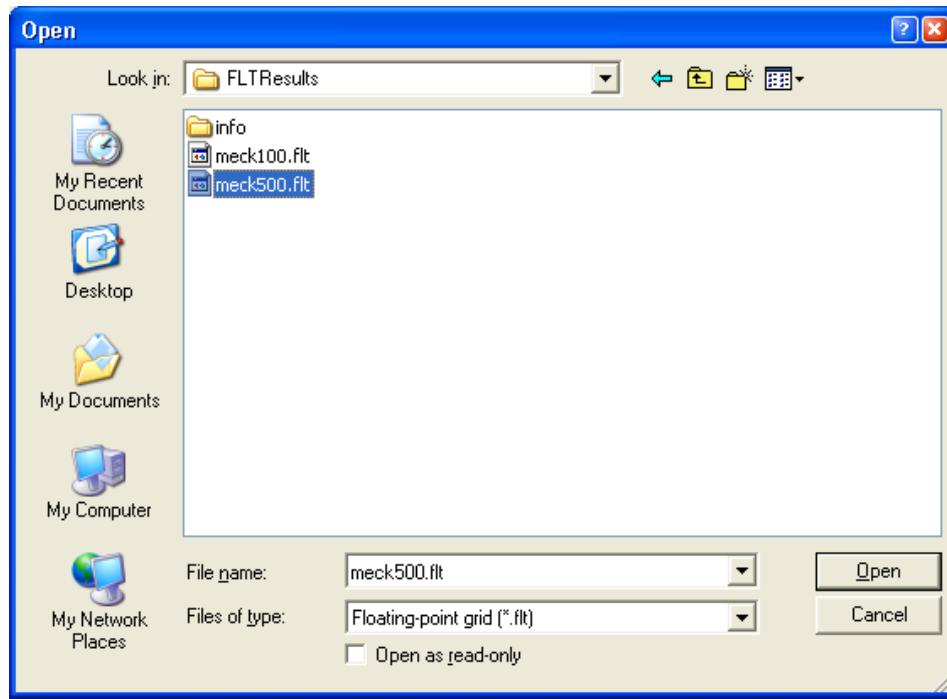


Figure 3-106: Open Dialog When Browsing for HEC-RAS Dataset

- i. Selecting of a FLT file and clicking on the Open button causes the Flood Model to validate the input by making sure the FLT depth grid's associated floodplain boundary (by default HEC-RAS saves it as FloodMap) is located partially within the study region (geographically), and it contains projection information (prj.adf).
- ii. The Flood Model does not validate the integrity between the FLT depth grid and the floodplain boundary polygon (by default HEC-RAS saves it as FloodMap). This is a HEC-RAS (Ras Mapper) prerogative.
- iii. The Flood Model assumes that the FLT grid and the floodplain boundary shapefile share the same name.
- iv. The Flood Model assumes that the projection information file (prj.adf) exists in the FLT directory.
- v. The Flood Model can obtain the projection information from either the prj.adf or the floodplain boundary shapefile .prj (by default FloodMap.prj).

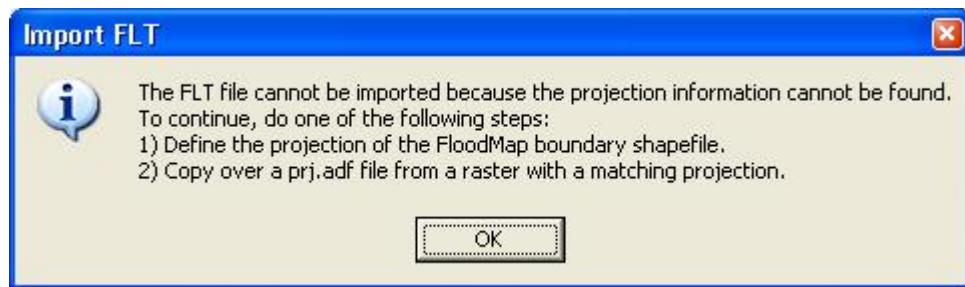


Figure 3-107: FLT Projection Information Missing Message Box

- vi. If both projection information files are missing (discussed in the bullet above), the FLT file is not added to the listbox and a message box is displayed notifying the user that the FLT file must have an accompanying prj.adf. The user must manually copy the corresponding prj.adf file to the folder the FLT grid is located in.
- d. Selection of Remove removes the selected raster dataset from the User data dialog. Files that begin with HRx_, which are those that have already been imported, processed, and saved by HAZUS-MH Flood User Data dialog, will also be removed from disk.
- e. Selection of the Set Parameters button opens a dialog allowing the user to set the vertical units and return period for each new floating-point binary file. The vertical units can be Feet or Meters. The return period is optional integer and if not set, will default to value of 0.

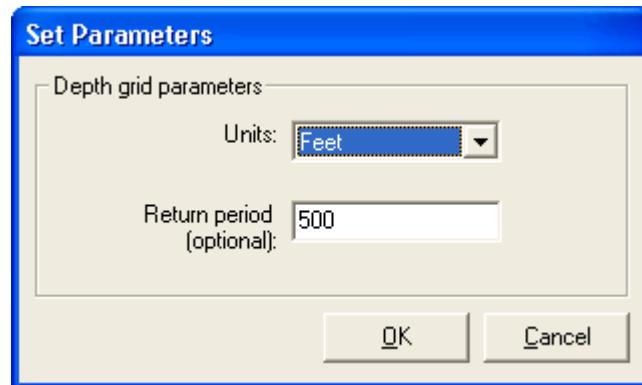


Figure 3-108: Set Parameters Dialog

- d. Selection of OK closes the dialog returns the user to the ArcGIS window. The GP tool Float to Raster is automatically called. All FLT files in the listbox are converted to an integer raster. The integer rasters are then saved in the <StudyRegion>\UserData\ DepthGrid \Riverine directory with a prefix of HRxx_ and the name of the FLT file. The name of the file has to be truncated to eight characters, as the full raster name cannot have a name greater than 13 characters.
- e. Selection of Cancel closes the dialog and returns the user to the base view.

3.2.6.3.3. Develop Stream Network

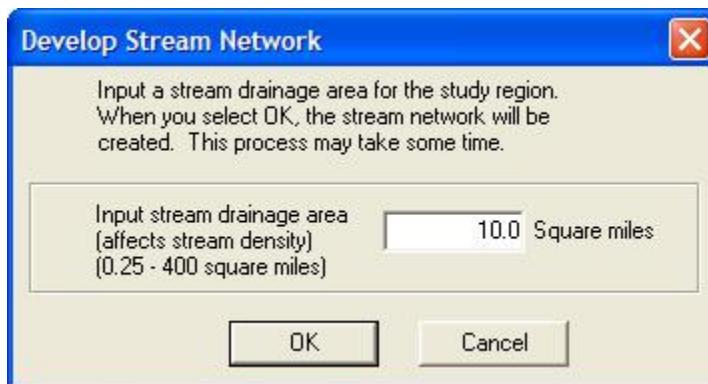


Figure 3-109: HAZUS Hazard Menu, Develop Stream Network Dialog

- a. Selection of the Stream Drainage menu item opens the dialog shown above. The dialog is not a standard HAZUS dialog. The dialog allows the user to input a variable for subsequent GIS analysis. The Develop Stream Network dialog has the following appearance items:
- The dialog does not have tabs.
 - The dialog does not have any combo boxes.
 - The dialog does not have any radio buttons.
 - The dialog does not have a check box for study case blocks.
 - The dialog has command buttons OK and Cancel.
 - The dialog has a single editable text box. Text box is labeled Input stream drainage area (affects stream density) (0.25 – 400 square miles).

- b. The text box allows the user to alter the default drainage area value of 10.0 square miles. The text box limits the user input to values between 0.25 square miles (a high stream density) and 400 square miles (very low stream density)..
- c. Upon selection of OK, the model validates the user input by the user to ensure that the input is within the minimum and maximum allowable values. If input is acceptable, HAZUS will open the Process Confirmation dialog discussed at the start of the Hazard Menu Section of this document.
 - a. The model will then perform a flow accumulation analysis based on the stream drainage area and create a layer of streams that satisfies the user's criteria. The river layer shall be displayed in blue for the user's visualization.
 - i. Upon completion of the stream network development the user is provided with information on the analysis time for the raster processing.

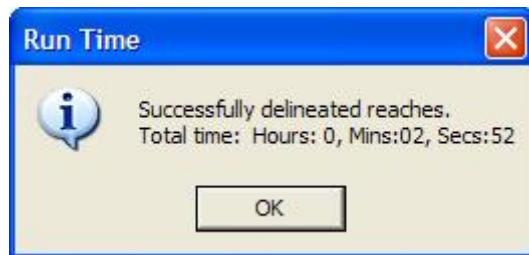


Figure 3-110: HAZUS Hazard Menu, Develop Stream Network, Delineation Process Completion Dialog

- d. Selection of Cancel shall close the dialog. Nothing is saved or displayed for the user.

3.2.6.3.4. Scenario Submenu



Figure 3-111: HAZUS Hazard Menu, Scenario Submenu

- a. The Scenario submenu allows the user to manage the hazard scenarios within their study region. Because flooding can impact an area significantly smaller than a county, the typical study region, the flood model allows users to select portions of their river reaches and/or shorelines to analyze the potential flooding. The Flood Model has called these study cases or scenarios.
- b. The submenu has menu items New, Open, Save As, Edit, Close, and Delete.
 - a. Submenu item New allows the users to create a new hazard scenario. This item is always enabled. Selection opens a dialog that provides the user with the selection tools necessary to define the scenario.
 - b. Submenu item Open is enabled only after the user has created a prior scenario. Selection of Open opens the scenario and adds the selected reaches and/or shorelines to the map layer. The user can only open one scenario at a time.
 - c. Submenu item Save As allows the user to copy and save an existing scenario that can then be edited. This menu item is enabled only after the user has created a scenario. Selection of Save As opens a dialog that allows the user to input the new name for the scenario.
 - d. Submenu item Edit allows the user to edit an open scenario. This menu item is enabled only after the user has created a scenario. Selection of Edit provides the user with a dialog that allows for the addition or removal of reaches and/or shorelines from the scenario.
 - e. Submenu item Close allows the user to close an open scenario. This menu item is enabled only after a user has created a scenario and has a scenario open. Selection of Close removes the scenario information from the map layers and closes the scenario.
 - f. Submenu item Delete allows the user to delete an existing scenario. This menu item is enabled only after the user has created a scenario. Selection of Delete removes the hazard scenario from the menu of available scenarios. The user cannot delete a scenario that is currently open.

- c. Each submenu will be discussed in further detail below.

3.2.6.3.4.1. Scenario Submenu: Create New Scenario Dialog

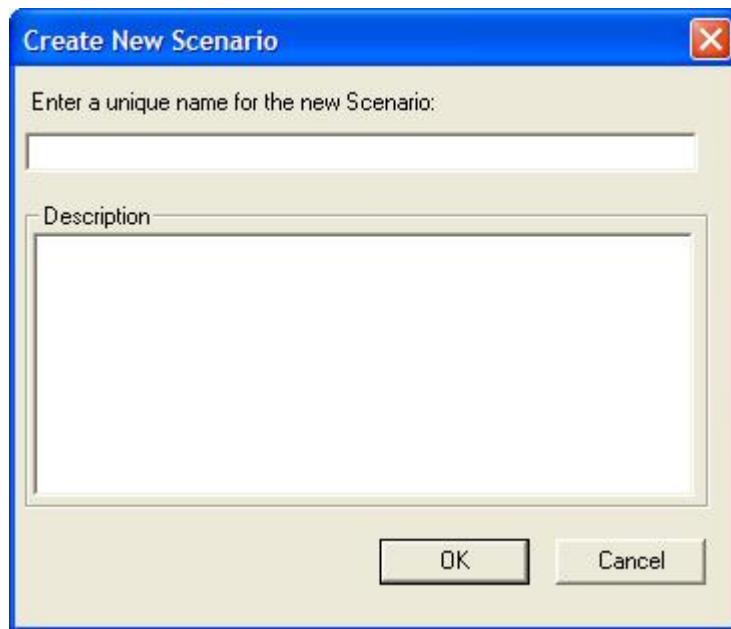


Figure 3-112: HAZUS Hazard Menu, Scenario Submenu: Create New Scenario Dialog

- a. Selection of New on the Scenario submenu opens the dialog shown above. Although the dialog is a custom HAZUS dialog it is common for several of the Scenario submenu items. The dialog has the following features:
- The dialog has two editable text boxes. The top text box is labeled Enter a unique name for the new Scenario: The bottom text box is labeled Description.
 - The dialog does not have any combo boxes.
 - The dialog does not have any radio buttons.
 - The dialog does not have a check box.
 - The dialog has two command buttons labeled OK and Cancel.
- b. The user is required to enter a value in the Enter a unique name for the new Scenario. The name can have any mix of characters, numbers and special characters. The text box has a character input limit of 40.

- c. The user has the option to enter values in the text box labeled Description. No error message is provided if the user does not provide an input. The description can have any mix of characters, numbers and special characters. The text box has a character input limit of 255.
- d. Selection of the command button OK prior to completing the data required in the text box Enter a unique name for the new Scenario causes the error message shown below to pop-up. If the user has input a valid scenario name, the user is directed to the second dialog in the process of creating a new scenario.



Figure 3-113: New Scenario Data Entry Error Dialog

- a. Selection of OK closes the error message and returns the user to the Create New Scenario Dialog.
- e. Selection of Cancel closes the dialog without saving any selections or modifications.

3.2.6.3.4.1.1. Scenario Submenu, New Scenario: Second Dialog New Scenario in Creation Process

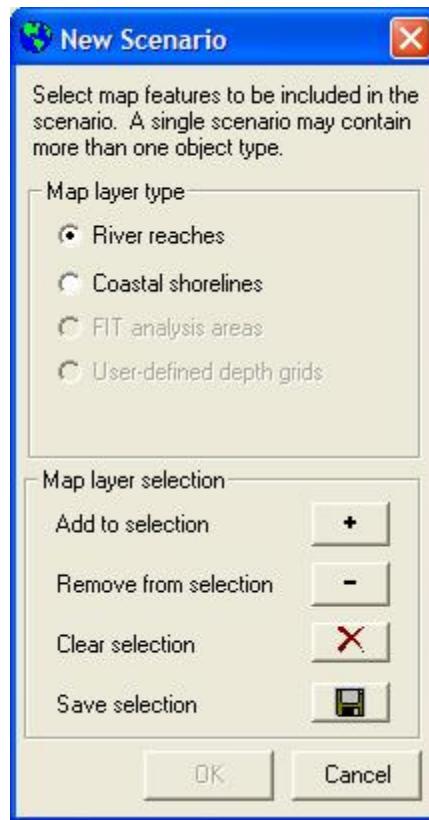


Figure 3-114: HAZUS Hazard Menu, Scenario Submenu, New Scenario: Second Dialog in Creation Process

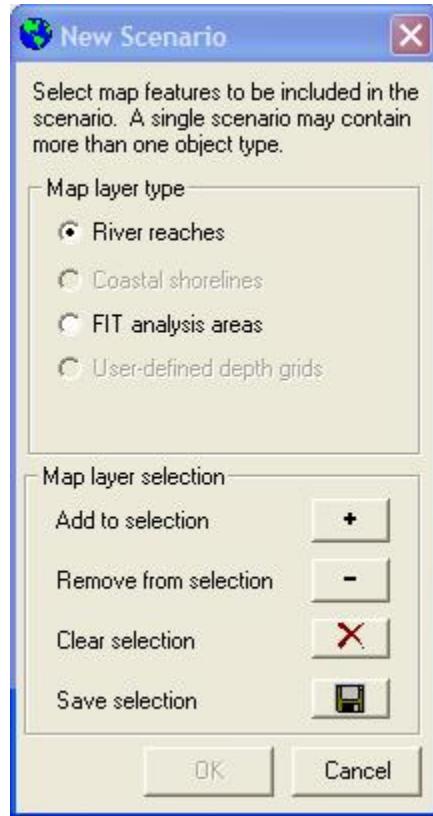
- a. Once the user has created a valid name for the new scenario and clicked OK in the Create New Scenario dialog, the dialog shown above is opened. This is custom dialog with the following features:
 - a. The dialog has four radio buttons. The Radio Buttons are labeled River reaches, Coastal shorelines, FIT analysis areas, and User-defined depth grids. Radio buttons are enabled based on the user defined Hazard Type and input on the User Data dialog.
 - b. The dialog does not have any combo boxes.
 - c. The dialog does not have any text boxes or data grids.

- d. The dialog has two types of command buttons. The first set of command buttons activates ArcGIS map layer tools to assist the user in creating their scenario. The second set of command buttons are labeled OK and Cancel.

- b. The radio buttons allow the flood model to set the map layers that are “editable” for the user. The radio buttons are enabled based on the user’s input in the User Data dialogs. If the user has brought in a DEM, the Coastal and Riverine buttons are enabled. If the user has brought in a FIT project, the FIT radio buttons are enabled. If the user has brought in depth grids, the User-defined depth grids are enabled.
 - a. Selection of the River reaches radio button sets the stream network data layer – shown as “Reaches” as the editable layer. The user can then use the Map Layer selection tools to add and remove river reaches from the user’s scenario.

 - b. Selection of the Coastal shorelines radio button sets the HAZUS shoreline – shown as “RegionShore” as the editable layer. The user can then use the Map Layer selection tools to add and remove shorelines from the user’s scenario. Please note that a study region can have more than one distinct shoreline.

 - c. Selection of the FIT analysis areas radio button sets the FIT polygons within the user’s study region as the editable layer. The user can then use the Map Layer selection tools to add and remove the FIT polygons from the scenario.



**Figure 3-115: HAZUS Hazard Menu, Scenario Submenu, Example New Scenario:
Second Dialog When User Has FIT Projects**

- d. Selection of the User-defined depth grids radio button sets the depth grids established by the user in the User Data dialog as the editable layer. The user can then use the Map Layer selection tools to add and remove the depth grids from the scenario
- c. The Map layer selection command buttons are as follows:
 - a. The command button labeled Add to selection (with the plus sign icon) is used to add data to the scenario. Selection of this button enables the ArcGIS Select Features tool. When the user selects river reaches and shorelines, they are highlighted for the user (see images below).

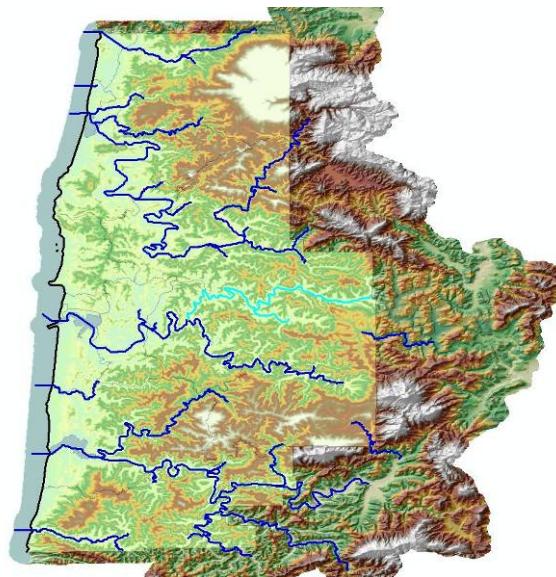


Figure 3-116: Example – Selection of River Reaches

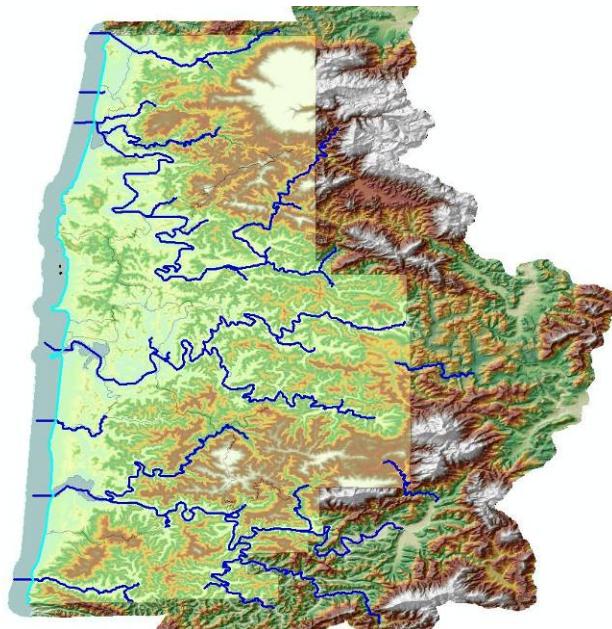


Figure 3-117: Example – Selection of Coastal Shoreline

- b. The command button labeled Remove from selection (with the minus sign icon) is used to remove data from the scenario. Selection of this button enables the ArcGIS Clear Select Features tool.

- c. The command button labeled Clear selection (with the cross out icon) is used to clear all active selections in the map window. Selection of this button enables the ArcGIS Clear Features function.
- d. The command button labeled Save selection (with the floppy disc icon) is used to save the users selections. The button uses ArcGIS functionality to save the users selections as a separate map layer. Once saved the new layer is added to the map as shown below.

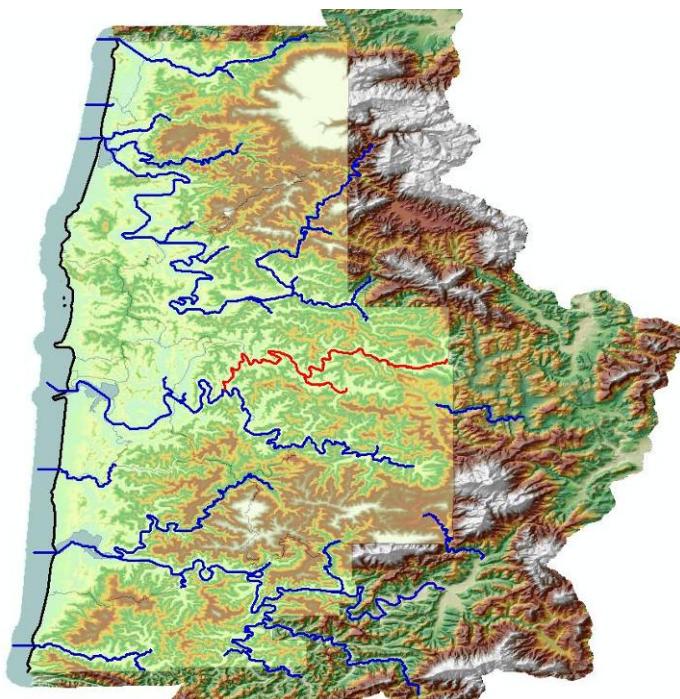


Figure 3-118: Example – Selection of River Reaches

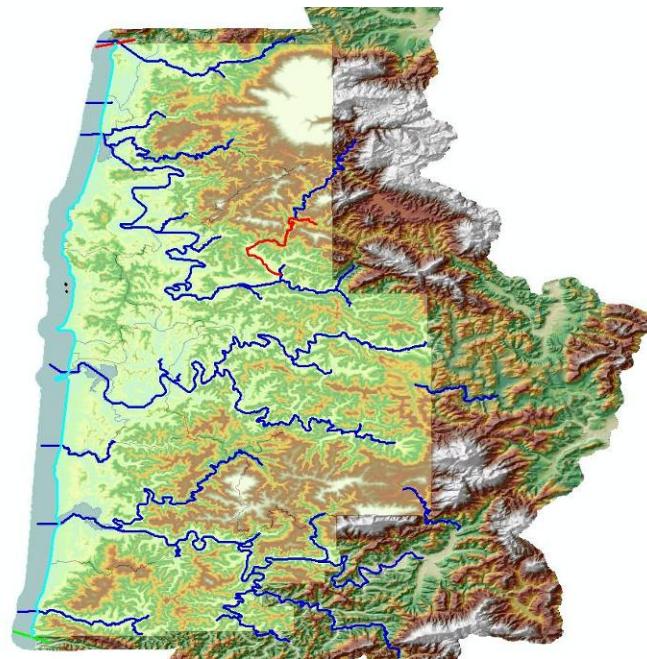


Figure 3-119: Example – Selection of Coastal Shoreline (note: saved river reach in scenario and the default start and end lines on the shoreline)

- e. The command button labeled OK is disabled until the user selects and saves map features to their scenario. Selection of OK closes the New Scenario dialog and returns the user to the base HAZUS display.
- f. The command button labeled Cancel is enabled until the user selects and save map features to their scenario. Selection of Cancel closes the New Scenario dialog and returns the user to the base HAZUS display. Once the user saves a selection, the Cancel button is disabled and the user is required to edit there Scenario to make changes.

3.2.6.3.4.1.1.1. Scenario Submenu, New Scenario: Shoreline Limits Dialog

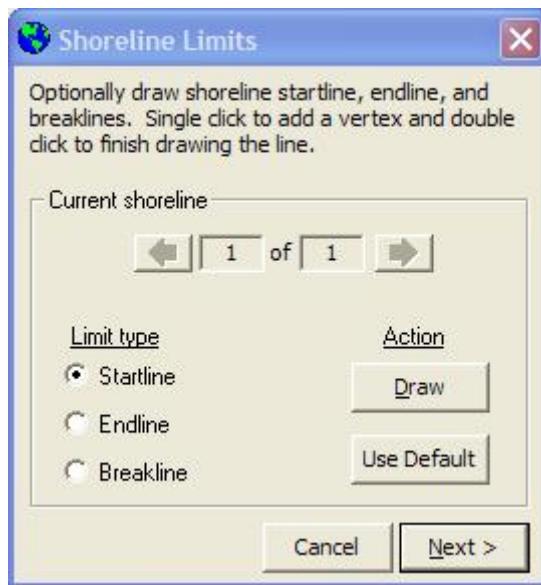


Figure 3-120: Scenario Submenu, New Scenario: Shoreline Limits Dialog

- a. Once the user has selected a shoreline, saved the shoreline, and clicked on the command button OK, the Shoreline Limits dialog is launched. This is a custom HAZUS dialog that allows the user to navigate their selected shorelines (if multiple selected) and allows the user to segment the shoreline(s) into segments of common characteristics. The dialog has the following features:
 - a. The dialog does not have combo boxes.
 - b. The dialog does not have data grids.
 - c. The dialog has three radio buttons. The radio buttons are labeled Startline, Endline, and Breakline. Startline is the default selection.
 - d. The dialog has two non-editable text boxes that show the number of shorelines which the user has selected. The default is 1 of X, where X is the total number of shorelines that was selected by the user (not the total number of shorelines available in the study region).
 - e. The dialog has 6 command buttons. Command buttons are labeled with a left arrow icon, right arrow icon, Draw, Use Default, Cancel, and Next>. As shown

above, if there is only one shoreline selected, the left and right arrow command buttons are disabled.

- b. The text boxes and the two command buttons with the left/right arrow icons are connected to allow the user to navigate from shoreline to shoreline if more than one is available and selected in the users study region.
 - a. The right most text box always shows the total number of shorelines the user has selected.
 - b. The left most text box shows the shoreline that is currently selected and displayed on the map layer.
 - c. The user can navigate using the left and right arrow command buttons. The left arrow command button lowers the selected shoreline (e.g., going from shoreline 3 to shoreline 2). The right arrow command button raises the selected shoreline (e.g., going from shoreline 5 to 6).
 - d. As the user navigates up and down the shorelines, the selected shoreline is highlighted on the ArcGIS map window with its respective Startlines and Endlines.
- c. Originally, the dialog was designed to assume that the user may want to reduce the area of analysis by shifting the default Startline and Endline on the shoreline. Currently the flood model does not eliminate any areas of flooding that has a hydraulic connection to the shoreline segment. This means that in most cases, regardless of whether the user reduces the analysis area, the entire coastline will be analyzed.
- d. The radio buttons and command buttons Draw and Use Default are connected. The user is expected to select a radio button and then select draw. This enables the ArcGIS draw toll and sets the selected shoreline as editable on the map layer. The user uses the mouse to draw a line that crosses the selected HAZUS shoreline. This requires the user to click where the line is to start and then move the mouse and double click when completed to complete the line. This process is the same for all Startlines, Endlines, and Breaklines.

- a. Selection of the Startline radio button allows the user to shift the default startline on the shoreline that is displayed in the text boxes.

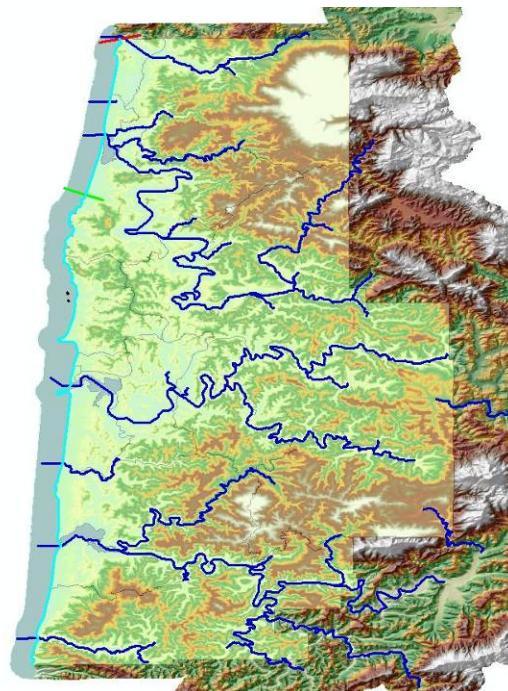


Figure 3-121: Drawing a New Shoreline Startline (green line in figure)

- b. Selection of the Endline radio button allows the user to shift the default endline on the shoreline that is displayed in the text boxes.

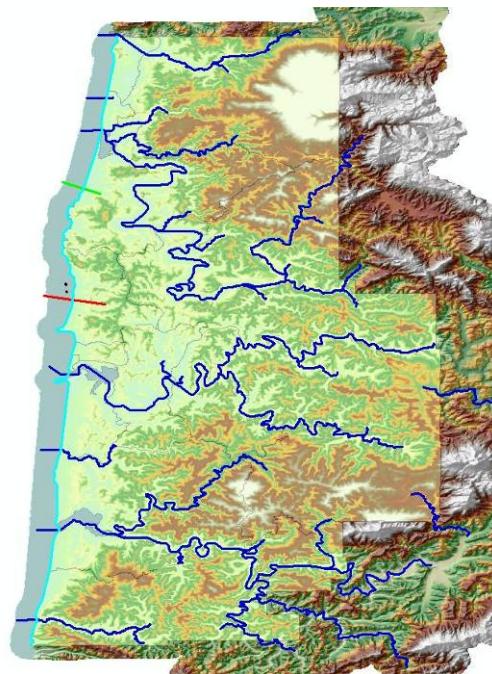


Figure 3-122: Drawing a New Shoreline Endline (red line in figure)

- c. Selection of Breakline allows the user to segment their shoreline by allowing the user to draw a line between the Startline and Endline. The idea of adding Breaklines is to allow the user to assign a different characteristic to the shoreline (discussed in later sections of this document).
- d. If the user attempts to draw a Breakline outside of the Startline or Endline HAZUS provides an error message and removes the incorrect line from the map layer.

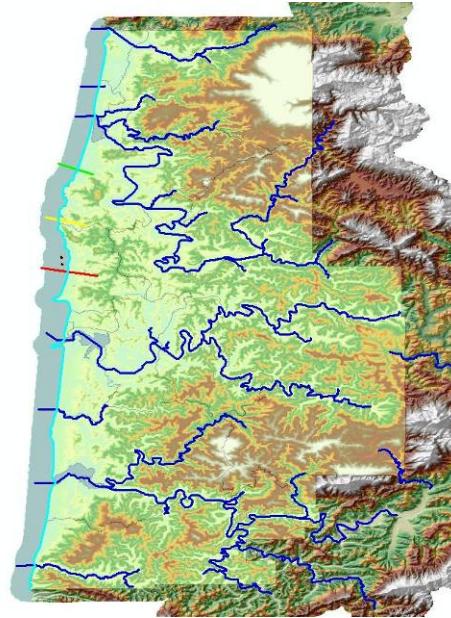
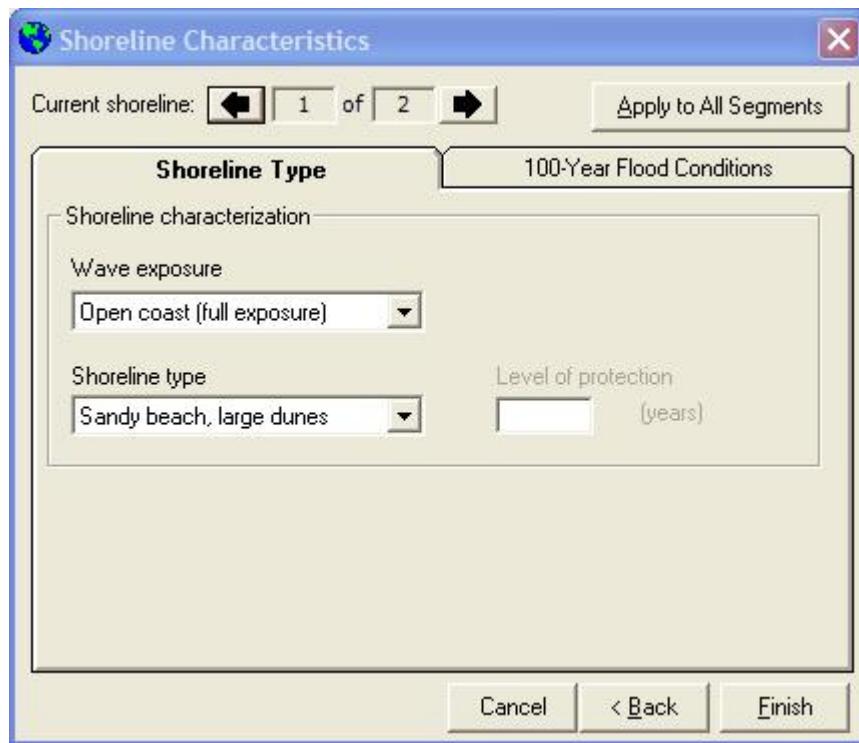


Figure 3-123: Drawing a New Shoreline Breakline (yellow line in figure)

- e. Selection of the command button Use Default clears any Startline, Endline and Breaklines the user has drawn on the selected shoreline and restores the HAZUS default Startline and Endline. HAZUS shorelines are not segmented by default (no Breaklines).
 - f. For any drawn Startline, Endline, or Breakline, the model checks to ensure that the polygon is not intersected more than once. If intersected more than once, an error message pop-up tells the user that the drawn line will not work. The drawn line is cleared and the cursor returns to the draw tool.
-
- e. Selection of the command button Next > causes the model to clip the County polygon to produce a polyline between the start and end lines. The model shall then select the nearest “smoothed shoreline from the hidden default layer provided with the flood model and shall cut the shoreline using the same start and end lines created by the user. This smoothed shoreline line segment shall be used for the development of transects for the coastal analysis.
 - f. Selection of Next > also closes the Shoreline Limits dialog and launches the Shoreline Characterization dialog.

- g. Selection of the Cancel command button closes the Shoreline Limits Dialog

3.2.6.3.4.1.1.2. Scenario Submenu, New Scenario: Shoreline Characteristics Dialog



**Figure 3-124: HAZUS Hazard Menu, Scenario Submenu, New Scenario:
Shoreline Characteristics Dialog**

- a. Selection of Next> on the Shoreline Limits dialog launches the Shoreline Characteristics dialog shown above. This is a custom HAZUS dialog that allows the user to navigate through their selected shorelines (if multiple selected) segment by segment to define the characteristics of the segments. The dialog has the following features:
- a. The dialog has two tabs. The tabs are labeled Shoreline Type and 100-Year Flood Conditions. Shoreline Type is the default tab.
 - b. The dialog has a variety of combo boxes depending on the selected tab.
 - c. The dialog does not have data grids.
 - d. The dialog has a variable number of text boxes depending on the selected tab.

- e. The dialog has radio buttons depending on the selected tab.
- f. The dialog has two non-editable text boxes that show the number of shoreline segments created by the user. The default is 1 of X, where X is the total number of shoreline segments.
- g. The dialog has 6 command buttons. Command buttons are labeled with a left arrow icon, right arrow icon, Apply to All Segments, Cancel, <Back, and Finish. If there is only one shoreline selected, the left and right arrow command buttons are disabled.

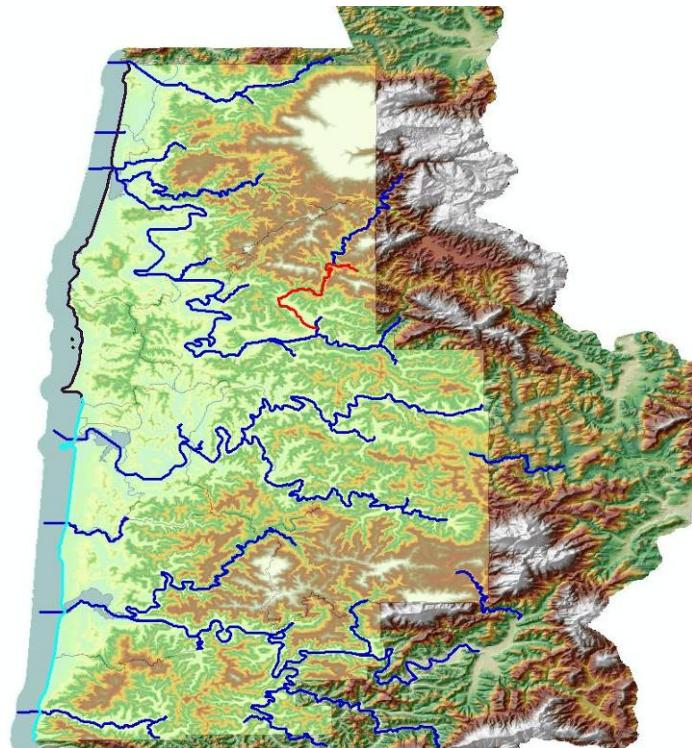


Figure 3-125: Shoreline Segment 1 of X Highlighted in Light Blue

- b. The two non-editable text boxes display the number of shoreline segments in the users open scenario. The default value when the dialog is open is segment 1 of X.
 - a. The user can navigate using the left and right arrow command buttons. The left arrow command button lowers the selected shoreline segment (e.g. going from segment 3 to segment 2). The right arrow command button raises the selected shoreline segment (e.g. going from segment 5 to 6).

- b. As the user navigates up and down the shorelines segments, the selected shoreline is highlighted on the ArcGIS map window (shown below).
- c. The Shoreline Type tab has two combo boxes. The combo boxes are labeled Wave Exposure and Shoreline Type.
 - a. The combo box labeled Wave Exposure allows the user to select between an Open Coast (full exposure), Moderate exposure, Minimal exposure, and Sheltered. Selection Open Coast (full exposure) is the default value.
 - b. The combo box labeled Shoreline Type allows the user to select the physical characteristics of the shoreline segment. Options include Rocky Bluffs, Sandy bluffs, little beach, Sandy beach, small dunes, Sandy beach, large dunes, Open wetlands, and Erosion protection. Sandy Beach, large dunes is the default value.
 - i. Selection of Erosion Protection enables the text box labeled Level of Protection (years) for the user to input the design return interval for the erosion protection. Note the text box should have input limits between 0 and 5,000 years.
 - ii. If the user has not entered a level of protection before selecting Finish at this dialog, the following error message appears.

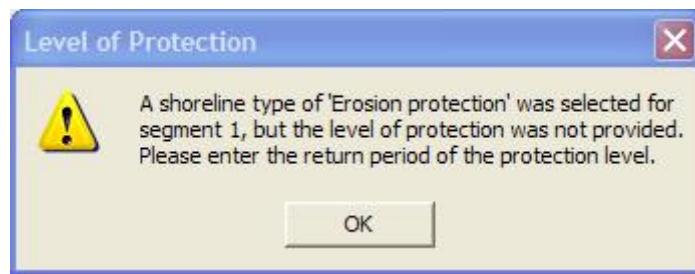


Figure 3-126: Level of Protection Data Missing Error Dialog

- d. Selection of the Cancel command button brings up the message dialog shown below. The dialog alerts the user that without completing the shoreline characterization the user cannot go further in the hazard analysis.

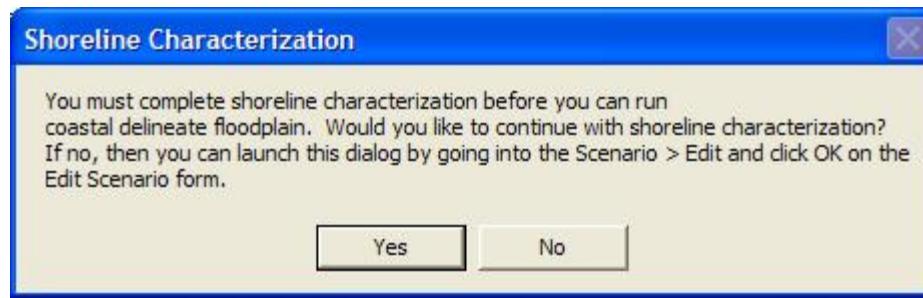


Figure 3-127: Shoreline Characterization Cancel Validation Dialog

- a. The dialog has a message alerting the user to the need to complete the shoreline characterization in order to complete the hazard analysis. The dialog also alerts the user as to how to return to the shoreline characterization dialog if they should continue to Cancel the process.
- b. The dialog has command buttons Yes and No.
 - i. Selection of Yes closes the Shoreline Characterization Cancel Validation dialog and returns the user to the Shoreline Characterization dialog.
 - ii. Selection of No closes the Shoreline Characterization Cancel Validation dialog and the Shoreline Characterization dialog returning the user to the base HAZUS view.
- e. Selection of the <Back command button returns the user to the Shoreline Limits dialog.
- f. Selection of Finish stores the user input into the hazard ini file and enables the next components of the coastal hazard analysis.

3.2.6.3.4.1.1.3. Scenario Submenu, New Scenario: Shoreline Characteristics 100-Year Flood Conditions Tab

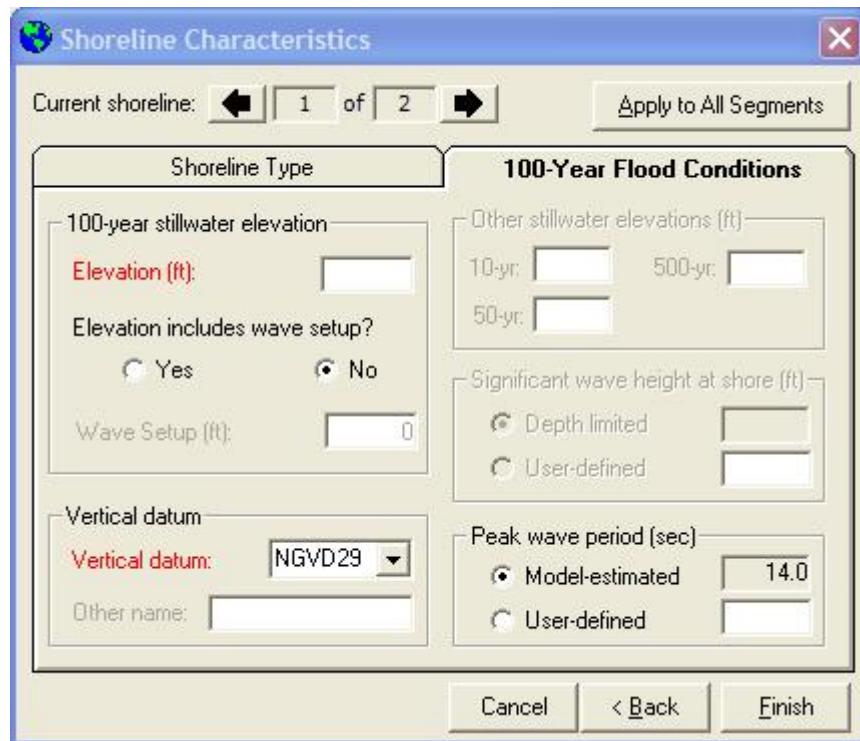


Figure 3-128: HAZUS Hazard Menu, Scenario Submenu, New Scenario: Shoreline Characteristics Dialog 100-Year Flood Conditions Tab

- a. Selection of 100-Year Flood Conditions tab on the Shoreline Characteristics dialog opens the dialog shown above. This is a custom HAZUS dialog that allows the user input Flood Insurance Study (FIS) related data for their shoreline segments. The dialog has the following features:
 - a. The dialog has two tabs. The tabs are labeled Shoreline Type and 100-Year Flood Conditions. Shoreline Type is the default tab.
 - b. The dialog has a variety of combo boxes depending on the selected tab.
 - c. The dialog does not have data grids.
 - d. The dialog has a variable number of text boxes depending on the selected tab.
 - e. The dialog has radio buttons depending on the selected tab.

- f. The dialog has two non-editable text boxes that show the number of shoreline segments created by the user. The default is 1 of X, where X is the total number of shoreline segments.
 - g. The dialog has 6 command buttons. Command buttons are labeled with a left arrow icon, right arrow icon, Apply to All Segments, Cancel, <Back, and Finish. If there is only one shoreline selected, the left and right arrow command buttons are disabled.
- b. The Left Arrow and Right Arrow command buttons function consistently with the discussion on the Shoreline Type tab. Likewise, the non-editable text box displaying the selected segment number and the total segments also functions consistently with the discussion on the Shoreline Type tab.
- c. The 100-Year Flood Conditions tab has 8 editable text boxes. Some of the text boxes are enabled after the selection of radio buttons or information in the combo box. Key information on the dialog is highlighted with red text labels.
- d. The user is required to provide a 100-Year Stillwater elevation in the text box labeled Elevation (ft). The label is in red text.
- a. Once the user inputs the Elevation, they have the option to select one of the radio buttons where the user answers the question “Elevation includes wave setup?” The radio button options are Yes, and No. No is the default selection
 - b. Selection of Yes enables the text box labeled Wave Setup (ft). The user is required to input a value that represents the amount of the 100-Year SWEL caused by wave setup. The wave setup is limited to values of 0 to 3 feet.
 - c. Once the user has input a 100-Year Stillwater elevation, the text boxes in the frame labeled “Other Stillwater elevations (ft) are automatically calculated and populated. The values can be edited, but are automatically provided to the user.
 - d. If the user does not enter a 100-year SWEL for one or more segments brings up the error message shown below.



Figure 3-129: 100-Yr Stillwater Elevation Missing Error Dialog

- e. The dialog has a combo box labeled Vertical Datum. The available options in the combo box are NAVD88, NGVD29, and Other. NAVD88 is the default value.
 - i. Selection of Other enables the text box labeled Other Name. The user is expected to provide a reference name for the Other datum.
- f. The user is asked to identify if the Significant wave height at the shore (ft) is Depth limited or User –Defined. The user makes the selection using radio buttons labeled Depth Limited and User Defined.
 - i. Depth limited is the default value and the text box is automatically estimated and populated. The user cannot edit the calculated value.
- g. The user is asked to identify the Peak wave period (sec) for their segment. The selection is made using radio buttons labeled Model-estimated and User-defined.
 - i. The default is Model-estimated. The user cannot edit the Model-estimated value.
- h. Selection of the Cancel command button brings up the message dialog shown below. The dialog alerts the user that without completing the shoreline characterization the user cannot go further in the hazard analysis.

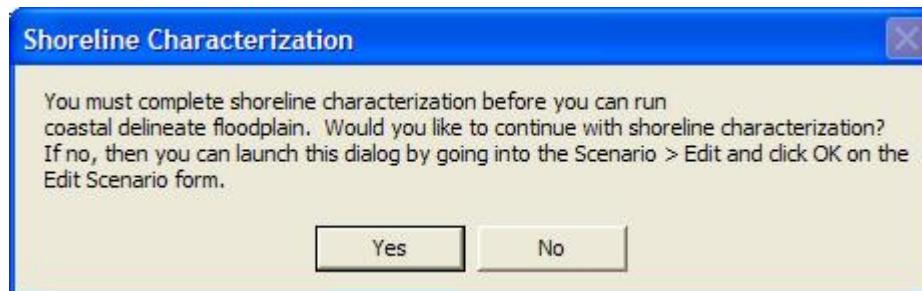


Figure 3-130: Shoreline Characterization Cancel Validation Dialog

- i. The dialog has a message alerting the user to the need to complete the shoreline characterization in order to complete the hazard analysis. The dialog also alerts the user as to how to return to the shoreline characterization dialog if they should continue to Cancel the process.
- j. The dialog has command buttons Yes and No.
 - i. Selection of Yes closes the Shoreline Characterization Cancel Validation dialog and returns the user to the Shoreline Characterization dialog.
 - ii. Selection of No closes the Shoreline Characterization Cancel Validation dialog and the Shoreline Characterization dialog returning the user to the base HAZUS view.
- k. Selection of the <Back command button returns the user to the Shoreline Limits dialog.
- l. Selection of Finish stores the user input into the hazard ini file and enables the next components of the coastal hazard analysis.

3.2.6.3.4.2. Scenario Submenu: Open Scenario Dialog

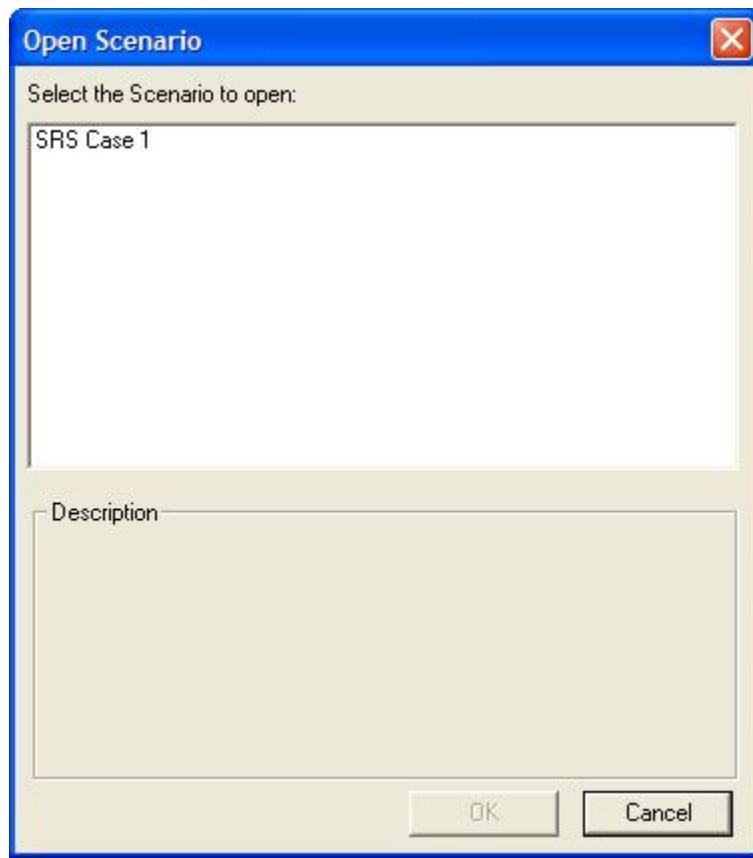


Figure 3-131: HAZUS Hazard Menu. Scenario Submenu, Open Scenario Dialog

- a. Selection of Open on the Scenario submenu opens the dialog shown above. The dialog is a custom HAZUS dialog but it is somewhat common with other Scenario submenu dialogs. The dialog has the following features:
 - a. The dialog does not have text boxes.
 - b. The dialog does not have any combo boxes.
 - c. The dialog does not have any radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog has a viewer that provides the user with a listing of all scenarios within their open study region. The user can select any scenario within the viewer.

- f. The dialog has a data frame where the user supplied description of the scenario is displayed. The user cannot edit this frame.
 - g. The dialog has two command buttons labeled OK and Cancel. The default for the dialog is to have only the Cancel command button enabled until the user highlights (selects) a scenario.
- b. The user is required to select a scenario to open. Once a scenario has been highlighted, the OK command button is enabled.
- c. Selection of OK causes the program to open the selected scenario. This includes adding all relevant map layers into the table of contents and into the ArcGIS map view. If the hazard analysis has been completed the depth grid and bounding polygon is displayed. If the loss estimation analysis has been completed, the user has access to the results.
- d. Selection of Cancel closes the Open Scenario dialog and returns the user to the default ArcGIS map view.

3.2.6.3.4.3. Scenario Submenu: Save As Dialog

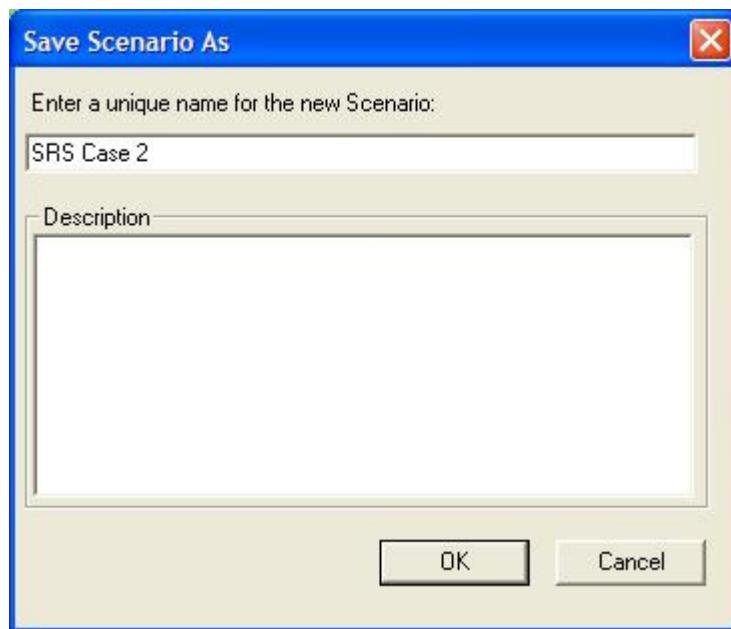


Figure 3-132: HAZUS Hazard Menu, Scenario Submenu, Save Scenario As Dialog

- a. Selection of Save As... on the Scenario submenu opens the dialog shown above. The dialog is a custom HAZUS dialog but it is somewhat common with other Scenario submenu dialogs. The dialog has the following features:
 - a. The dialog has two text boxes.
 - b. The dialog does not have any combo boxes.
 - c. The dialog does not have any radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog has two command buttons labeled OK and Cancel.
- b. The user is required to have an open scenario before the Save As submenu item is enabled. The Save As menu item is designed to allow the user to make a duplicate of their open scenario.
 - a. All geodatabases and ArcGIS values are copied into the new scenario.
 - b. The copied scenario is closed and the new scenario (the copy) is opened and all of the map layers added to the toolbar and map view.
 - c. When copying a scenario, the user is required to input a name in the text box labeled Enter a unique name for the new Scenario. If the user does not, the Not Null error message (New Scenario) is opened.
 - d. Selection of OK causes the program to open the selected scenario. This includes adding all relevant map layers into the table of contents and into the ArcGIS map view. If the hazard analysis has been completed the depth grid and bounding polygon is displayed. If the loss estimation analysis has been completed, the user has access to the results.
 - e. Selection of Cancel closes the Open Scenario dialog and returns the user to the default ArcGIS map view.

3.2.6.3.4.4. Scenario Submenu: Edit Scenario Dialog

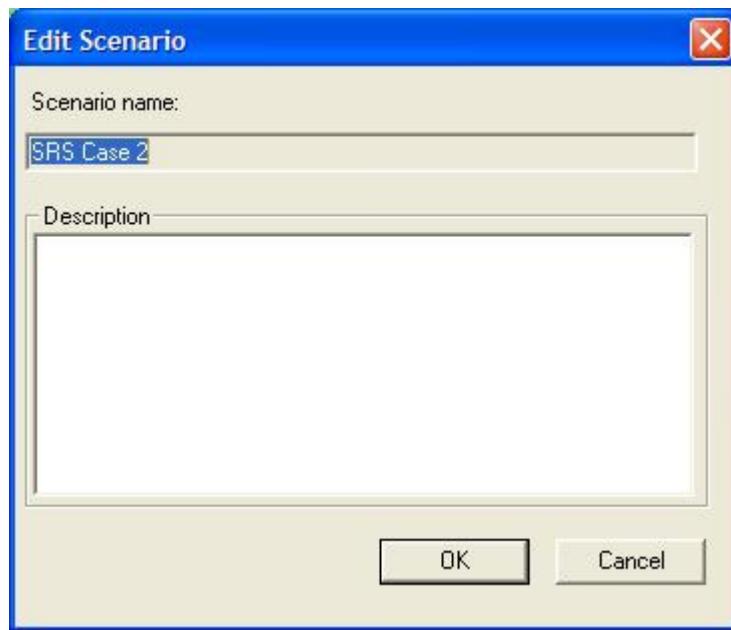


Figure 3-133: HAZUS Hazard Menu, Scenario Submenu, Edit Scenario Dialog

- a. Selection of Edit... on the Scenario submenu opens the dialog shown above. The dialog is a custom HAZUS dialog but it is somewhat common with other Scenario submenu dialogs. The dialog has the following features:
 - a. The dialog has two text boxes. The top text box is not editable and displays the open scenario name. The second text box is editable and displays any user provided description of the scenario being edited.
 - b. The dialog does not have any combo boxes.
 - c. The dialog does not have any radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog has two command buttons labeled OK and Cancel.
- b. The user is required to have an open scenario before the Edit... submenu item is enabled. The Edit menu item is designed to allow the user to make changes to their open scenario. This includes adding or removing shorelines, river reaches, etc.

- c. Selection of OK causes the program to open the Edit Scenario tools dialog shown below.
- d. Selection of Cancel closes the Open Scenario dialog and returns the user to the default ArcGIS map view.

3.2.6.3.4.4.1. Scenario Submenu, Edit Scenario: Edit Tool Dialog

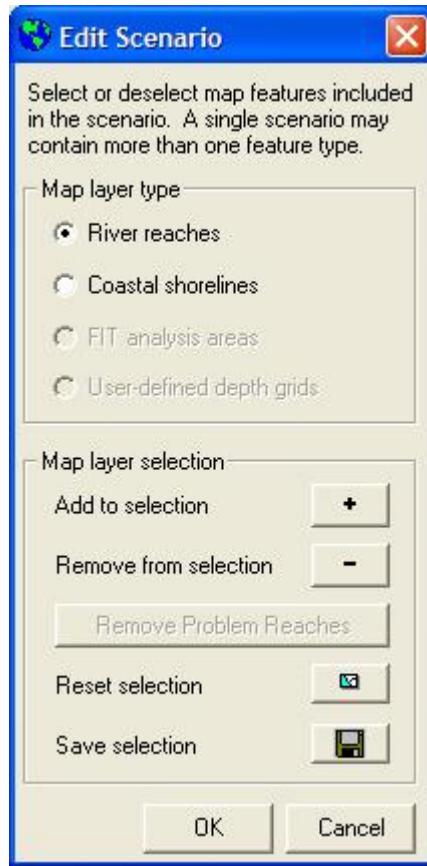


Figure 3-134: HAZUS Hazard Menu, Scenario Submenu, Edit Scenario, Second Dialog, Edit Tools

- a. Once the user has clicked OK in the Edit Scenario dialog, the dialog shown above is opened. This is custom dialog with the following features:
 - a. The dialog has four radio buttons. The Radio Buttons are labeled River reaches, Coastal shorelines, FIT analysis areas, and User defined depth grids. Radio buttons are enabled based on the user defined Hazard Type and input on the User Data dialog.

- b. The dialog does not have any combo boxes.
 - c. The dialog does not have any text boxes or data grids.
 - d. The dialog has two types of command buttons. The first set of command buttons activates ArcGIS map layer tools to assist the user in editing their scenario. The second set of command buttons are labeled OK and Cancel.
 - i. A specific command button labeled Remove Problem Reaches is only enabled whenever a scenario analysis (Hydrology or Hydraulics) encounters problems with specific reaches and cannot successfully complete those reaches.
- b. The radio buttons allow the flood model to set the map layers that are “editable” for the user.
- a. Selection of the River reaches radio button sets the stream network data layer – shown as “Reaches” as the editable layer. The user can then use the Map Layer selection tools to add and remove river reaches from the user’s scenario.
 - b. Selection of the Coastal shorelines radio button sets the HAZUS shoreline – shown as “RegionShore” as the editable layer. The user can then use the Map Layer selection tools to add and remove shorelines from the user’s scenario. Please note that a study region can have more than one distinct shoreline.
 - c. Selection of the FIT analysis areas radio button sets the FIT polygons within the user’s study region as the editable layer. The user can then use the Map Layer selection tools to add and remove the FIT polygons from the scenario.
 - d. Selection of the User-defined depth grids radio button sets the depth grids established by the user in the User Data dialog as the editable layer. The user can then use the Map Layer selection tools to add and remove the depth grids from the scenario.
 - e. A scenario can be comprised of any or all of the above items assuming the user has made the necessary selections and provided necessary data to enable any and all options. This command button is also only visible when the River Reaches radio button is selected (default condition).

- c. The Map layer selection command buttons are as follows:
- a. The command button labeled Add to selection (with the plus sign icon) is used to add data to the scenario. Selection of this button enables the ArcGIS Select Features tool. When the user selects river reaches and shorelines, they are highlighted for the user (see images below).

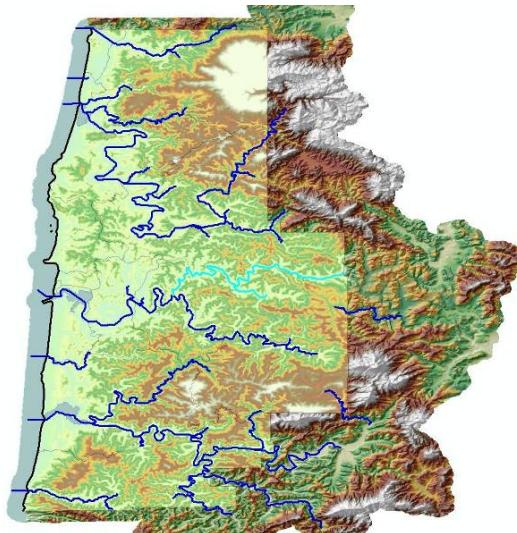


Figure 3-135: Example – Selection of River Reaches

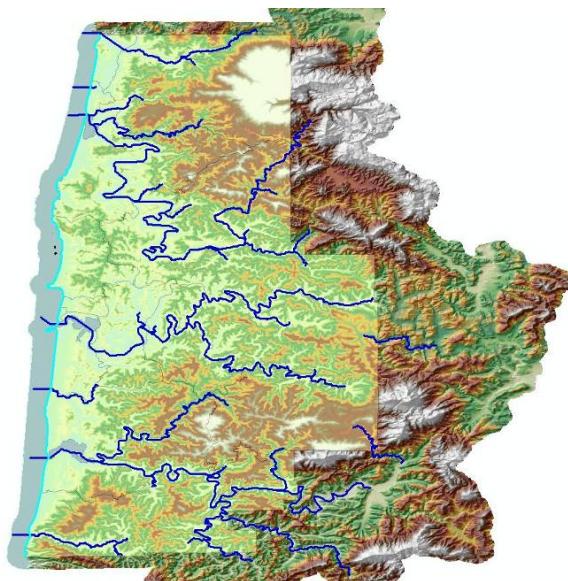


Figure 3-136: Example – Selection of Coastal Shoreline

- b. The command button labeled Remove from selection (with the minus sign icon) is used to remove data from the scenario. Selection of this button enables the ArcGIS Clear Select Features tool.
- c. Selection of the Remove Problem Reaches command button automatically removes all river reaches that may not have successfully completed the H&H analysis. This tool was added to support earlier versions of the Flood Model where a variety of exceptions and 3rd party issues prevented all river reaches from completing their analysis.
- d. The command button labeled Reset selection (with the selection arrow icon) is used to clear all active selections in the map window. Selection of this button enables the ArcGIS Clear Features function.
- e. The command button labeled Save selection (with the floppy disc icon) is used to save the users selections. The button uses ArcGIS functionality to save the users selections as a separate map layer. Once saved the new layer is added to the map as shown below.

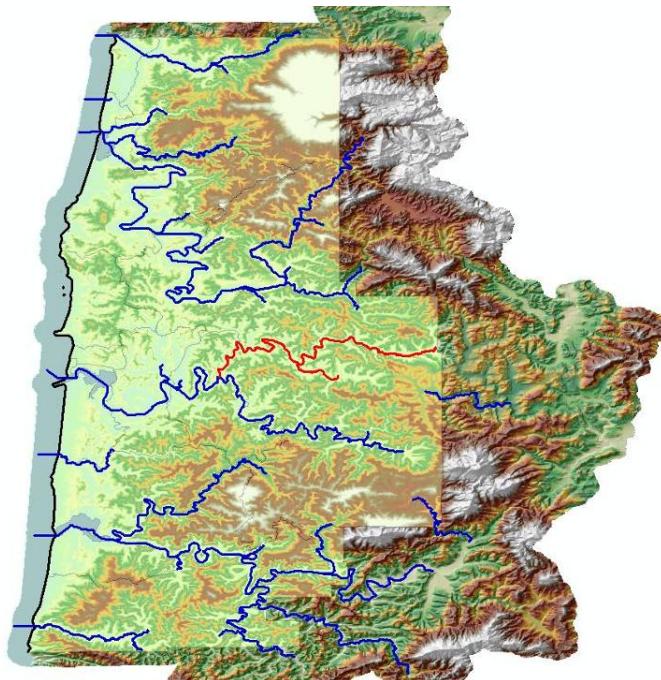


Figure 3-137: Example – Selection of River Reaches

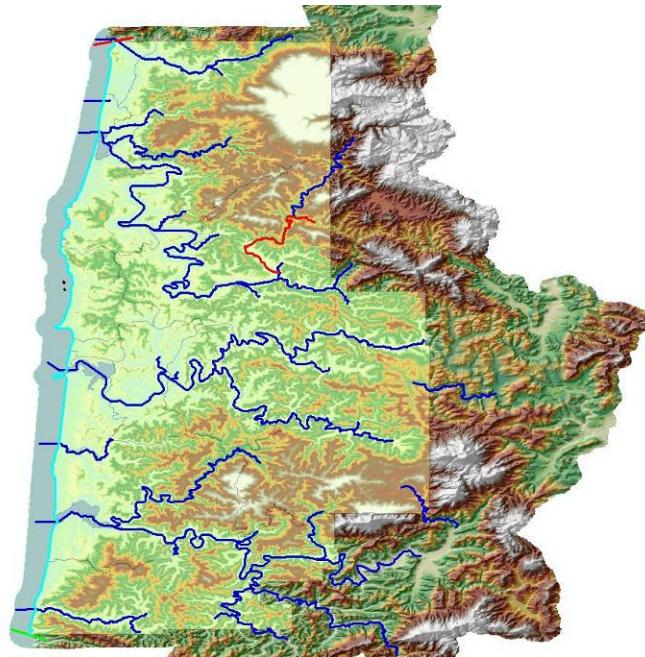


Figure 3-138: Example - Selection of Coastal Shoreline

(Note saved river reach in scenario and the default start and end lines on the shoreline.)

- d. The command button labeled OK is disabled until the user selects and saves map features to their scenario. Selection of OK closes the Edit Scenario dialog and returns the user to the base HAZUS display.
- e. The command button labeled Cancel is enabled until the user selects and save map features to their scenario. Selection of Cancel closes the Edit Scenario dialog and returns the user to the base HAZUS display.

3.2.6.3.4.5. Scenario Submenu: Close Scenario Dialog

- a. Selection of Close on the Scenario submenu closes the users open scenario and returns the map layer window and table of contents to the base view that is shown post User Data and (assuming riverine) post Develop Stream Network.
- b. The Close Scenario submenu item does not have a dialog.

3.2.6.3.4.6. Scenario Submenu: Delete Scenario Dialog

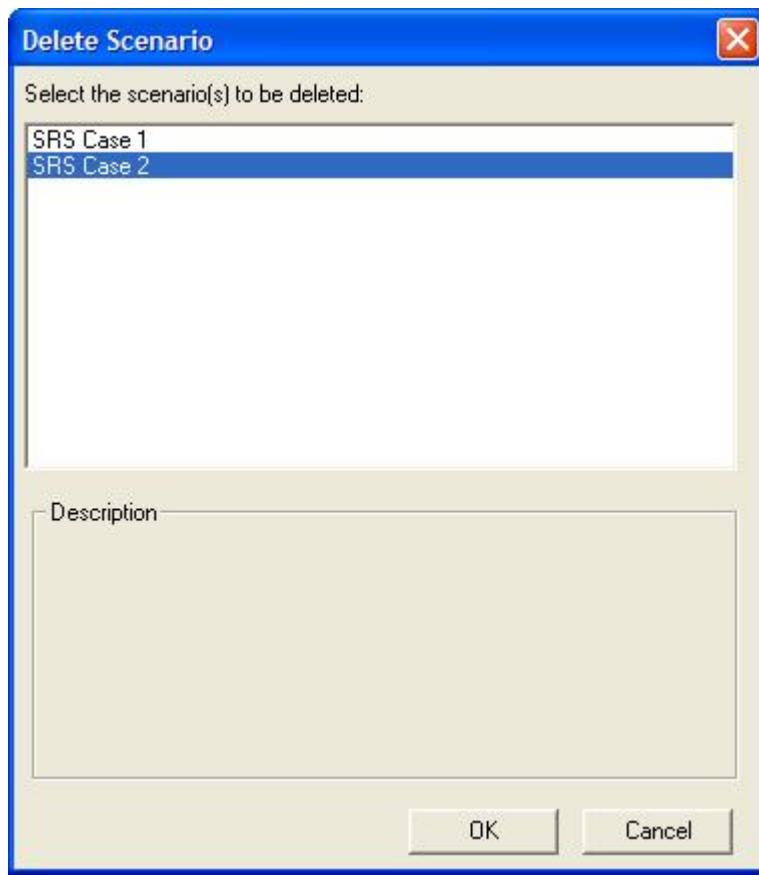


Figure 3-139: HAZUS Hazard Menu, Scenario Submenu, Delete Scenario Dialog

- a. Selection of Delete on the Scenario submenu opens the dialog shown above. The dialog is a custom HAZUS dialog but it is somewhat common with other Scenario submenu dialogs. The dialog has the following features:
 - a. The dialog does not have text boxes.
 - b. The dialog does not have any combo boxes.
 - c. The dialog does not have any radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog has a viewer that provides the user with a listing of all scenarios within their open study region. The user can select any scenario within the viewer.

- f. The dialog has a data frame where the user supplied description of the scenario is displayed. The user cannot edit this frame.
 - g. The dialog has two command buttons labeled OK and Cancel. The default for the dialog is to have only the Cancel command button enabled until the user highlights (selects) a scenario.
- b. The user is required to select a scenario to delete. Once a scenario has been highlighted, the OK command button is enabled.
 - c. Selection of Cancel closes the Delete Scenario dialog and returns the user to the default ArcGIS map view. Nothing is deleted.
 - d. Selection of OK causes the program to delete the selected scenario. This includes removing all relevant map layers into the table of contents and into the ArcGIS map view. If the hazard analysis has been completed the depth grid and associated geodatabases are deleted. If the loss estimation analysis has been completed, the results are invalidated and deleted.

3.2.6.3.5. Riverine Submenu



Figure 3-140: HAZUS Hazard Menu, Riverine Submenu

- a. The Riverine submenu allows the user to perform the hazard analysis for their selected river reaches. The Riverine submenu has two major parts. The first part allows the user to perform the Hydrology and Hydraulics (Delineate Floodplain) for their selected reaches. The second part allows the user to perform a series of “What if?” analyses on the open scenario. The “What if?” capabilities are Levee, Velocity, and Flow Regulation.

3.2.6.3.5.1. Riverine Submenu, Hydrology

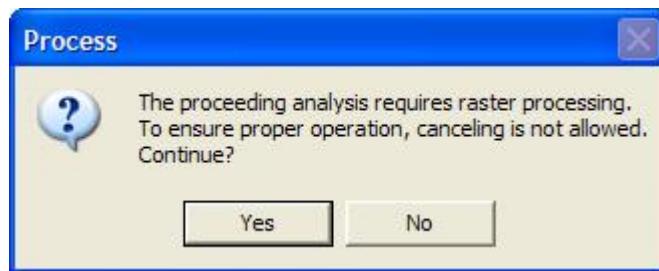


Figure 3-141: HAZUS Hazard Submenu, Riverine Submenu, Hydrology Confirmation

- a. Selection of Hydrology on the Riverine submenu calls up the previously mentioned raster process confirmation dialog. HAZUS uses internal datasets and processes to perform the development of the discharge frequency curves for the selected river reaches.
 - a. The dialog has command buttons Yes and No. Selection of Yes launches the Hydrology analysis. Selection of No closes the Process dialog and returns the user to the base ArcGIS map window.
- b. Selection of Yes launches the Hydrologic analysis and the Hydrology status bar (discussed) is displayed.
- c. Upon completion of the analysis, the user is notified of the processing time and the completion of the process in the following dialog.

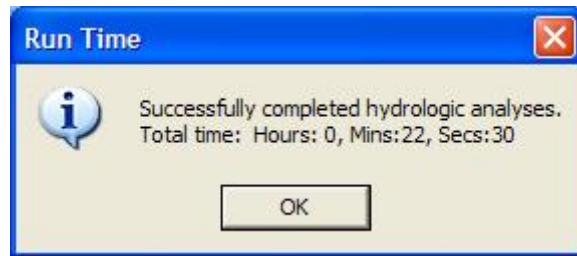


Figure 3-142: HAZUS Hazard Menu, Riverine Submenu, and Hydrology Process Completion Dialog

- a. Selection of the command button OK on the Run Time dialog closes the dialog and returns the user to the base ArcGIS map window.

3.2.6.3.5.2. Riverine Submenu, Delineate Floodplain

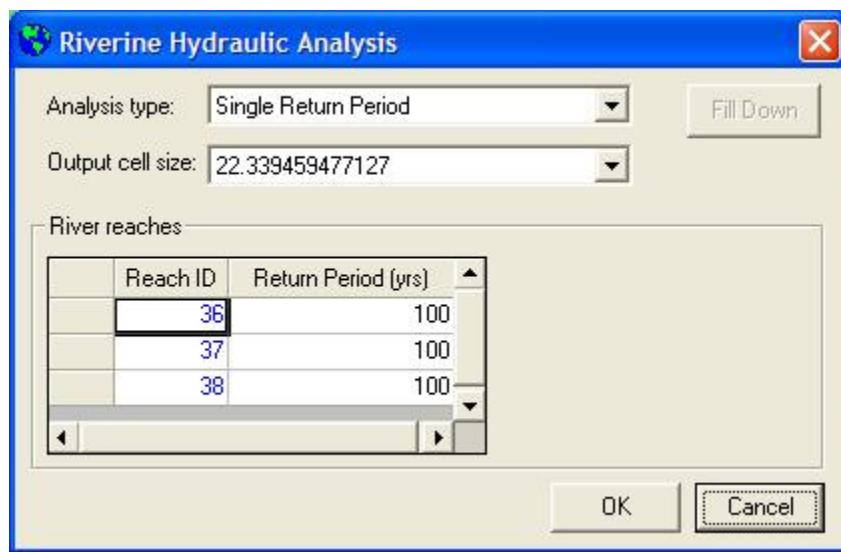
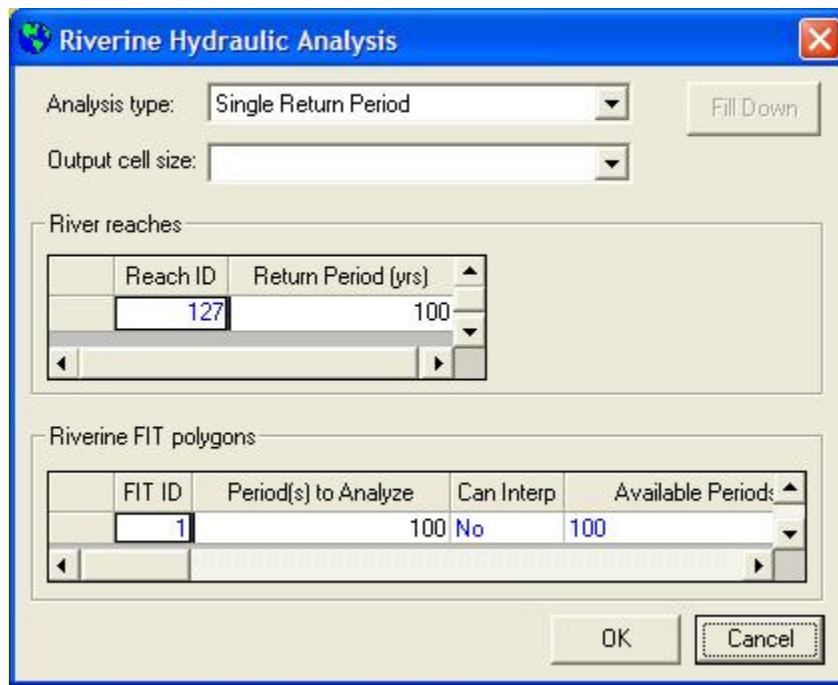


Figure 3-143: HAZUS Hazard Menu, Riverine Submenu, Hydrology Confirmation

- a. Selection of Delineate Floodplain on the Riverine submenu opens the Riverine Hydraulic Analysis dialog. This dialog is a custom dialog designed to allow the user to select from a number of options for their riverine analysis. The dialog has the following features:
 - a. The dialog has two combo boxes. The combo boxes are labeled Analysis Type and Output cell size.
 - b. The number of data grids on the dialog varies depending on whether or not the user has imported FIT data.
 - i. If the user is running purely default analysis the dialog has a single data grid labeled River reaches. If the user has imported FIT data, the dialog will have two data grids. One is labeled River reaches and the other is labeled FIT polygons.



**Figure 3-144: HAZUS Hazard Menu, Riverine Submenu,
Hydrology Confirmation with Available FIT Projects**

- c. The number of data grids on the dialog varies depending on whether or not the user has imported User Depth Data data.
 - i. If the user is running purely default analysis, the dialog has a single data grid labeled River reaches. If the user has imported depth grid data, the dialog will have two data grids. One is labeled River reaches and the other is labeled User Depth Grid.

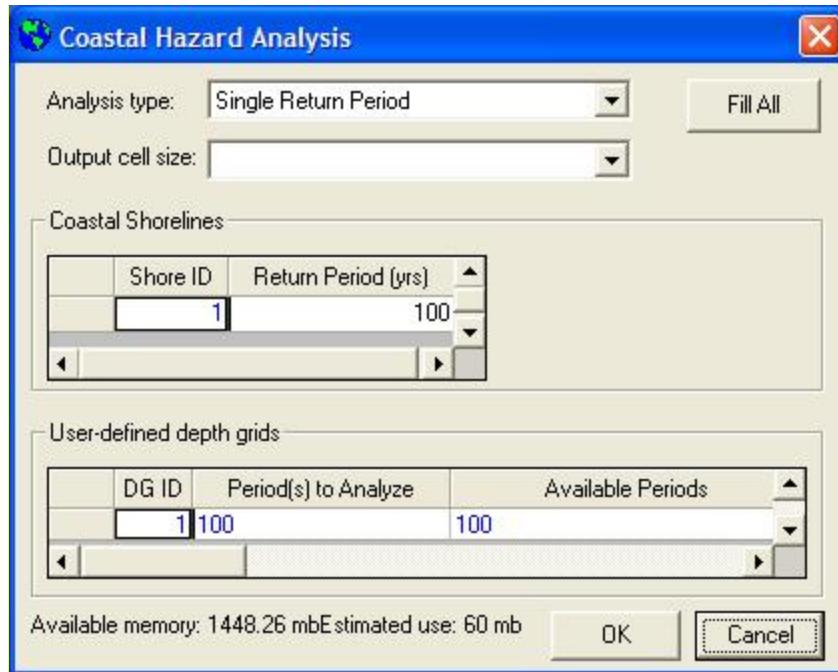


Figure 3-145: HAZUS Hazard Menu, Riverine Submenu, Hydrology Confirmation with Available FIT Projects (Coastal Example Shown)

- d. The dialog has command buttons Fill Down, OK, and Cancel.
- b. The combo box labeled Analysis type allows the user to select from a number of analysis options. Options include Return Periods 10, 50, 100, 200, and 500 (often times called the suite), Single Return Period (default value), Single Discharge, and Annualized Loss.
 - a. Selection of the Return Periods 10, 50, 100, 200, and 500 allows the user to run a “suite” of return periods for their selected river reaches. If selected and applied to reaches, the flood model will analyze the Hydraulics associated with the 5 return periods.
 - i. Selection of the suite forces the user to perform the suite for every reach in the Scenario. The user cannot choose other values for different reaches.
 - b. Selection of the Single Return Period allows the user to input the return period they want analyzed. The user has the option to run the same return period on every reach in the scenario (expedited by using the Fill Down command button)

or running different return periods on different reaches (called a mixed case).

Values are input in terms of annual return (100-year flood for example).

- c. Selection of the Single Discharge is functionally identical to the aforementioned selection of a Single Return Period with the exception that the user is expected to input values in terms of Cubic Feet per Second (CFS).
- d. Selection of Annualized Loss essentially runs the suite of return periods (10, 50, 100, 200, and 500) for every reach in the users Scenario. Similarly, the user cannot run different return periods for different reaches. When running Annualized Loss, all reaches must run the suite.
- c. The Fill Down command button is enabled only when the user selects Single Return Period or Single Discharge in the Analysis Type combo box.
- d. Through the combo box labeled Output cell size, the user can adjust the cell size of their depth grid depending on the nature of the DEM provided. The default cell size is the size of the DEM. If the user has provided FIT or other grids with larger or smaller cell sizes, the user is provided the option of selecting the alternative cell size.
- e. The behavior of the data grid(s) varies depending on the user's selection in the Analysis Type combo box. The first data grid has two columns labeled Reach ID and either Return Period (yrs) or Discharge (cfs). The Reach ID is not Editable and displayed in blue text. Some selections set analysis requirements that the user cannot alter.
 - a. Selection of Return Periods 10, 50, 100, 200, and 500 (the suite) or Annualized Loss assigns the same return periods to all reaches and FIT areas. Note: If the FIT data does not support the above analysis the user is notified and must make an alternative selection. In this case, the Return Period (yrs) or Discharge (cfs) columns are also not editable and displayed in blue text.



**Figure 3-146: HAZUS Hazard Menu, Riverine Submenu,
Hydrology Confirmation with Available FIT Projects (Coastal Example Shown)**

- b. Selection of Single Return Period or Single Discharge allows the user to edit the data to establish their desired analysis. The user is not required to input the same Return Period or Discharge in the grids.
- f. Depending on the data provided with the FIT Polygons, the user is provided with the analysis options that are available. If the FIT data includes at least 3 return periods, the user can interpolate for other return intervals or even perform suite analysis.
 - i. Selection of Return Periods 10, 50, 100, 200, and 500 (the suite) or Annualized Loss assigns the same return periods to all reaches and FIT areas. Note: If the FIT data does not support the above analysis the user is notified and must make an alternative selection. In this case, the Return Period (yrs) or Discharge (cfs) columns are also not editable and displayed in blue text.
 - ii. Selection of Single Return Period or Single Discharge allows the user to edit the data to establish their desired analysis. The user is not required to input the same Return Period or Discharge in the grid.
- g. Selection of the command button OK closes the dialog and launches the raster operations. The user is required to confirm that they indeed want to perform the raster operations.
- h. Once the floodplain delineation has been performed, a status dialog pops-up that shows the user the duration of their analysis.

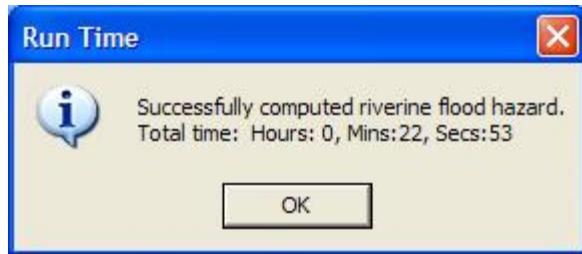


Figure 3-147: HAZUS Hazard Menu, Riverine Submenu, and Delineate Floodplain Completion Dialog

3.2.6.3.5.3. Riverine Submenu, Levee What If Scenario

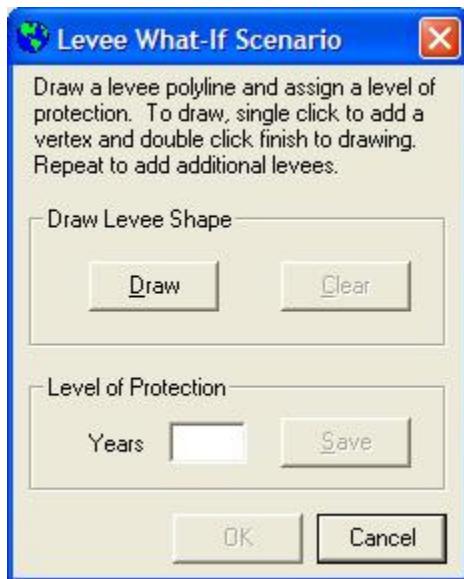


Figure 3-148: HAZUS Hazard Menu, Riverine Submenu, Levee What If Scenario Dialog

- a. Selection of Levee what if on the Riverine submenu opens the Levee What-If Scenario dialog. This dialog is a custom dialog designed to allow the user to perform a what-if analysis associated with having levee protection along a segment of river that they have analyzed in the open scenario. The dialog has the following features:
 - a. The dialog has command buttons Draw, Clear, Save, OK and Cancel. Upon opening, the Clear, Save, and OK command buttons are disabled.
 - b. The dialog has an editable text box labeled Years that allows the user to input a value for the return period protection of the presumed levee.

- b. The user is required to select the command button Draw to proceed with the “What-If” analysis. Selection of the Draw command button enables the polyline edit tool. The user is then required to draw a line that delineates the levee location.
- c. Once the user has drawn the polyline that represents the levee, the Clear command button is enabled. Selection of the Clear command button clears the map layer of the polyline created by the user and allows the user to change their input.
 - a. If the user likes the location of their levee, they will see something similar to the map view below.

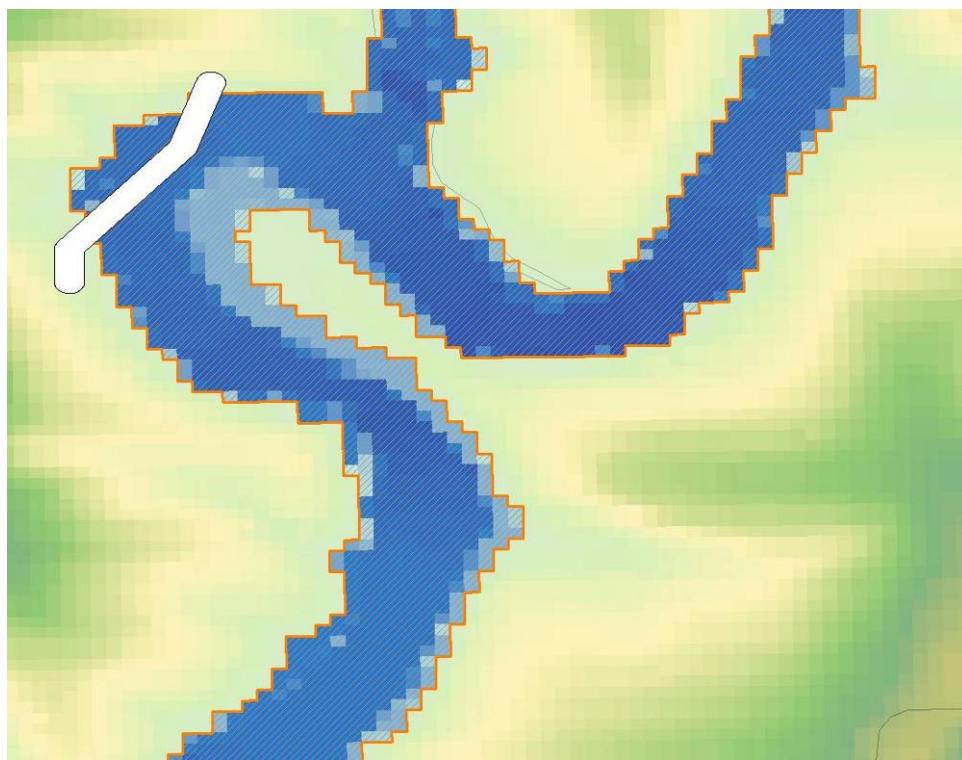


Figure 3-149: HAZUS Hazard Menu, Riverine Submenu, Levee What If Map View (Example)

- a. The user is required to input a value in the text box in the frame labeled Level of Protection. This is the level of protection for which the flood model will assume that all census blocks behind the levee are protected.
 - a. Once the user inputs a value in the text box, the command button Save is enabled.

- b. Selection of the command button Save saves the level of protection the user has input in an .ini file and enables the OK command button.
- c. Selection of the command button OK launches the raster calculations. The user will see the raster operation warning discussed at the beginning of the Hazard menu.
 - a. At the completion of the analysis, a dialog pops-up showing the duration of the analysis.



**Figure 3-150: HAZUS Hazard Menu, Riverine Submenu,
Levee What If Process Completion Dialog**

- a. Selection of the command button Cancel closes the dialog and discards any user input. Any polyline added to the map view is discarded. The user is returned to the base map view.

3.2.6.3.5.4. Riverine Submenu, Velocity What If Dialog



Figure 3-151: HAZUS Hazard Menu, Riverine Submenu, Velocity What If Scenario Dialog

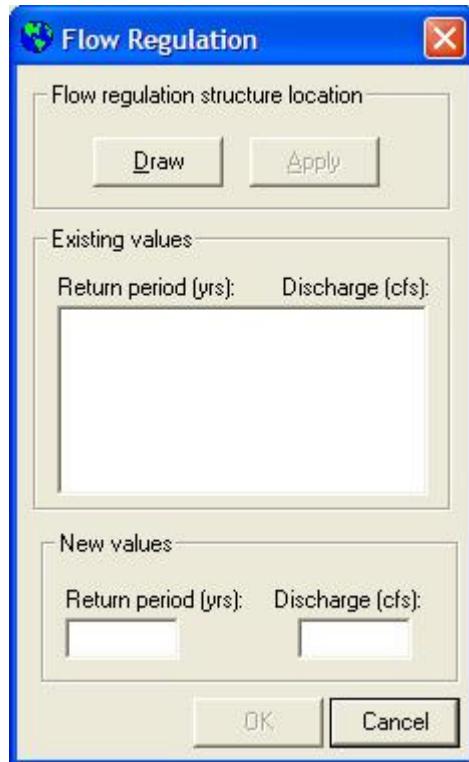
- a. Selection of Velocity what if on the Riverine submenu launches the Velocity What-If Scenario analysis. As there are no parameters required from the user, the analysis launched upon selection and confirmation from the user that they want to perform the necessary raster analysis.

- b. The HAZUS Flood Oversight Committee determined that they did not want the user getting a quantitative result for the velocity analysis because it was based in part on estimated depth of flooding and cross section interpolation of the discharge frequency calculations. For this reason, HAZUS provides a grid of high, medium and low velocity.
- c. If the user has run the suite of return periods or more than a single return period for their scenario, the following error message is raised and the velocity analysis cannot be run.



Figure 3-152: Velocity What If Error Message

3.2.6.3.5.5. Riverine Submenu, Flow Regulation What If Dialog



**Figure 3-153: HAZUS Hazard Menu, Riverine Submenu,
Flow Regulation What If Scenario Dialog**

- a. Selection of Flow Regulation what if on the Riverine submenu opens the Flow Regulation What-If Scenario Dialog shown above. The dialog is a custom HAZUS Flood dialog that allows the user to utilize ArcGIS drawing tools (point), and the distribution of the maximum discharge/frequency curve at the closest segment to the location fo the users “regulation dam”. The dialog has the following features:
- The dialog has three text boxes, two that are editable and one that is non-editable.
 - The dialog has command buttons Draw, Apply, OK, and Cancel.
- b. The user is required to select the command button Draw to start the flow regulation process. Selection of the command button enables the ArcGIS drawing tool that allows the user to select a point along the river reach (in the floodplain) where they user would like to create a regulatory dam.

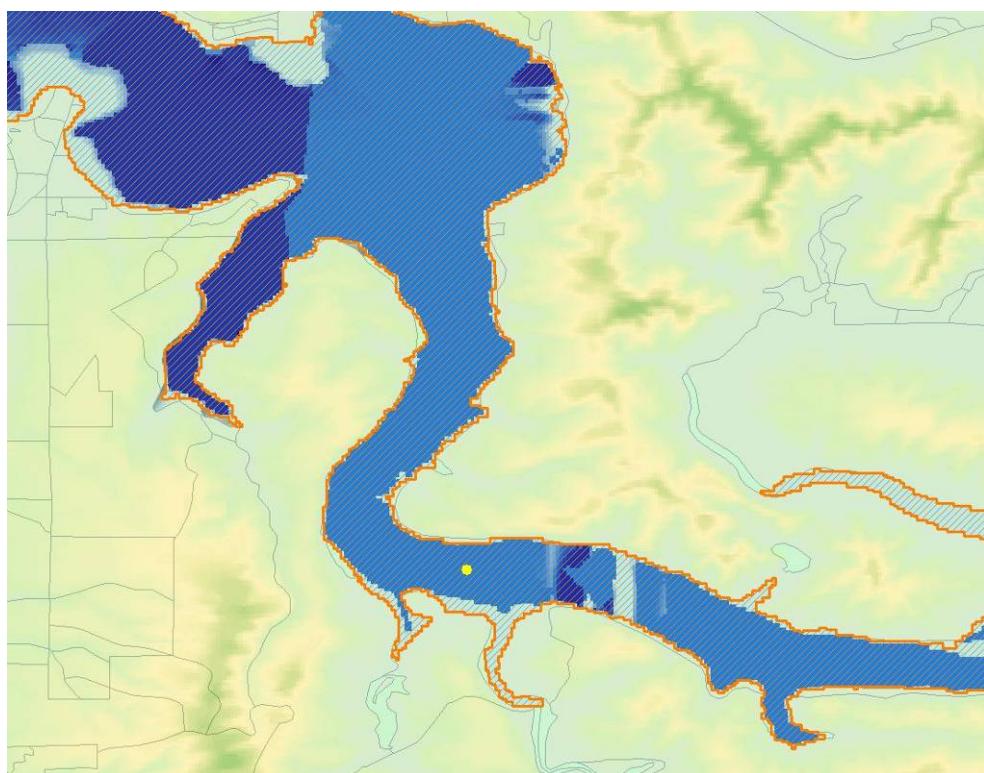
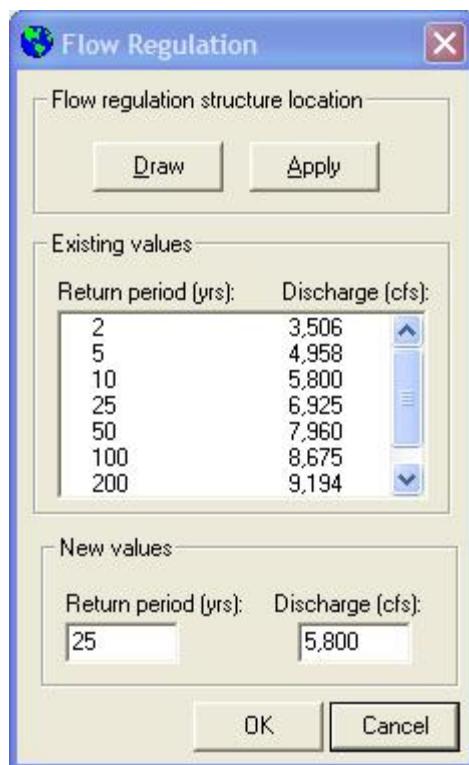


Figure 3-154: HAZUS Flow Regulation What If Map View with User Defined Regulatory Dam Location (yellow dot)

- c. Once the user has picked a location on the map, the Apply command button is enabled and the user is required to click on the Apply button to retrieve the existing discharge frequency data.
- d. The dialog has a text box that displays the existing discharge frequency data extracted from the underlying data that was used to develop the return periods depth grid.
 - a. This data is provided to the user to allow them to determine an appropriate discharge value and return period for the adjusted river regulation.



**Figure 3-155: HAZUS, Hazard Menu, Riverine Submenu,
Flow Regulation What If Scenario – Populated**

- e. The text boxes labeled Return Period (yrs) and Discharge (cfs) in the New Values frame are editable and allows the user input the new discharge value to adjust the discharge frequency curve to allow for the installation of a flow regulation dam.

- a. If the user inputs a regulation value that is incorrect or not consistent with the values seen in the existing discharge frequency curve, the following error message is raised.

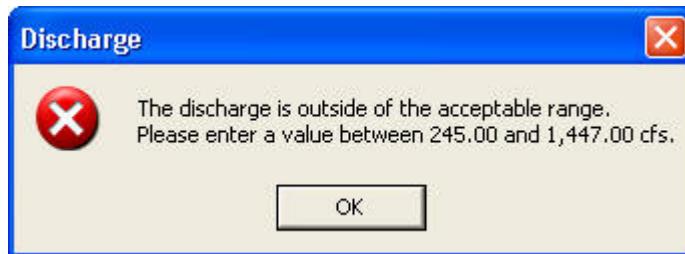


Figure 3-156: HAZUS Flow Regulation Invalid Flow Regulation Input

- f. The command button OK is enabled after the user has established the location of the flow regulation and has input values in the new values frame. Selection of the command button OK launches the hydraulic calculations for the scenario reaches with the new discharge frequency curve at that location. The change in discharge is processed downstream.
- g. Selection of Cancel closes the Flow Regulation dialog without saving the user input or the location of the user's choice for flow regulation. The user is returned to the base map view.

3.2.6.3.6. Hazard Menu, Coastal Submenu



Figure 3-157: HAZUS Hazard Menu, Coastal Submenu

- a. The Coastal submenu allows the user to perform the hazard analysis for their selected shoreline(s). The Coastal submenu has two major parts. The first part allows the user to perform the Hydraulics (Delineate Floodplain) for their selected shoreline(s). The second part allows the user to perform a series of "What if?" analyses on the open scenario. The "What if?" capabilities are Long Term Erosion, and Shore Protection.

3.2.6.3.6.1. Coastal Submenu, Delineate Floodplain

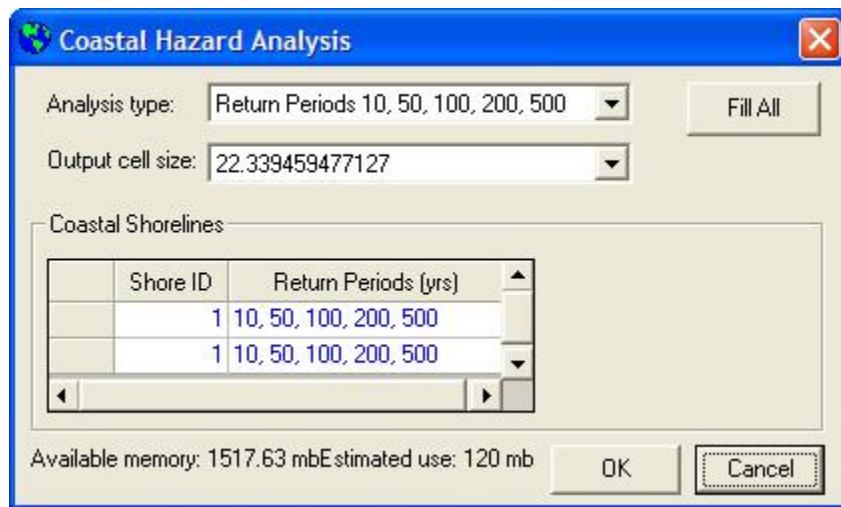


Figure 3-158: HAZUS Hazard Menu, Coastal Submenu, Delineate Floodplain Dialog

- a. Selection of Delineate Floodplain on the Coastal submenu opens the Coastal Hazard Analysis dialog. This dialog is a custom dialog designed to allow the user to select from a number of options for their coastal analysis. The dialog has the following features:
 - a. The dialog has two combo boxes. The combo boxes are labeled Analysis Type and Output cell size.
 - b. The number of data grids on the dialog varies depending on whether or not the user has imported FIT data.
 - i. If the user is running purely default analysis the dialog has a single data grid labeled Coastal Shorelines. If the user has imported FIT data, the dialog will have two data grids. One is labeled Coastal Shorelines and the other is labeled FIT polygons. See the Riverine discussion above.
 - c. The dialog has command buttons Fill All, OK, and Cancel.
- b. The combo box labeled Analysis Type allows the user to select from a number of analysis options. Options include Return Periods 10, 50, 100, 200, and 500 (often times called the suite), Single Return Period (default value), and Annualized Loss.

- a. Selection of the Return Periods 10, 50, 100, 200, and 500 allows the user to run a “suite” of return periods for their selected shoreline(s). If selected and applied to the shoreline(s), the flood model will analyze the Hydraulics associated with the 5 return periods.
 - i. Selection of the suite forces the user to perform the suite for every shoreline(s) in the Scenario. The user cannot choose other values for different reaches.
- b. Selection of the Single Return Period allows the user to input the return period they want analyzed. The user has the option to run the same return period on every shoreline(s) in the scenario (expedited by using the Fill All command button) or running different return periods on different shoreline(s) (called a mixed case). Values are input in terms of annual return (100-year flood for example).
- c. Selection of Annualized Loss essentially runs the suite of return periods (10, 50, 100, 200, and 500) for every shoreline(s) in the users Scenario. Similarly, the user cannot run different return periods for different reaches. When running Annualized Loss, all shoreline(s) must run the suite.
- d. The Fill All command button is enabled only when the user selects Single Return Period in the Analysis Type combo box.
- e. Through the combo box labeled Output cell size, the user can adjust the cell size of their depth grid depending on the nature of the DEM provided. The default cell size is the size of the DEM. If the user has provided FIT or other grids with larger or smaller cell sizes, the user is provided the option of selecting the alternative cell size.
- f. The behavior of the data grid(s) varies depending on the user’s selection in the Analysis Type combo box. The first data grid has two columns labeled Shoreline ID and either Return Period (yrs). The Shoreline ID is not Editable and displayed in blue text. Some selections set analysis requirements that the user cannot alter.
 - a. Selection of Return Periods 10, 50, 100, 200, and 500 (the suite) or Annualized Loss assigns the same return periods to all reaches and FIT areas. Note: If the

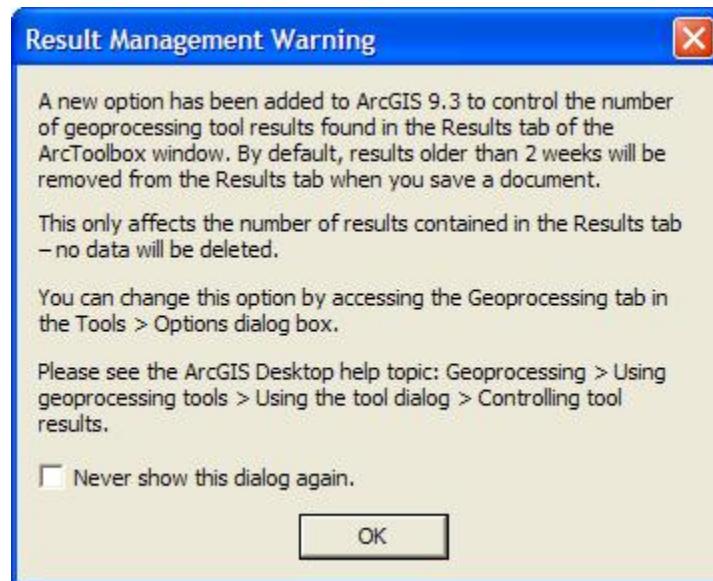
FIT data does not support the above analysis the user is notified and must make an alternative selection. In this case, the Return Period (yrs) columns are also not editable and displayed in blue text.

- b. Selection of Single Return Period allows the user to edit the data to establish their desired analysis. The user is not required to input the same Return Period or Discharge in the grid.
- f. Depending on the data provided with the FIT polygons, the user is provided with the analysis options that are available. If the FIT data includes at least 3 return periods, the user can interpolate for other return intervals or even perform the suite analysis.
 - a. Selection of Return Periods 10, 50, 100, 200, and 500 (the suite) or Annualized Loss assigns the same return periods to all shorelines and FIT areas. Note: If the FIT data does not support the above analysis the user is notified and must make an alternative selection. In this case, the Return Period (yrs) columns are also not editable and displayed in blue text.
 - b. Selection of Single Return Period allows the user to edit the data to establish their desired analysis. The user is not required to input the same Return Period or Discharge in the grid.
- g. Selection of the command button OK closes the dialog and launches the raster operations. The user is required to confirm that they indeed want to perform the raster operations.
- h. Once the floodplain delineation has been performed, a status dialog pops-up that shows the user the duration of their analysis.



**Figure 3-159: HAZUS Hazard Menu, Coastal Submenu,
Delineate Coastal Hazard Process Completion Dialog**

- i. A message has been provided that notifies the user of improvements in ArcGIS 9.3 that helps resolve data management issues within the geoprocessing results.



**Figure 3-160: HAZUS Hazard Menu, Coastal Submenu,
Delineation Process Results Management Warning Dialog**

- j. If the user is performing a riverine and coastal analysis in the same scenario, and the user has performed the suite analysis for the river reaches, the user will see the following message alerting them



**Figure 3-161: HAZUS Hazard Menu, Riverine Submenu,
Delineation Process Compute Coastal Flood Hazard**

3.2.6.3.7. Hazard Menu: Quick Analysis

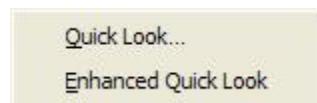


Figure 3-162: HAZUS Hazard Menu, Quick Analysis Submenu

- a. The Quick Analysis is a unique analysis tool created at the request of FEMA for those users that are looking at low level flooding in a specific area. The Quick Analysis does not utilize any of the H&H functionality within HAZUS and cannot be construed as being scientifically sound.
- b. Because there is no methodology behind the development of the analysis, the Quick Analysis is function ONLY when the user does not have an active Scenario open. If all Scenarios are closed, the Quick Analysis menu is enabled.

3.2.6.3.7.1. Hazard Menu, Quick Analysis: Quick Look

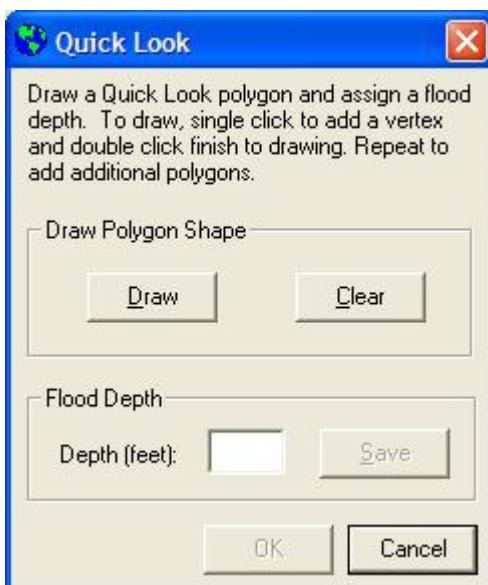


Figure 3-163: HAZUS Hazard Menu, Quick Analysis: Quick Look Dialog

- a. Selection of Quick Look on the Quick Analysis submenu opens the dialog shown above. The dialog is a custom HAZUS Flood dialog designed to allow a user to create areas or polygons of constant depth flooding on their study region. The dialog has the following features.
 - a. The dialog has a single editable text box labeled Depth (feet).
 - b. The dialog does not have any combo boxes.
 - c. The dialog does not have any radio buttons.

- d. The dialog does not have a check box.
 - e. The dialog does not have a data grid.
 - f. The dialog has five command buttons labeled Draw, Clear, Save, OK and Cancel.
- b. Selection of the command button Draw opens the standard ArcGIS polygon drawing tool to allow the user to draw a polygon of any shape into the study region. The user may draw multiple polygons (one at a time).
- a. Once the user has created a polygon, they are required to input a depth value for that polygon. The input value is put into the editable text box labeled Depth (feet).

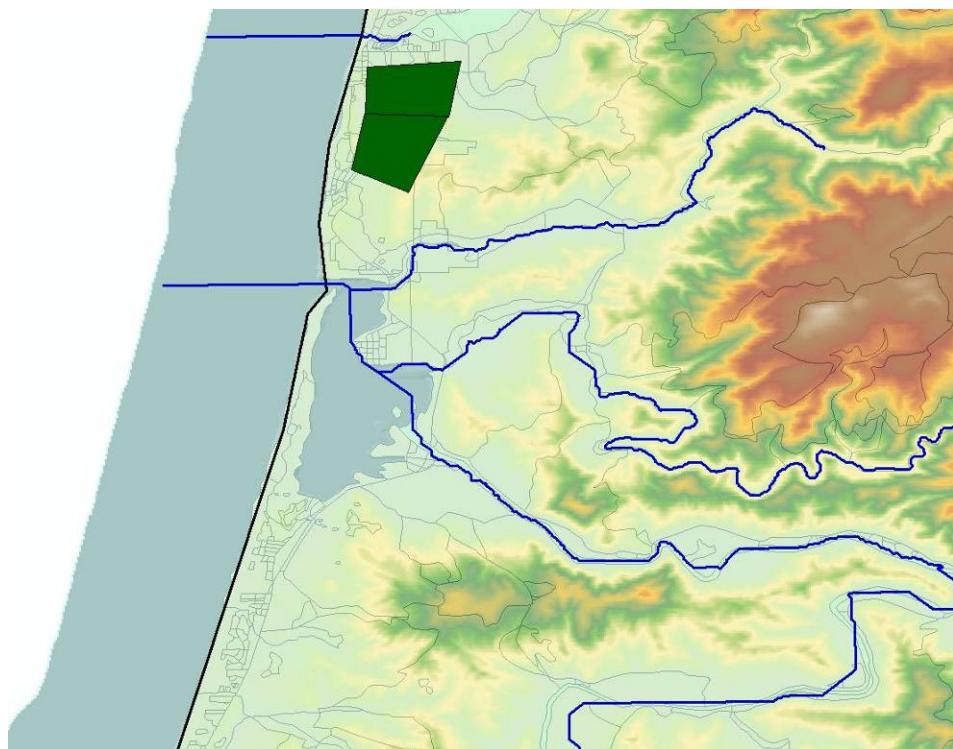


Figure 3-164: HAZUS Hazard Menu, Quick Analysis: Map View of User Created Polygons

- c. If the user does not like the polygons they have drawn, they can use the command button Clear to remove the polygons and start over. This function is available until the user hits OK.

- d. After the user has drawn the polygon, the user can input the depth value in the text box, the Save command button is enabled and the user can save all of the polygons they may have created.
- e. Selection of the command button OK saves the polygon and the depth values for the analysis functions. The map view changes to show the polygons with different depth values. The edit dialog is closed and the user is returned to the base map view.

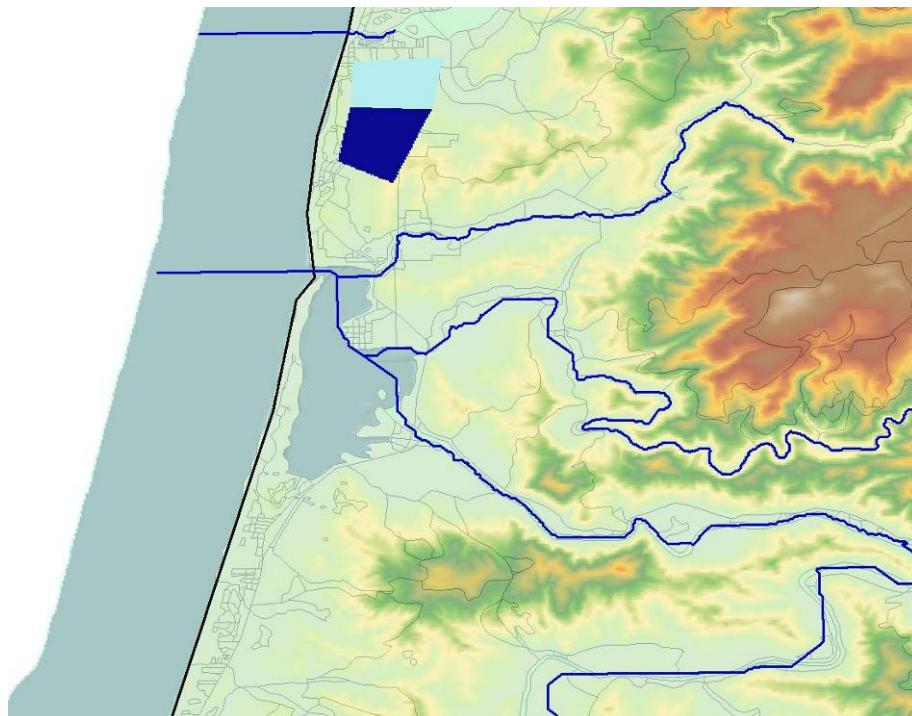


Figure 3-165: HAZUS Hazard Menu, Quick Analysis: Map View of User Created Polygons with Depth Values

- f. Selection of the command button Cancel closes the dialog and returns the user to the base map view. Any polygons and depth values created are lost.

3.2.6.3.7.1.1. Hazard Menu, Quick Analysis: Enhanced Quick Look

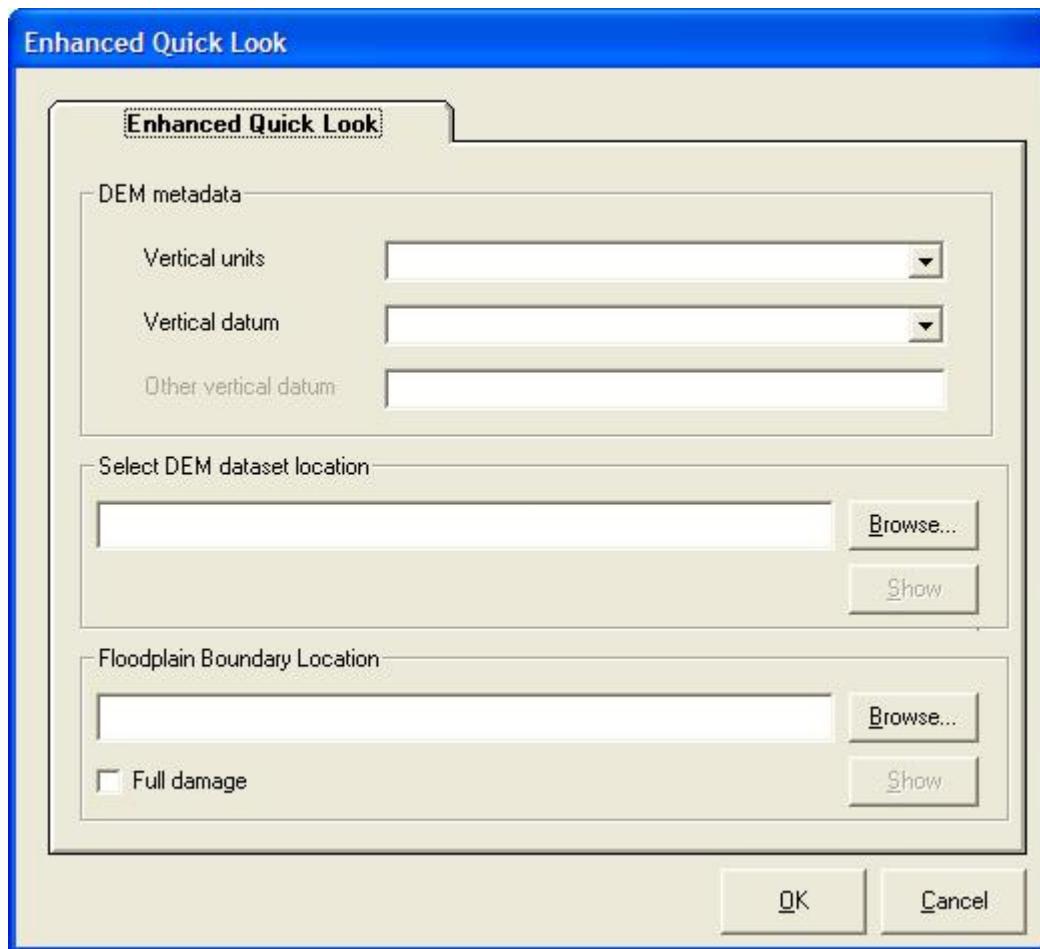


Figure 3-166: HAZUS Hazard Menu, Quick Analysis: Enhanced Quick Look Dialog

- a. Selection of Enhanced Quick Look on the Quick Analysis submenu opens the dialog shown above. The dialog is a custom HAZUS Flood dialog designed to allow a user to create areas or polygons of constant depth flooding on their study region. The dialog has the following features.
 - a. The dialog has three editable text boxes, two of which allows the user to point to data locations.
 - b. The dialog has a single tab labeled Enhanced Quick Look.
 - c. The dialog has two combo boxes labeled Vertical units and Vertical datum. There are no default values.

- d. The dialog does not have any radio buttons.
 - e. The dialog has a single check box labeled Full damage.
 - f. The dialog does not have a data grid.
 - g. The dialog has six command buttons labeled Browse (2), Show (2), OK, and Cancel.
- b. The dialog has a combo box labeled Vertical Units. There is no default value but options include Feet and Meters. The user selects the value that is best associated with their DEM.
- c. The dialog has a combo box labeled Vertical Datum. There is no default value and options include NAVD88, NGCD29, and Other. The user is expected to select a value that is appropriate for their DEM.
- d. The dialog has a text box labeled Select DEM dataset location. The user can use the command button Browse adjacent to the box to bring up a standard ArcCatalog dialog that searches for raster datasets. Once the user selects the DEM, the Show button is enabled and the user can see the DEM they are planning to import.
- e. The dialog has a text box labeled Floodplain Boundary location. The user can use the command button Browse adjacent to the box to bring up a standard ArcCatalog dialog that allows the user to search for Polygon Feature Classes. Once the user selects their floodplain boundary location, the Show button is enabled and the user can see the polygons on their map.
- f. The user can check the box Full damage. When the box is checked, HAZUS will assume the area within the Floodplain Boundary is fully damaged, with uniform flood depths of 24 feet.
- g. Selection of the command button OK saves the information and closes the dialog returning the user to the base map view.
- h. Selection of the command button Cancel closes the dialog and all input from the user is lost. The user is returned to the base map view.

3.2.7. Analysis Menu

3.2.7.1. Analysis Menu Available in Earthquake Model

- a. The Analysis menu shall provide the user with various options to help manage the complete analysis for the study region and for a specific scenario event.
- b. The Analysis menu shall allow the user to modify the default parameters used by HAZUS-MH to run an earthquake analysis.

3.2.7.1.1. Damage Functions

- a. The user shall have the ability to modify the parameters used to estimate the damage to buildings and lifeline systems. The menu item has three sub-menus associated with buildings, transportation systems, and utility systems

3.2.7.1.1.1. Buildings

- a. The user shall be able to view and/or edit the building capacity and fragility curves by earthquake-specific building types.
- b. The sub-menu shall provide the user with two tab selections. The tabs shall allow the user to view/edit the building damage parameters: Capacity Curves and Fragility Curves. The parameters in these windows are editable.
- c. The Capacity Curves tab shall have a pull-down menu that allows the user to edit the capacity curve parameters based on the seismic design level.
- d. The Fragility Curves tab shall have a pull-down menu that allows the user to edit the fragility curves for the structural and nonstructural components of the building.
- e. The Capacity Curves and Fragility Curves tabs shall have buttons to Close the window and Print data.
- f. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. For both tabs, the Data Dictionary is the only option available.

3.2.7.1.1.2. Transportation

- a. The user shall be able to view and/or edit the transportation systems Fragility Curves by the various classification types.
- b. The sub-menu provides users with seven tab selections: Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport. The tabs shall allow the user to view/edit the damage parameters for the Transportation Lifeline Systems.

Each general Transportation Lifeline System has a tab.

- c. Each tab shall have a pull-down menu that allows the user to edit the fragility curve parameters due to either PGA or PGD. The user shall have the following options:
 - For the Highway tab: Bridge Segments and Tunnels
 - For the Railway tab: Bridges, Tracks, Facilities, and Tunnels
 - For the Light Rail tab: Bridges, Tracks, Facilities, and Tunnels
 - For the Airport tab: Facilities and Runways
- d. The Bus, Ferry, and Port tabs shall not provide additional options.
- e. Each tab shall have buttons to Close the window or Print data.
- f. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. For all tabs, the Data Dictionary is the only option available.

3.2.7.1.1.3. Utility Systems

- a. The user shall be able to view and/or edit the utility systems fragility curves by the various classification types.
- b. The sub-menu shall provide the user with six tab selections: Potable Water, Wastewater, Oil Systems, Natural Gas, Electric Power, and Communications.
- c. The tabs shall allow the user to view/edit the damage parameters for the Utility Lifeline Systems.

- d. There is a tab for each general Utility Lifeline System. The parameters in these windows are editable.
- e. Each tab shall have a pull-down menu that allows the user to edit the Fragility Curves parameters due to either PGA or PGD. Additionally, for systems that have pipelines, there is an option that shall allow the user to edit pipeline fragility parameters. Each tab shall have buttons to Close the window or Print data.
- f. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. For all tabs, the Data Dictionary is the only option available.

3.2.7.1.2. Restoration Functions

- a. The user shall have the ability to modify the parameters used to estimate the restoration time for essential facilities and lifeline systems. The menu item has three sub-menus associated with essential facilities, transportation systems, and utility systems.

3.2.7.1.2.1. Essential Facilities

- a. The user shall be able to view and/or edit the essential facilities functionality restoration curves by the various classification types.
- b. The sub-menu shall provide the user with three tab selections: Medical Care Facilities, Emergency Response, and Schools.
- c. The tabs shall allow the user to view/edit the restoration parameters for the essential facilities. The parameters in these windows are editable.
- d. Each tab shall have buttons to Close the window or Print data.
- e. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. For both tabs, the Data Dictionary is the only option available.

3.2.7.1.2.2. Transportation Systems

- a. The user shall be able to view and/or edit the Transportation Systems Functionality Restoration curves by the various classification types.

- b. The sub-menu shall provide the user with seven tab selections: Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport.
- c. The tabs shall allow the user to view/edit the restoration parameters for the transportation lifeline systems. Each general Transportation Lifeline System has a tab.
- d. Each tab shall have buttons to Close the window or Print data.
- e. Right clicking while the cursor is within the data table shall allow the user to activate a context menu. For all tabs, the Data Dictionary is the only option available.

3.2.7.1.2.3. Utility Systems

- a. The user shall be able to view and/or edit the Utility Systems Functionality Restoration curves by the various classification types.
- b. The sub-menu shall provide the user with six tab selections: Potable Water, Wastewater, Oil Systems, Natural Gas, Electric Power, and Communications.
- c. The tabs shall allow the user to view/edit the restoration parameters for the utility lifeline systems. Each General Utility Lifeline System has a tab. The parameters in these windows are editable.
- d. Each tab shall have a pull-down menu that allows the user to edit the fragility curve parameters due to either PGA or PGD.
- e. For systems that have pipelines, there is also an option that shall allow the user to edit pipeline fragility parameters.
- f. Each tab shall have buttons to Close the window or Print data.
- g. Right clicking the mouse button while the cursor is within the data table shall allow the user to activate a context menu. For all tabs, the Data Dictionary is the only option available.

3.2.7.1.3. Analysis Parameters

The user shall have the ability to modify the parameters used to run a HAZUS-MH earthquake analysis.

The menu item has 14 sub-menus: General Building Stock, Ground Motion Hazard, Ground Motion Contours, Inundation Data Files, Fire Following Earthquake, Potable Water Networks, Debris, Casualties, Shelter, Buildings—Economic Loss, Military Installations—Economic Loss, Lifeline—Economic Loss, Indirect Economic Loss, and Default Classes. The content for these menu options is consistent with HAZUS-MH-SR2.

3.2.7.1.3.1. General Building Stock

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of general building stock (i.e., square footage per building by specific occupancy).

3.2.7.1.3.2. Ground Motion Hazard

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of ground motion and ground failure (e.g., soil amplification factors, liquefaction map proportions).

3.2.7.1.3.3. Ground Motion Contours

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the generation of ground motion contour maps (e.g., contour grid size)

3.2.7.1.3.4. Inundation Data Files

- a. The user shall be able to specify, view, and/or edit the location of the inundation maps for dams, tsunami, seiche, and levees.

3.2.7.1.3.5. Fire Following Earthquake

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of fire following earthquake (e.g., number of simulations, engine speed).

3.2.7.1.3.6. Potable Water Networks

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of potable water networks (e.g., number of simulations, simulation time)

3.2.7.1.3.7. Debris

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of earthquake-generated debris (e.g., structural and nonstructural unit weight by building type).

3.2.7.1.3.8. Casualties

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of earthquake-generated casualties (e.g., casualty rates by severity and building type, collapse rates by building type).

3.2.7.1.3.9. Shelter

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of shelter requirements because of an earthquake (e.g., weighting factors, and modification factors by income, ethnicity, age, and ownership).

3.2.7.1.3.10. Buildings–Economic Loss

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of direct economic loss to buildings (e.g., structural repair cost by specific occupancy and specific building type, replacement value for contents).

3.2.7.1.3.11. Military Installations–Economic Loss

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of direct economic loss to military installations (e.g., value breakdown ratios, damage to loss ratios).

3.2.7.1.3.12. Lifeline–Economic Loss

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of lifeline economic loss to lifelines (e.g., replacement costs, damage ratios).

3.2.7.1.3.13. Indirect Economic Loss

- a. The user shall be able to view and/or edit specific analysis parameters to be used in the analysis of indirect economic loss to the study region (e.g., defining study region economy, importing IMPLAN data sets).

3.2.7.1.3.14. Default Classes

- a. The user shall be able to view and/or edit default classifications to be used for the analysis of various types of building inventory wherever user has not explicitly specified a classification.

3.2.7.1.4. Ground Truthing On/Off

- a. The user shall be able to enable or disable Ground Truthing mode of analysis using this menu option.
- b. The user shall have the ability to ground truth the HAZUS-MH results. Chapter 12 of the HAZUS User Manual describes the ground truthing capability. This toggle menu option turns the ground truthing capability on and off.

3.2.7.1.5. Run

- a. The user shall be able to analyze a study region for the following:
 - Ground motion and ground failure for buildings
 - Damage to buildings, essential facilities, military installations, user-defined structure inventory, transportation systems, and utility systems
 - Economic loss to buildings, military installations, transportation systems, and utility systems
 - Fire following earthquake
 - Inundation following earthquake
 - Earthquake-generated debris
 - Shelter requirements following earthquake
 - Earthquake-generated casualties
 - Indirect economic loss to the region resulting from earthquake
 - AEBM where the user shall be able to create a portfolio of buildings and analyze them for social and economic losses.
- b. The user shall be able to view the progress of the analysis calculations in the status bar of the main application window and shall be able to abort the analysis at any time. The user can view the analysis summary log after the calculations are completed.

- c. The user shall have the ability to run a partial or complete HAZUS-MH earthquake analysis. The list of models to run shall be classified by inventory type to simplify access to it.

Table 3-21 summarizes the major feature attributes related to the Earthquake Model Analysis Menu. For a complete description of the attributes, see Appendix A.

Table 3-21: Earthquake Model Analysis Menu Attributes Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Damage Functions	A	C	L	L	
Restoration Functions	A	C	L	L	
Analysis Parameters	A	C	M	L	
Ground Truthing	A	C	H	L	
Run	A	C	H	L	

3.2.7.2. Analysis Menu Available in Hurricane Model

The analysis menu shall offer the options described below.

3.2.7.2.1. Damage Functions

- a. The user shall be able to view graphical displays of damage probability function of peak wind speed and surface roughness for each hurricane-specific building type and the corresponding hurricane-specific building features.
- b. The damage functions dialog shall be modeless and resizable.
- c. The damage functions dialog shall have the OK and Cancel buttons enabled.

3.2.7.2.2. Loss Functions

- a. The user shall be able to view graphical displays of building damage loss ratios and contents loss ratios as a function of peak wind speed and surface roughness for each hurricane-specific building type and the corresponding hurricane-specific building features.
- b. The building loss functions dialog shall be modeless and resizable.
- c. The building loss functions dialog shall have the OK and Cancel buttons enabled.

3.2.7.2.3. Restoration Functions

- a. The user shall be able to view and/or modify the following restoration functions:
 - Essential facilities (specific options are TBD). (Due to lack of historical data, it is not possible to determine the date or entity responsible for this TBD. Therefore, this SRS is not compliant with Section 4.3.3.1 of IEEE Standard 830-1998, Recommended Practice for Software Requirements Specifications.)
 - (Deferred) Transportation systems
 - (Deferred) Utility systems

3.2.7.2.4. Analysis Parameters

3.2.7.2.4.1. Terrain

- a. The user shall be able to view the default surface roughness for each census tract.
- b. The user shall be able to edit the surface roughness values by census tract.
- c. The user shall be able to map the surface roughness.
- d. The surface roughness data browser shall have the OK, Cancel, Map, and Print buttons enabled.
- e. The data browser shall be modeless and resizable.

3.2.7.2.4.2. Debris

- a. The user shall be able to view and/or modify the following building debris parameters:
 - Unit Weight by specific building type.
 - Debris Fraction by specific building type and damage state.
- b. The debris parameters data browser shall have the OK, Cancel, and Apply buttons enabled.
- c. The debris parameters data browser shall be modeless and resizable.

3.2.7.2.4.3. (Deferred) Casualty Parameters

3.2.7.2.4.4. Shelter

- a. The user shall be able to view and/or modify the following shelter requirements parameters:
 - TBD. (Due to lack of historical data, it is not possible to determine the date or entity responsible for this TBD. Therefore, this SRS is not compliant with Section 4.3.3.1 of IEEE Standard 830-1998, Recommended Practice for Software Requirements Specifications.)
- b. The shelter requirements data browser shall have the OK, Cancel, and Print buttons enabled.
- c. The shelter requirements data browser shall be modeless and resizable.

3.2.7.2.4.5. Building Economic

- a. The user shall be able to view and/or edit the following building economic parameters:
 - Contents value as a percentage of building replacement value
 - Time elements (TBD). (Due to lack of historical data, it is not possible to determine the date or entity responsible for this TBD. Therefore, this SRS is not compliant with Section 4.3.3.1 of IEEE Standard 830-1998, Recommended Practice for Software Requirements Specifications.)
- b. The buildings economic parameters data browser shall have the OK, Cancel, and Print buttons enabled.
- c. The buildings economic parameters data browser shall be modeless and resizable.

3.2.7.2.4.6. (Deferred) Military Installations

3.2.7.2.4.7. (Deferred) Lifelines

3.2.7.2.4.8. (Deferred) Indirect Economic Loss

3.2.7.2.4.9. Run

- a. The hurricane preview model shall allow the user to turn on or turn off the following analysis modules:
 - Direct economic losses sustained in the general building stock
 - Direct physical damage to buildings and facilities
 - Debris generated by direct physical damage to buildings and facilities in the general building stock
 - Shelter requirements
 - (Deferred) Casualties
 - (Deferred) Direct economic losses sustained at military installations
 - (Deferred) Direct economic losses sustained by lifelines
 - (Deferred) Indirect economic loss
- b. The user shall be able to select or de-select individual general occupancy classes for analysis (e.g., analyze only residential buildings).
- c. For a probabilistic analysis, the user shall be able to select the return periods for which the analysis results shall be reported.
- d. The user shall be able to save the analysis options for later use.
- e. A default set of options shall be provided.
- f. The user shall be able to revert to the default options at any time before running the analysis.

- g. The user shall be able to view the progress of the analysis calculations in the status bar of the main application window.
- h. The analysis options dialog shall have the OK and Cancel buttons enabled.
- i. The user can view the analysis summary log after the calculations are completed.
- j. The user shall be able to abort/terminate the analysis run at any time by pressing the <Esc> key on the keyboard.

3.2.7.3. Analysis Menu Available in Flood Model



Figure 3-167: HAZUS Analysis Menu

- a. The Analysis menu allows the user to modify the parameters involved in the estimation of damage and losses. Nearly all of the menu items on this menu and subsequent submenus have default values with the exception of the Agriculture crop parameters.
- b. The user shall be shown menu items Damage Functions, Restoration Functions, Parameters, 3rd Party models, Flood Warning, Annualized Loss, Quick Analysis, and Run.
 - a. With the exception of Quick Analysis and Run, all menu items are enabled as a default.
 - b. The user must have completed the Hazard Analysis in order to have the Run option enabled.

- c. Menu items Damage Functions, Restoration Functions, Parameters, and 3rd Party models have submenus and will be discussed in later sections.
- d. d If the user changes parameters or hazard data after having completed an analysis for the open scenario, all results are invalidated and the user is required to run the analysis again.
- e. e Addition or removal of reaches, FIT polygons or shorelines shall require re-analysis of data in order to view results.

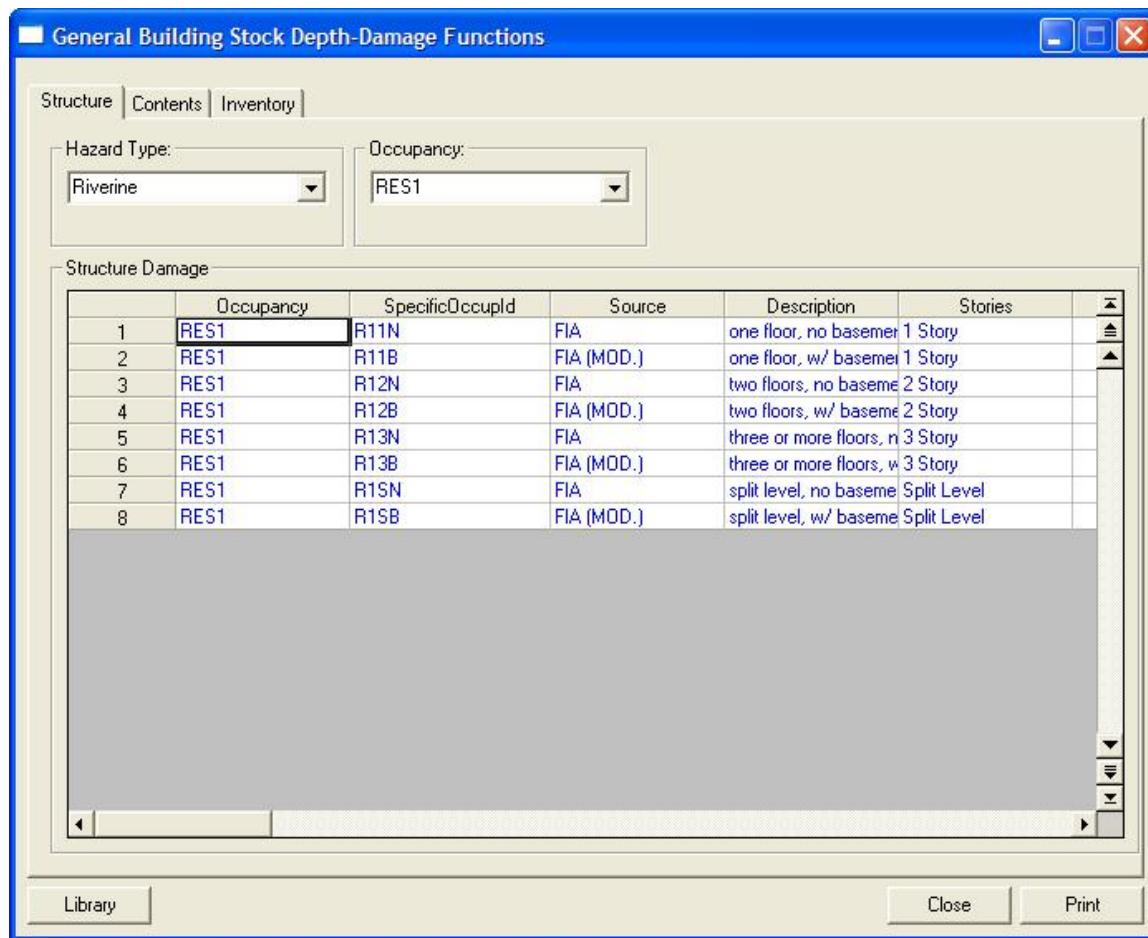
3.2.7.3.1. Analysis Menu: Damage Functions Submenu



Figure 3-168: HAZUS Analysis Menu: Damage Functions Submenu

- a. The damage functions submenu allows the user to view and work with the damage functions used to estimate damages to inventory items. The damage functions are unique to the flood model and have been developed through multiple government agencies and expert opinion.
- b. The user shall be able to select between Buildings, Essential Facilities, Transportation Systems, Utility Systems, Agricultural Products, and Vehicles. Each will be discussed in further detail in later sections.
- c. The user has the option to re-assign damage functions to occupancies or structures. Changes on this level are managed in the study region and not the specific scenario.

3.2.7.3.1.1. Analysis Menu, Damage Functions Submenu: Buildings Dialog



**Figure 3-169: HAZUS Analysis Menu, Damage Functions Submenu:
Building Dialog and Structure Tab**

- Selection of the Buildings submenu item opens the dialog shown above. This dialog is built on the standard HAZUS flood dialog allows the user to view and work with the damage functions for the General Building Stock. The dialog has the following features:
 - The dialog has three tabs. The tabs are labeled Structure, Contents, and Inventory. Structure is the default view.
 - The dialog has two combo boxes. The combo boxes are labeled Hazard Type and Occupancy. The combo boxes are available on all three tabs.
 - The dialog does not have radio buttons.

- d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. Data for the data grid is stored in the tables ‘fIBldgStructDmgFn’, ‘fIBldgStructDmgRES1_2UnionDetails’, ‘fIBldgContDmgRES3UnionDetails’, ‘fIBldgContDmgNonResUnionDetails’, and ‘fIBldgStructDmgXRef’.
- c. The data view for this dialog is absv_BldgStructDmgFn.
- d. The Hazard Type combo box allows the user to choose between Riverine, Coastal A-Zone, and Coastal V-Zone damage functions. Riverine is the default value for the combo box
- a. Selection of Riverine (the default) allows the user to view damage functions assigned to the occupancy classifications for riverine inundation.
 - b. Selection of Coastal A-Zone allows the user to view the A-Zone damage functions assigned to the occupancy classifications for coastal inundation.
 - c. Selection of Coastal V-Zone allows the user to view the V-Zone damage functions assigned to the occupancy classifications for coastal inundation.
- e. The Occupancy combo box allows the user to navigate over the general building occupancy classifications. Options include RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, AG1, REL1, GOV1, GOV2, EDU1, and EDU2. RES1 is the default value for the combo box.
- f. A data grid labeled Structure Damage displays the assigned damage functions related to the selected hazard type shown in the Hazard Type combo box and occupancy shown in the Occupancy combo box.

- a. For example: Hazard Type Coastal V-zone and Occupancy COM1 shows all assigned damage functions for the occupancy of COM1 (including the Low rise No basement (C1LN), Low rise with Basement (C1LB), Mid-rise No basement (C1MN), Mid-rise with Basement (C1MB), High rise No basement(C1HN), and High rise with Basement (C1HB)).
- b. The data grid is not editable and all text is displayed in blue.
- c. If the user has changed the assignment of a damage function from the default value, it is highlighted with a yellow shading to ensure the user is aware that a default value is not being used.
- d. Columns are Occupancy, SpecificOccupID, Source, Description, Stories, Comment, DefaultFn (check boxes), Editable (check boxes), Selected (check boxes), -4 ft, -3 ft, -2 ft, -1 ft, 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, 11 ft, 12 ft, 13 ft, 14 ft, 15 ft, 16 ft, 17 ft, 18 ft, 19 ft, 20 ft, 21 ft, 22 ft, 23 ft, 24 ft, ID, Basement (check boxes), HazardRiverine (check boxes), HazardCV (check boxes), and HazardCA (check boxes).
- g. Selection of the command button Library opens up a library of structure damage functions. The library is discussed in section below.
- h. Selection of command button close closes the General Building Stock Depth-damage Functions dialog and returns the user to the base map view.
- i. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.1.1. Analysis Menu, Damage Function Submenu: Buildings, Structure Tab, Library Dialog

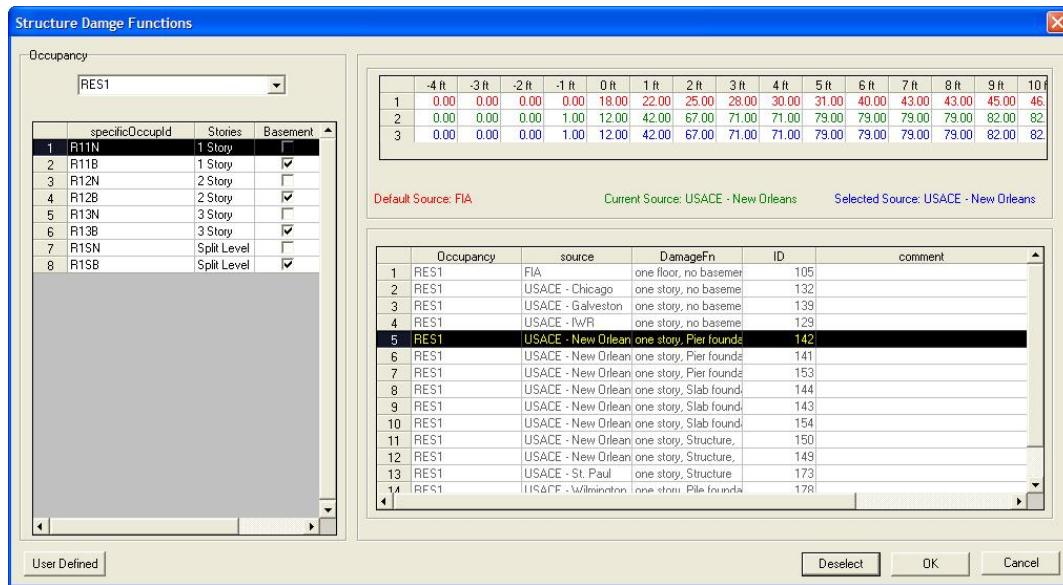


Figure 3-170: HAZUS Analysis Menu, Damage Functions Submenu: Building, Structure Tab, and Library Dialog

- On the Structure tab of the Buildings dialog clicking on the command button Library opens the dialog shown above. The dialog is a custom dialog that allows the user to view the default damage function, compare to multiple optional functions, and to select or assign a different function. The dialog has the following features:
 - The dialog does not have tabs.
 - The dialog has a combo box labeled Occupancy. RES1 is the default value.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box.
 - The dialog has three data grids that display information necessary for the user to view and select alternative damage functions.
 - The dialog has command buttons labeled User Defined, Select (changes to Deselect if the user has selected a function), OK, and Print.

- b. Data for the data grid is stored in the tables ‘fIBldgStructDmgFn’, ‘fIBldgStructDmgRES1_2UnionDetails’, ‘fIBldgStructDmgRES3UnionDetails’, ‘fIBldgStructDmgNonResUnionDetails’, and ‘fIBldgStructDmgXRef’.
- c. The data view for this dialog is absv_BldgStructDmgFn.
- d. The combo box labeled Occupancy allows the user to select the occupancy that of interest to them. Options include RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, AGR1, REL1, GOV1, GOV2, EDU1, and EDU2.
 - a. Depending on the selection of Occupancy, the data grids will display information directly relevant to that occupancy.
- e. The left most data grid displays the specific occupancy used by the flood model for the assignment of damage functions. The specific occupancy is defined as follows:

Specific Occupancy	Stories	Foundation	Specific Occupancy IDs
RES1	1	No basement	R11N
RES1	1	Basement	R11B
RES1	2	No Basement	R12N
RES1	2	Basement	R12B
RES1	3	No Basement	R13N
RES1	3	Basement	R13B
RES1	Split Level	No Basement	R1SN
RES1	Split Level	Basement	R1SB
RES2	1	No Basement	R21N
RES2	1	Basement	R21B
RES3A	1 to 2	No Basement	R3A1N
RES3A	1 to 2	Basement	R3A1B
RES3A	3 to 4	No Basement	R3A3N
RES3A	3 to 4	Basement	R3A3B
RES3A	5 plus	No Basement	R3A5N
RES3A	5 plus	Basement	R3A5B
RES3B	1 to 2	No Basement	R3B1N
RES3B	1 to 2	Basement	R3B1B
RES3B	3 to 4	No Basement	R3B3N
RES3B	3 to 4	Basement	R3B3B
RES3B	5 plus	No Basement	R3B5N

Specific Occupancy	Stories	Foundation	Specific Occupancy IDs
RES3B	5 plus	Basement	R3B5B
RES3C	1 to 2	No Basement	R3C1N
RES3C	1 to 2	Basement	R3C1B
RES3C	3 to 4	No Basement	R3C3N
RES3C	3 to 4	Basement	R3C3B
RES3C	5 plus	No Basement	R3C5N
RES3C	5 plus	Basement	R3C5B
RES3D	1 to 2	No Basement	R3D1N
RES3D	1 to 2	Basement	R3D1B
RES3D	3 to 4	No Basement	R3D3N
RES3D	3 to 4	Basement	R3D3B
RES3D	5 plus	No Basement	R3D5N
RES3D	5 plus	Basement	R3D5B
RES3E	1 to 2	No Basement	R3E1N
RES3E	1 to 2	Basement	R3E1B
RES3E	3 to 4	No Basement	R3E3N
RES3E	3 to 4	Basement	R3E3B
RES3E	5 plus	No Basement	R3E5N
RES3E	5 plus	Basement	R3E5B
RES3F	1 to 2	No Basement	R3F1N
RES3F	1 to 2	Basement	R3F1B
RES3F	3 to 4	No Basement	R3F3N
RES3F	3 to 4	Basement	R3F3B
RES3F	5 plus	No Basement	R3F5N
RES3F	5 plus	Basement	R3F5B
RES4	Low	No Basement	R4LN
RES4	Low	Basement	R4LB
RES4	Mid	No Basement	R4MN
RES4	Mid	Basement	R4MB
RES4	High	No Basement	R4HN
RES4	High	Basement	R4HB
RES5	Low	No Basement	R5LN
RES5	Low	Basement	R5LB
RES5	Mid	No Basement	R5MN
RES5	Mid	Basement	R5MB
RES5	High	No Basement	R5HN
RES5	High	Basement	R5HB
RES6	Low	No Basement	R6LN
RES6	Low	Basement	R6LB
RES6	Mid	No Basement	R6MN
RES6	Mid	Basement	R6MB
RES6	High	No Basement	R6HN
RES6	High	Basement	R6HB
COM1	Low	No Basement	C1LN

Specific Occupancy	Stories	Foundation	Specific Occupancy IDs
COM1	Low	Basement	C1LB
COM1	Mid	No Basement	C1MN
COM1	Mid	Basement	C1MB
COM1	High	No Basement	C1HN
COM1	High	Basement	C1HB
COM2	Low	No Basement	C2LN
COM2	Low	Basement	C2LB
COM2	Mid	No Basement	C2MN
COM2	Mid	Basement	C2MB
COM2	High	No Basement	C2HN
COM2	High	Basement	C2HB
COM1	Low	No Basement	C1LN
COM3	Low	Basement	C3LB
COM3	Mid	No Basement	C3MN
COM3	Mid	Basement	C3MB
COM3	High	No Basement	C3HN
COM3	High	Basement	C3HB
COM4	Low	No Basement	C4LN
COM4	Low	Basement	C4LB
COM4	Mid	No Basement	C4MN
COM4	Mid	Basement	C4MB
COM4	High	No Basement	C4HN
COM4	High	Basement	C4HB
COM5	Low	No Basement	C5LN
COM5	Low	Basement	C5LB
COM5	Mid	No Basement	C5MN
COM5	Mid	Basement	C5MB
COM5	High	No Basement	C5HN
COM5	High	Basement	C5HB
COM6	Low	No Basement	C6LN
COM6	Low	Basement	C6LB
COM6	Mid	No Basement	C6MN
COM6	Mid	Basement	C6MB
COM6	High	No Basement	C6HN
COM6	High	Basement	C6HB
COM7	Low	No Basement	C7LN
COM7	Low	Basement	C7LB
COM7	Mid	No Basement	C7MN
COM7	Mid	Basement	C7MB
COM7	High	No Basement	C7HN
COM7	High	Basement	C7HB
COM8	Low	No Basement	C8LN
COM8	Low	Basement	C8LB
COM8	Mid	No Basement	C8MN

Specific Occupancy	Stories	Foundation	Specific Occupancy IDs
COM8	Mid	Basement	C8MB
COM8	High	No Basement	C8HN
COM8	High	Basement	C8HB
COM9	Low	No Basement	C9LN
COM9	Low	Basement	C9LB
COM9	Mid	No Basement	C9MN
COM9	Mid	Basement	C9MB
COM9	High	No Basement	C9HN
COM9	High	Basement	C9HB
COM10	Low	No Basement	C10LN
COM10	Low	Basement	C10LB
COM10	Mid	No Basement	C10MN
COM10	Mid	Basement	C10MB
COM10	High	No Basement	C10HN
COM10	High	Basement	C10HB
IND1	Low	No Basement	I1LN
IND1	Low	Basement	I1LB
IND1	Mid	No Basement	I1MN
IND1	Mid	Basement	I1MB
IND1	High	No Basement	I1HN
IND1	High	Basement	I1HB
IND2	Low	No Basement	I2LN
IND2	Low	Basement	I2LB
IND2	Mid	No Basement	I2MN
IND2	Mid	Basement	I2MB
IND2	High	No Basement	I2HN
IND2	High	Basement	I2HB
IND3	Low	No Basement	I3LN
IND3	Low	Basement	I3LB
IND3	Mid	No Basement	I3MN
IND3	Mid	Basement	I3MB
IND3	High	No Basement	I3HN
IND3	High	Basement	I3HB
IND4	Low	No Basement	I4LN
IND4	Low	Basement	I4LB
IND4	Mid	No Basement	I4MN
IND4	Mid	Basement	I4MB
IND4	High	No Basement	I4HN
IND4	High	Basement	I4HB
IND5	Low	No Basement	I5LN
IND5	Low	Basement	I5LB
IND5	Mid	No Basement	I5MN
IND5	Mid	Basement	I5MB
IND5	High	No Basement	I5HN

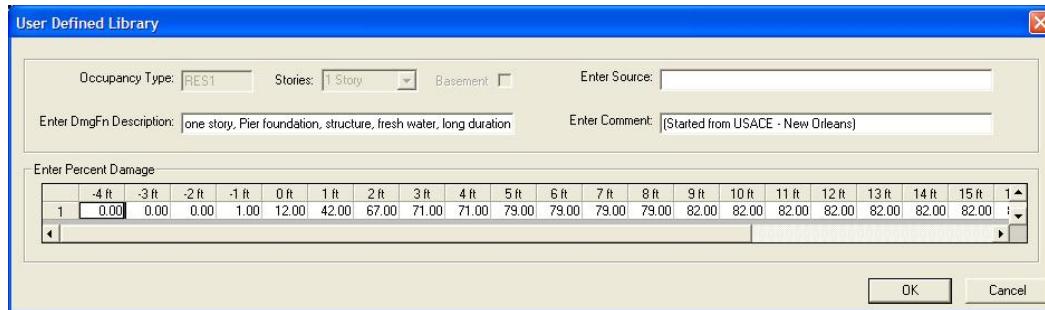
Specific Occupancy	Stories	Foundation	Specific Occupancy IDs
IND5	High	Basement	I5HB
IND6	Low	No Basement	I6LN
IND6	Low	Basement	I6LB
IND6	Mid	No Basement	I6MN
IND6	Mid	Basement	I6MB
IND6	High	No Basement	I6HN
IND6	High	Basement	I6HB
AGR1	Low	No Basement	A1LN
AGR1	Low	Basement	A1LB
AGR1	Mid	No Basement	A1MN
AGR1	Mid	Basement	A1MB
AGR1	High	No Basement	A1HN
AGR1	High	Basement	A1HB
REL1	Low	No Basement	R1LN
REL1	Low	Basement	R1LB
REL1	Mid	No Basement	R1MN
REL1	Mid	Basement	R1MB
REL1	High	No Basement	R1HN
REL1	High	Basement	R1HB
GOV1	Low	No Basement	G1LN
GOV1	Low	Basement	G1LB
GOV1	Mid	No Basement	G1MN
GOV1	Mid	Basement	G1MB
GOV1	High	No Basement	G1HN
GOV1	High	Basement	G1HB
GOV2	Low	No Basement	G2LN
GOV2	Low	Basement	G2LB
GOV2	Mid	No Basement	G2MN
GOV2	Mid	Basement	G2MB
GOV2	High	No Basement	G2HN
GOV2	High	Basement	G2HB
EDU1	Low	No Basement	E1LN
EDU1	Low	Basement	E1LB
EDU1	Mid	No Basement	E1MN
EDU1	Mid	Basement	E1MB
EDU1	High	No Basement	E1HN
EDU1	High	Basement	E1HB
EDU2	Low	No Basement	E2LN
EDU2	Low	Basement	E2LB
EDU2	Mid	No Basement	E2MN
EDU2	Mid	Basement	E2MB
EDU2	High	No Basement	E2HN
EDU2	High	Basement	E2HB

- f. The left most data grid columns are labeled: SpecificOccupId, Stories, Basement (check box), and ID.
- g. The top data grid is designed to display several damage functions at the same time to allow the user to review the default function versus alternative selections.
 - a. The data grid has columns -4 ft, -3 ft, -2 ft, -1 ft, 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, 11 ft, 12 ft, 13 ft, 14 ft, 15 ft, 16 ft, 17 ft, 18 ft, 19 ft, 20 ft, 21 ft, 22 ft, 23 ft, 24 ft,
 - b. The top data grid has unique text control that colors the text to allow the user quick visualization of the data they are reviewing.
 - i. Default damage functions are displayed on the top line of the grid and in red text.
 - ii. The middle line of the data grid displays any damage function in the lower data grid that the user highlights through mouse selection. This data is displayed in green text.
 - iii. If the user uses the command button select, the third line in the data grid displays the selected damage function in blue text.
 - iv. Within the data frame of the data grid, the source of the damage functions is displayed. The source of the default, the highlighted, and the selected.
- h. The bottom data grid displays the library of potential damage functions that the user can select from. The library was developed from FEMA and USACE published depth damage curves. In FEMA's case, the curves are based on data from the NFIP program. In the case of the USACE, each district and the Institute for Water Resources each develop functions based on observed damages.
 - a. The data is not editable.
 - b. The data grid has columns labeled Occupancy, source, Damagefn, ID, Comment, Selected, Editable, defaultfn.

- c. If the user highlights any damage function in the lower data grid, it is displayed in the center row of the data grid above, in green text (meaning the currently highlighted function). The Select command button is also enabled allowing the user to select that function as an alternative to the default damage function.
 - d. The user cannot select a different damage function as a default – they can just use alternate functions in their given study region.
- i. Selection of the Select Command button causes the highlighted damage function to be displayed in the third row of the top data grid in blue text. The function is also displayed in the bottom data grid in blue text.
- a. Selection of a damage function changes a flag that tells the flood model to use this damage function in place of the default.
 - b. The Select command button becomes Deselect allowing the user to restore the default function if they so choose. To Deselect, the user must highlight the selected function (blue text in the bottom data grid) and hit Deselect. If the user highlights any other function the command button returns to Select allowing the user to override their previous selection.
- j. Selection of OK closes the Structure Damage Functions dialog and returns the user to the General Building Stock Depth-Damage Functions dialog. If the user has selected an alternative function that function can be seen on the open screen assuming the user selects the appropriate Occupancy and Hazard Type in the combo boxes. This damage function is used in subsequent loss calculations. If the user has not selected any alternative functions, the defaults are used.
- k. Selection of Cancel closes the Structure Damage Functions dialog and returns the user to the General Building Stock Depth-Damage Functions dialog. If the user has selected an alternative damage function, that selection is not maintained.
- l. Selection of the User Defined command button opens the dialog discussed in the subsection below.

- a. The user can either go to the User Defined command button using the default damage function as the base, or they can select a damage function (using the Select command button) and then use the User Defined command button to work off that selected damage function.

3.2.7.3.1.1.1. Analysis Menu, Damage Function Submenu: Buildings, Structure Tab, Library, User Defined Dialog.



**Figure 3-171: HAZUS Analysis Menu, Damage Functions Submenu:
Building, Structure Tab, Library, and User Defined Dialog**

- a. Selection of the User Defined command button on the Library dialog opens the dialog shown above. The dialog allows the user to create their own damage function starting with any damage function of their choice. This feature was provided to make it easier for users to create new functions without having to start from scratch. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog has a disabled combo box labeled Stories. The value shown is the value of either the default damage function or a function the user may have highlighted before using the command button.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a disabled check box labeled basement. This value is either checked or unchecked depending on the source damage function.
 - e. The dialog has four text boxes labeled Occupancy Type, Enter Source, Enter DmgFn Description, and Enter Comment. Occupancy Type is not editable and

grayed out displaying the value of the source damage function. The other text boxes are editable.

- f. The dialog has a data grid that displays the damage values the user wants to start working with. The grid is editable and is labeled Enter Percent Damage.
 - g. The dialog has command buttons labeled OK, and Cancel.
- b. Data for the data grid is stored in the table f1BldgStructDmgFn.
 - c. There is no data view for this dialog.
 - d. The Enter Source text box allows the user to provide a name for the source of their damage function (if they are looking at a published report or creating their own). If the user selects OK without completing this box, the following error message.



Figure 3-172: Enter Source Error Message

- e. The Enter DmgFn Description is pre-populated with the Description from the damage function the user started with. The user can then alter this information to better describe their custom damage function.
- f. The Enter Comment text box is pre-populated with a sentence that shows the damage function the user started with. For example they can see (Started from FIA). The user can input any value here.
- g. The data grid has columns labeled -4 ft, -3 ft, -2 ft, -1 ft, 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, 11 ft, 12 ft, 13 ft, 14 ft, 15 ft, 16 ft, 17 ft, 18 ft, 19 ft, 20 ft, 21 ft, 22 ft, 23 ft, and 24 ft.

- a. The user must double click on a given grid cell to change the value. The user can enter any value (integer or decimal).
- b. Input of unrealistic damage functions causes the following error message to be displayed.

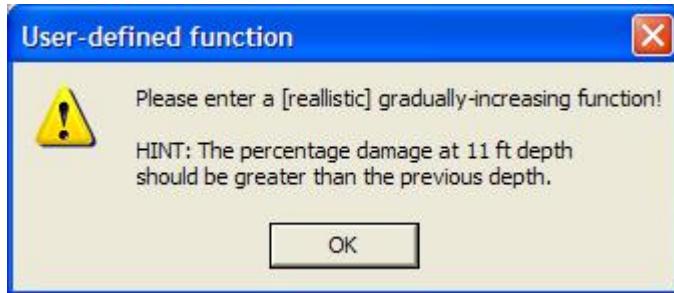
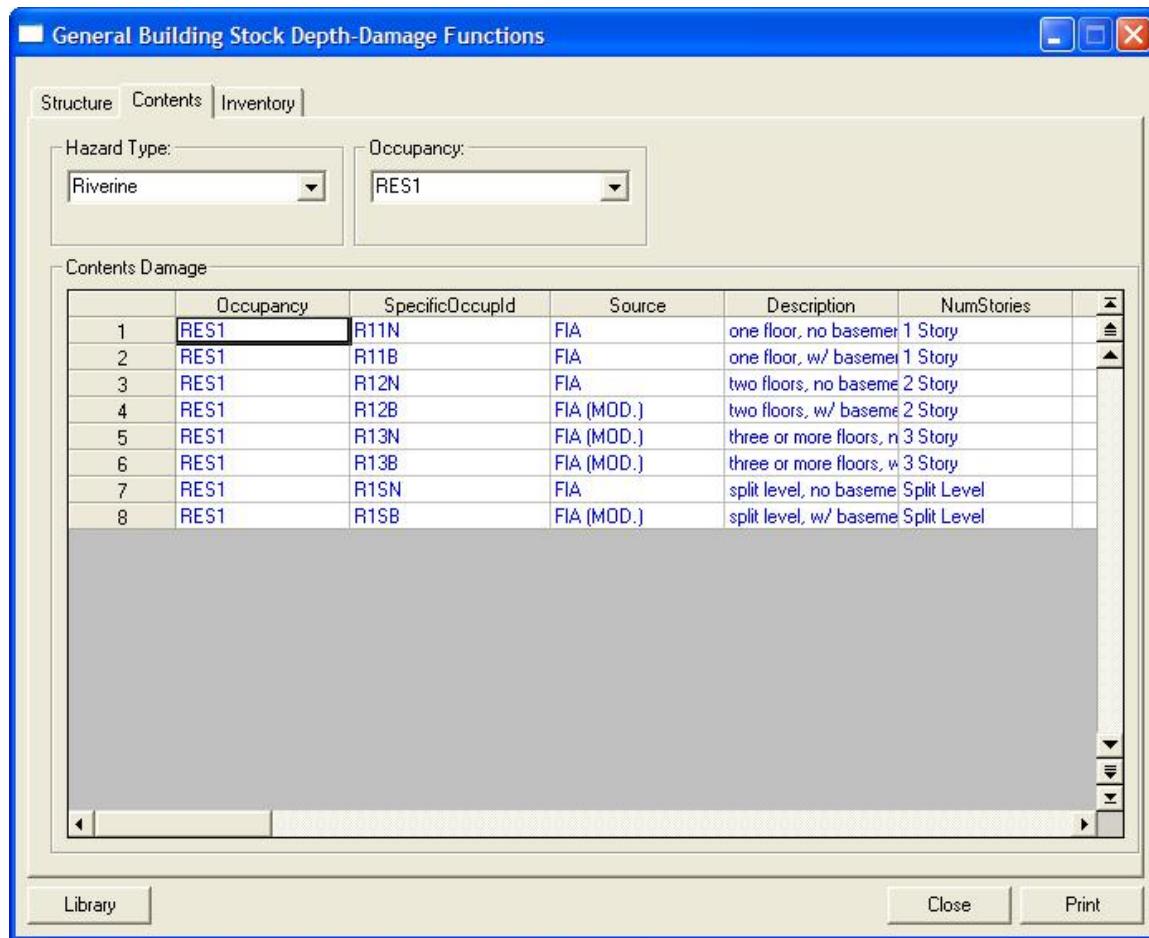


Figure 3-173: User Defined Damage Function Input Error Message

- h. Selection of OK save the user edits and adds the function to the library for the user to either use or not. The model does not automatically select the new function. The User Defined dialog closes and returns the user to the Structure Damage Function dialog.
- i. Selection of Cancel closes the User Defined dialog without saving any changes. The user is returned to the Structure Damage Function dialog.

3.2.7.3.1.1.2. Analysis Menu, Damage Function Submenu: Buildings Dialog, Contents Tab



**Figure 3-174: HAZUS Analysis Menu, Damage Functions Submenu:
General Building Stock Damage Function, Contents Tab**

- Selection of the Contents tab opens the dialog shown above. This dialog is built on the standard HAZUS flood dialog allows the user to view and work with the damage functions for the General Building Stock contents damage assessment. The dialog has the following features:
 - The dialog has three tabs. The tabs are labeled Structure, Contents, and Inventory. Structure is the default view.
 - The dialog has two combo boxes. The combo boxes are labeled Hazard Type and Occupancy. The combo boxes are available on all three tabs.

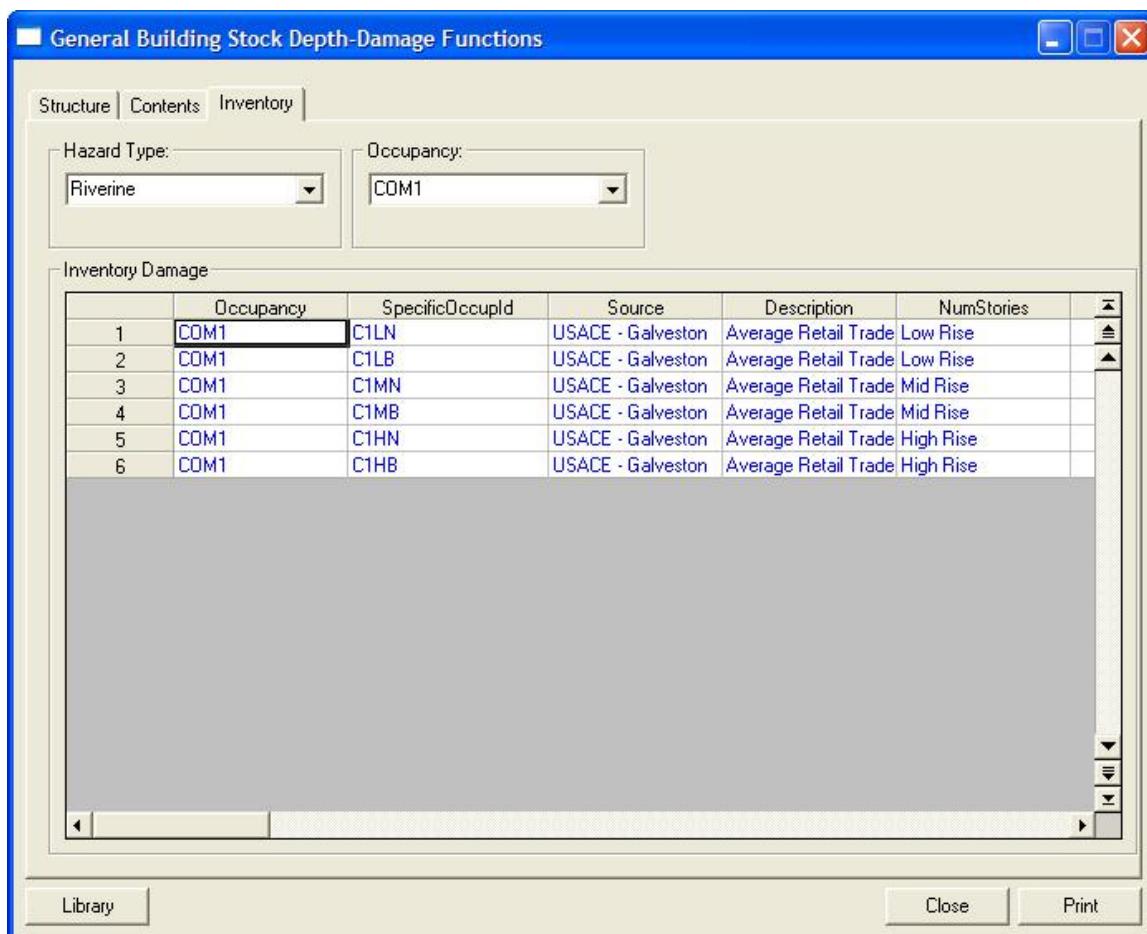
- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. Data for the data grid is stored in the tables ‘flBldgContDmgFn’, ‘flBldgContDmgRES1_2UnionDetails’, ‘flBldgContDmgRES3UnionDetails’, ‘flBldgContDmgNonResUnionDetails’, and ‘flBldgContDmgXRef’.
- c. The data view for this dialog is absv_BldgContDmgFn.
- d. The Hazard Type combo box allows the user to choose between Riverine, Coastal A-Zone, and Coastal V-Zone damage functions. Riverine is the default value for the combo box.
 - a. Selection of Riverine (the default) allows the user to view damage functions assigned to the occupancy classifications for riverine inundation.
 - b. Selection of Coastal A-Zone allows the user to view the A-Zone damage functions assigned to the occupancy classifications for coastal inundation.
 - c. Selection of Coastal V-Zone allows the user to view the V-Zone damage functions assigned to the occupancy classifications for coastal inundation.
- e. The Occupancy combo box allows the user to navigate over the general building occupancy classifications. Options include RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, AG1, REL1, GOV1, GOV2, EDU1, and EDU2. RES1 is the default value for the combo box.

- f. A data grid labeled Contents Damage displays the assigned damage functions related to the selected hazard type shown in the Hazard Type combo box and occupancy shown in the Occupancy combo box.
 - a. For example: Hazard Type Coastal V-zone and Occupancy COM1 shows all assigned damage functions for the occupancy of COM1 (including the Low rise No basement (C1LN), Low rise with Basement (C1LB), Mid-rise No basement (C1MN), Mid-rise with Basement (C1MB), High rise No basement(C1HN), and High rise with Basement (C1HB)).
 - b. The data grid is not editable and all text is displayed in blue.
 - c. If the user has changed the assignment of a damage function from the default value, it is highlighted with a yellow shading to ensure the user is aware that a default value is not being used.
- g. Columns are Occupancy, SpecificOccupID, Source, Description, Stories, Comment, DefaultFn (check boxes), Editable (check boxes), Selected (check boxes), -4 ft, -3 ft, -2 ft, -1 ft, 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, 11 ft, 12 ft, 13 ft, 14 ft, 15 ft, 16 ft, 17 ft, 18 ft, 19 ft, 20 ft, 21 ft, 22 ft, 23 ft, 24 ft, ID, Basement (check boxes), HazardRiverine (check boxes), HazardCV (check boxes), and HazardCA (check boxes).
- h. Selection of the command button Library opens up a library of structure damage functions. The Contents Library functions exactly as the Structure library discussed above. For this reason, the functions are incorporated by reference here rather than repeating the section.
 - a. Likewise, the User Defined function on the Content Library also functions exactly as discussed for the Structure damage functions. Again, in order to save time and space the functionality is incorporated by reference here.
- i. Selection of command button ‘Close’ closes the General Building Stock Depth-damage Functions dialog and returns the user to the base map view.
- j. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.

- k. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.1.3. Analysis Menu, Damage Function Submenu: Buildings Dialog, Inventory Tab



**Figure 3-175: HAZUS Analysis Menu, Damage Functions Submenu:
General Building Stock Damage Function, Inventory Tab**

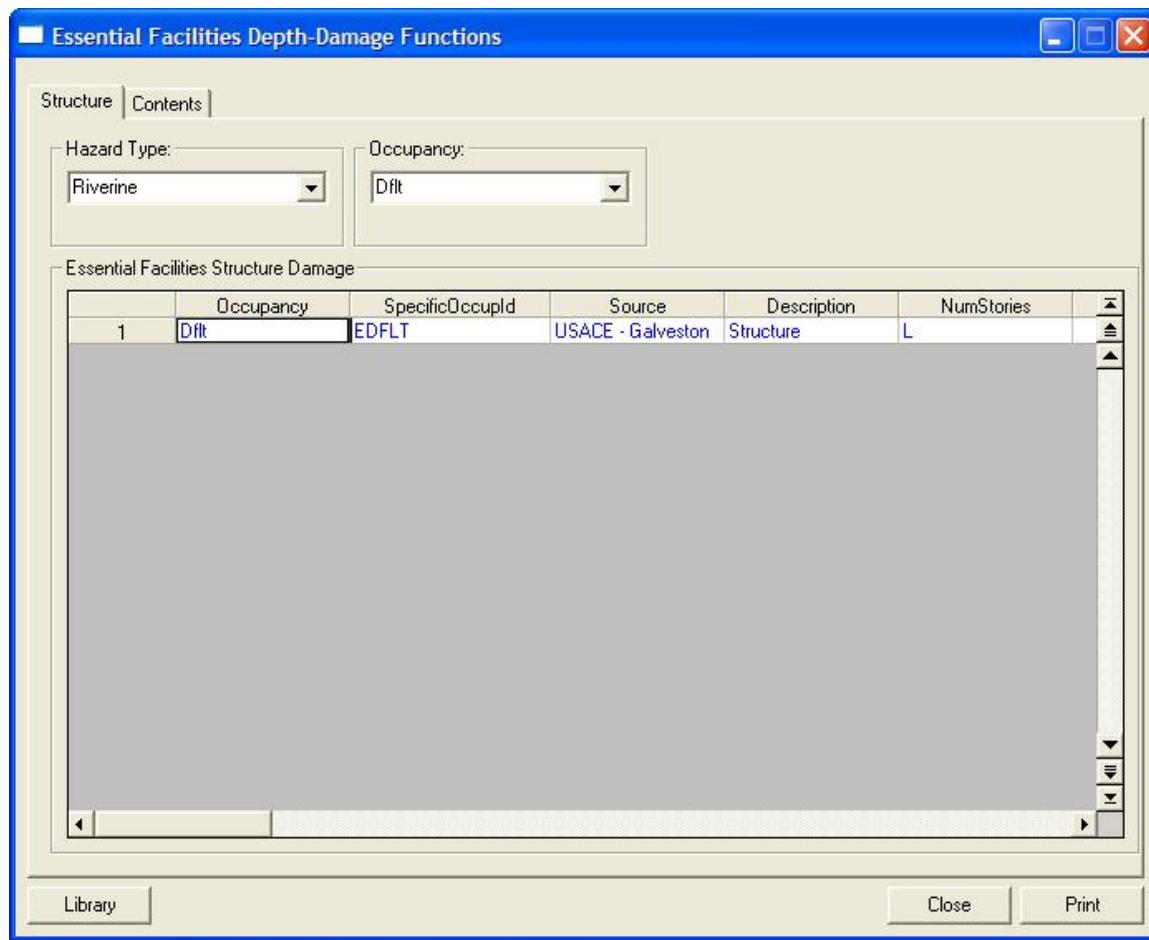
- a. Selection of the Inventory tab opens the dialog shown above. This dialog is built on the standard HAZUS flood dialog allows the user to view and work with the damage functions for the General Building Stock inventory damage assessment. The dialog has the following features:
 - a. The dialog has three tabs. The tabs are labeled Structure, Contents, and Inventory. Structure is the default view.
 - b. The dialog has two combo boxes. The combo boxes are labeled Hazard Type and Occupancy. The combo boxes are available on all three tabs.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. Data for the data grid is stored in the tables ‘flBldgInvDmgFn’, ‘flBldgInvDmgNonResUnionDetails’, and ‘flBldgInvDmgXRef’.
- c. The data view for this dialog is absv_BldgInvDmgFn.
- d. The Hazard Type combo box allows the user to choose between Riverine, Coastal A-Zone, and Coastal V-Zone damage functions. Riverine is the default value for the combo box.
 - a. Selection of Riverine (the default) allows the user to view damage functions assigned to the occupancy classifications for riverine inundation.
 - b. Selection of Coastal A-Zone allows the user to view the A-Zone damage functions assigned to the occupancy classifications for coastal inundation.
 - c. Selection of Coastal V-Zone allows the user to view the V-Zone damage functions assigned to the occupancy classifications for coastal inundation.

- e. The Occupancy combo box allows the user to navigate over the general building occupancy classifications. Options include RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, AG1, REL1, GOV1, GOV2, EDU1, and EDU2. RES1 is the default value for the combo box.
- f. A data grid labeled Inventory Damage displays the assigned damage functions related to the selected hazard type shown in the Hazard Type combo box and occupancy shown in the Occupancy combo box.
 - a. For example: Hazard Type Coastal V-zone and Occupancy COM1 shows all assigned damage functions for the occupancy of COM1 (including the Low rise No basement (C1LN), Low rise with Basement (C1LB), Mid-rise No basement (C1MN), Mid-rise with Basement (C1MB), High rise No basement(C1HN), and High rise with Basement (C1HB)).
 - b. The data grid is not editable and all text is displayed in blue.
 - c. If the user has changed the assignment of a damage function from the default value, it is highlighted with a yellow shading to ensure the user is aware that a default value is not being used.
- g. Columns are Occupancy, SpecificOccupID, Source, Description, Stories, Comment, DefaultFn (check boxes), Editable (check boxes), Selected (check boxes), -4 ft, -3 ft, -2 ft, -1 ft, 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, 11 ft, 12 ft, 13 ft, 14 ft, 15 ft, 16 ft, 17 ft, 18 ft, 19 ft, 20 ft, 21 ft, 22 ft, 23 ft, 24 ft, ID, Basement (check boxes), HazardRiverine (check boxes), HazardCV (check boxes), and HazardCA (check boxes).
- h. Selection of the command button Library opens up a library of structure damage functions. The Inventory Library functions exactly as the Structure library discussed above. For this reason, the functions are incorporated by reference here rather than repeating the section.
 - a. Likewise, the User Defined function on the Inventory Library also functions exactly as discussed for the Structure damage functions. Again, in order to save time and space the functionality is incorporated by reference here.

- i. Selection of command button 'Close' closes the General Building Stock Depth-damage Functions dialog and returns the user to the base map view.
- j. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- k. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.2. Analysis Menu, Damage Functions Submenu: Essential Facilities Dialog



**Figure 3-176: HAZUS Analysis Menu, Damage Functions Submenu:
Essential Facilities Depth Damage Functions Dialog, Structure Tab**

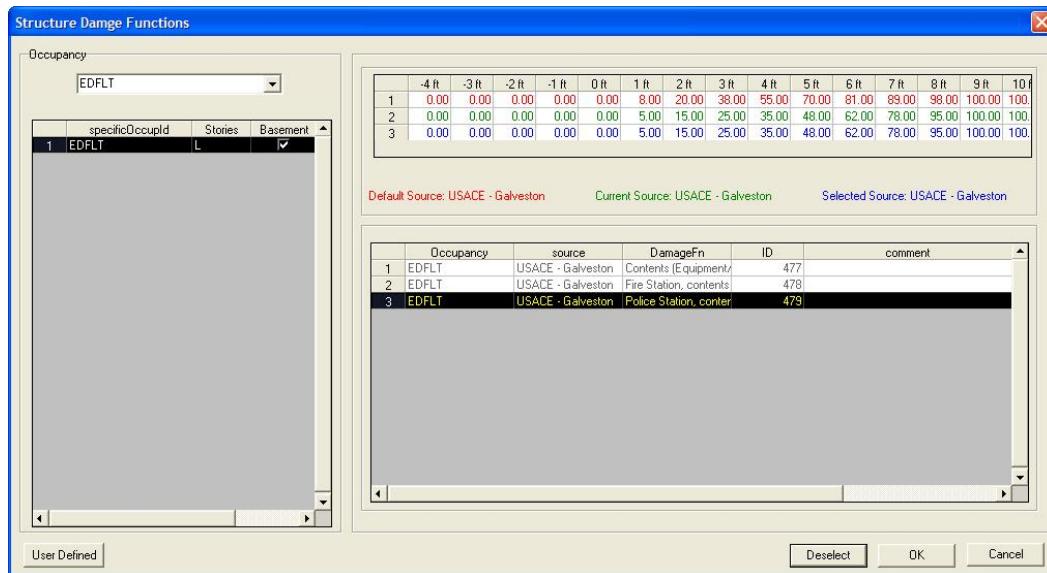
- a. Selection of Essential Facilities on the Damage Functions submenu opens the dialog shown above. This dialog is built on the standard HAZUS flood dialog allows the user to view and work with the damage functions for Essential Facilities. These functions are used for the point level analysis that is conducted for the Essential Facilities data on the Inventory Menu. The dialog has the following features:
 - a. The dialog has two tabs. The tabs are labeled Structure and Contents. Structure is the default view.
 - b. The dialog has two combo boxes. The combo boxes are labeled Hazard Type and Occupancy. The combo boxes are available on both tabs.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. Data for the data grid is stored in the tables ‘fIEssntFltyStructDmgXRef’, ‘fIEssntFltyStructDmgFn’, and ‘fIEssntFltyStructUnionDetails’.
- c. The data view for this dialog is `absv_EssntFltyStructDmgFn`.
- d. The Hazard Type combo box allows the user to choose between Riverine, Coastal A-Zone, and Coastal V-Zone damage functions. Riverine is the default value for the combo box.
- a. Selection of Riverine (the default) allows the user to view damage functions assigned to the occupancy classifications for riverine inundation.
 - b. Selection of Coastal A-Zone allows the user to view the A-Zone damage functions assigned to the occupancy classifications for coastal inundation.
 - c. Selection of Coastal V-Zone allows the user to view the V-Zone damage functions assigned to the occupancy classifications for coastal inundation.
- e. The Occupancy combo box allows the user to navigate over the essential facilities occupancy classifications. Options include EDFLT, EFFS, EFPS, EFEQ, EFHS, EFHM, EFHL, EFMC, EFS1, EFS2, FDFLT, MDFLT, PDFLT, and SDFLT. EDFLT is the default value for the combo box.
- f. A data grid labeled Essential Facilities Structure Damage displays the assigned damage functions related to the selected hazard type shown in the Hazard Type combo box and occupancy shown in the Occupancy combo box.

- a. For example: Hazard Type Coastal V-zone and Occupancy EFPS shows all assigned damage functions for the occupancy of EFPS. In every case, this is a single damage function since the Occupancy is descriptive.
- b. The data grid is not editable and all text is displayed in blue.
- c. If the user has changed the assignment of a damage function from the default value, it is highlighted with a yellow shading to ensure the user is aware that a default value is not being used.
- g. Columns are Occupancy, SpecificOccupID, Source, Description, NumStories, Comment, DefaultFn (check boxes), Editable (check boxes), Selected (check boxes), -4 ft, -3 ft, -2 ft, -1 ft, 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, 11 ft, 12 ft, 13 ft, 14 ft, 15 ft, 16 ft, 17 ft, 18 ft, 19 ft, 20 ft, 21 ft, 22 ft, 23 ft, 24 ft, ID, Basement (check boxes), HazardRiverine (check boxes), HazardCV (check boxes), and HazardCA (check boxes).
- h. Selection of the command button Library opens up a library of Essential Facilities structure damage functions. The function of the Essential Facilities Library is discussed below.
- i. Selection of command button 'Close' closes the Essential Facilities Depth damage Functions dialog and returns the user to the base map view.
- j. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- k. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.2.1. Analysis Menu, Damage Function Submenu: Essential Facilities, Structure Tab, Library Dialog



**Figure 3-177: HAZUS Analysis Menu, Damage Functions Submenu:
Essential Facilities, Structure Tab, and Library Dialog**

- On the Structure tab of the Essential Facilities Depth-Damage dialog clicking on the command button Library opens the dialog shown above. The dialog is a custom dialog that allows the user to view the default damage function, compare to multiple optional functions, and to select or assign a different function. The dialog has the following features:
 - The dialog does not have tabs.
 - The dialog has a combo box labeled Occupancy. EDFLT is the default value.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box.
 - The dialog has three data grids that display information necessary for the user to view and select alternative damage functions.
 - The dialog has command buttons labeled User Defined, Select (changes to Deselect if the user has selected a function), OK, and Print.

- b. Data for the data grid is stored in the tables ‘fIEssntFltyStructDamXRef’, ‘fIEssntFltyStructDmgFn’, and ‘fIEssntFltyStructUnionDetails’.
- c. The data view for this dialog is absv_EssntFltyStructDmgFn.
- d. The combo box labeled Occupancy allows the user to select the occupancy that of interest to them. Options include EDFLT, EFFS, EFPS, EFEQ, EFHS, EFHM, EFHL, EFMC, EFS1, EFS2, FDFLT, MDFLT, PDFLT, and SDFLT.
 - a. Depending on the selection of Occupancy, the data grids will display information directly relevant to that occupancy.
- e. The left most data grid displays the specific occupancy used by the flood model for the assignment of damage functions.
 - a. The left most data grid columns are labeled: SpecificOccupId, Stories, Basement (check box), and ID.
- f. The top data grid is designed to display several damage functions at the same time to allow the user to review the default function versus alternative selections.
 - a. The data grid has columns -4 ft, -3 ft, -2 ft, -1 ft, 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, 11 ft, 12 ft, 13 ft, 14 ft, 15 ft, 16 ft, 17 ft, 18 ft, 19 ft, 20 ft, 21 ft, 22 ft, 23 ft, and 24 ft.
 - b. The top data grid has unique text control that colors the text to allow the user quick visualization of the data they are reviewing.
 - i. Default damage functions are displayed on the top line of the grid and in red text.
 - ii. The middle line of the data grid displays any damage function in the lower data grid that the user highlights through mouse selection. This data is displayed in green text.
 - iii. If the user uses the command button select, the third line in the data grid displays the selected damage function in blue text.

- iv. Within the data frame of the data grid, the source of the damage functions is displayed. The source of the default, the highlighted, and the selected.
- g. The bottom data grid displays the library of potential damage functions that the user can select from. The library was developed by selecting damage functions from the General Building stock damage functions that were deemed by a panel of experts to be applicable to each of the specific Essential Facilities for the analysis of structure damage. Sources include FEMA and USACE published depth damage curves.
 - a. The data is not editable.
 - b. The data grid has columns labeled Occupancy, source, Damagefn, ID, Comment, Selected, Editable, defaultfn.
 - c. If the user highlights any damage function in the lower data grid, it is displayed in the center row of the data grid above, in green text (meaning the currently highlighted function). The Select command button is also enabled allowing the user to select that function as an alternative to the default damage function.
 - d. The user cannot select a different damage function as a default – they can just use alternate functions in their given study region.
- h. Selection of the Select Command button causes the highlighted damage function to be displayed in the third row of the top data grid in blue text. The function is also displayed in the bottom data grid in blue text.
 - a. Selection of a damage function changes a flag that tells the flood model to use this damage function in place of the default.
 - b. The Select command button becomes Deselect allowing the user to restore the default function if they so choose. To Deselect, the user must highlight the selected function (blue text in the bottom data grid) and hit Deselect. If the user highlights any other function the command button returns to 'Select' allowing the user to override their previous selection.
- i. Selection of OK closes the Structure Damage Functions dialog and returns the user to the Essential Facilities Depth-Damage Functions dialog. If the user has selected an alternative

function that function can be seen on the open screen assuming the user selects the appropriate Occupancy and Hazard Type in the combo boxes. This damage function is used in subsequent loss calculations. If the user has not selected any alternative functions, the defaults are used.

- j. Selection of Cancel closes the Structure Damage Functions dialog and returns the user to the Essential Facilities Depth-Damage Functions dialog. If the user has selected an alternative damage function, that selection is not maintained.
- k. Selection of the User Defined command button opens the dialog discussed in the subsection below.
 - a. The user can either go to the User Defined command button using the default damage function as the base, or they can select a damage function (using the Select command button) and then use the User Defined command button to work off that selected damage function.

3.2.7.3.1.2.1.1. Analysis Menu, Damage Function Submenu: Essential Facilities, Structure Tab, Library, User Defined Dialog.

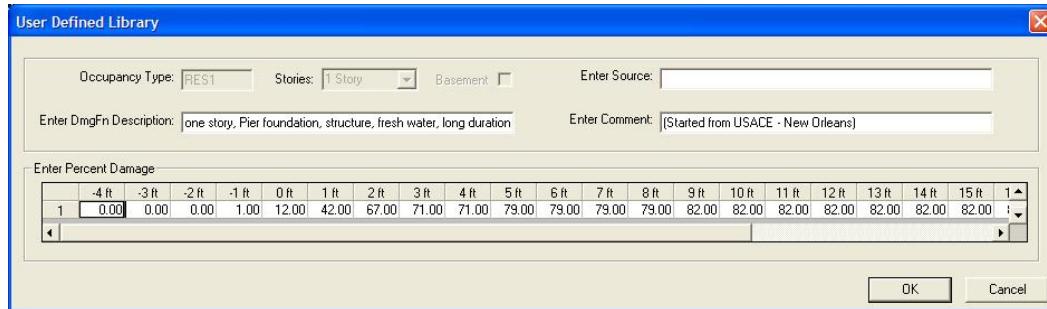


Figure 3-178: HAZUS Analysis Menu, Damage Functions Submenu: Essential Facilities, Structure Tab, Library, and User Defined Dialog

- a. Selection of the User Defined command button on the Library dialog opens the dialog shown above. The dialog allows the user to create their own damage function starting with any damage function of their choice. This feature was provided to make it easier for users to create new functions without having to start from scratch. The dialog has the following features:

- a. The dialog does not have tabs.
 - b. The dialog has a disabled combo box labeled Stories. The value shown is the value of either the default damage function or a function the user may have highlighted before using the command button.
 - c. The dialog does not have radio buttons.
 - d. The dialog has a disabled check box labeled basement. This value is either checked or unchecked depending on the source damage function.
 - e. The dialog has four text boxes labeled Occupancy Type, Enter Source, Enter DmgFn Description, and Enter Comment. Occupancy Type is not editable and grayed out displaying the value of the source damage function. The other text boxes are editable.
 - f. The dialog has a data grid that displays the damage values the user wants to start working with. The grid is editable and is labeled Enter Percent Damage.
 - g. The dialog has command buttons labeled OK, and Cancel.
-
- b. Data for the data grid is stored in the table 'f1EssntFltyStructDmgFn'.
 - c. There is no data view for this dialog.
 - d. The Enter Source text box allows the user to provide a name for the source of their damage function (if they are looking at a published report or creating their own). If the user selects OK without completing this box, the following error message.



Figure 3-179: Enter Source Error Message

- e. The Enter DmgFn Description is pre-populated with the Description from the damage function the user started with. The user can then alter this information to better describe their custom damage function.
- f. The Enter Comment text box is pre-populated with a sentence that shows the damage function the user started with. For example they can see (Started from FIA). The user can input any value here.
- g. The data grid has columns labeled -4 ft, -3 ft, -2 ft, -1 ft, 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, 11 ft, 12 ft, 13 ft, 14 ft, 15 ft, 16 ft, 17 ft, 18 ft, 19 ft, 20 ft, 21 ft, 22 ft, 23 ft, and 24 ft.
 - a. The user must double click on a given grid cell to change the value. The user can enter any value (integer or decimal).
 - b. Input of unrealistic damage functions causes the following error message to be displayed.

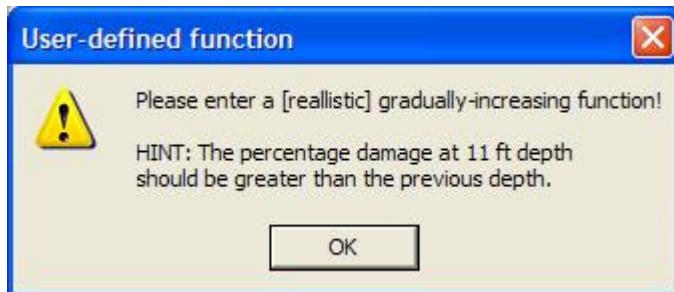
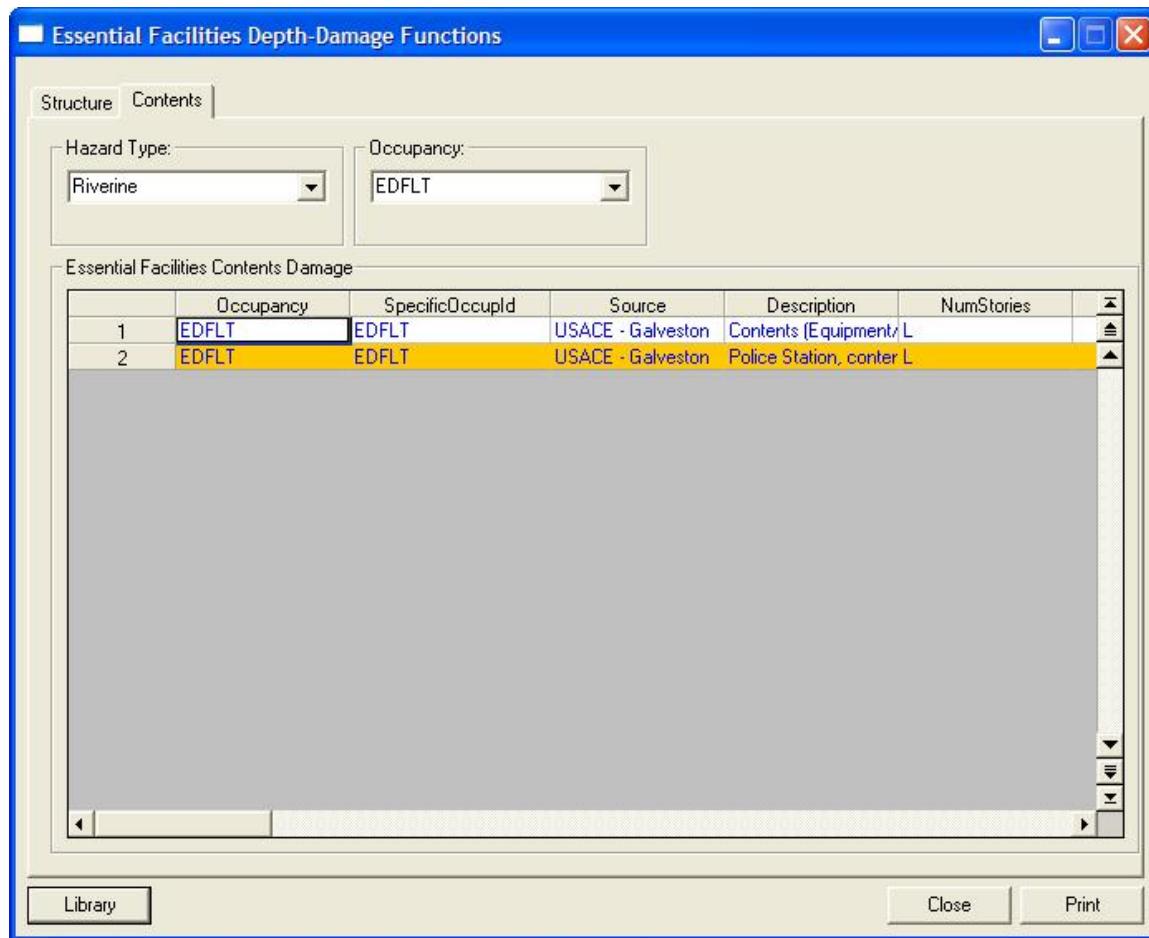


Figure 3-180: User Defined Damage Function Input Error Message

- h. Selection of OK save the user edits and adds the function to the library for the user to either use or not. The model does not automatically select the new function. The User Defined dialog closes and returns the user to the Structure Damage Function dialog.
- i. Selection of Cancel closes the User Defined dialog without saving any changes. The user is returned to the Structure Damage Function dialog.

3.2.7.3.1.2.2. Analysis Menu, Damage Function Submenu: Essential Facilities Dialog, Contents Tab



**Figure 3-181: HAZUS Analysis Menu, Damage Functions Submenu:
Essential Facilities Damage Function, Contents Tab**

a. Selection of the Contents tab opens the dialog shown above. This dialog is built on the standard HAZUS flood dialog allows the user to view and work with the damage functions for the Essential Facilities contents damage assessment. The dialog has the following features:

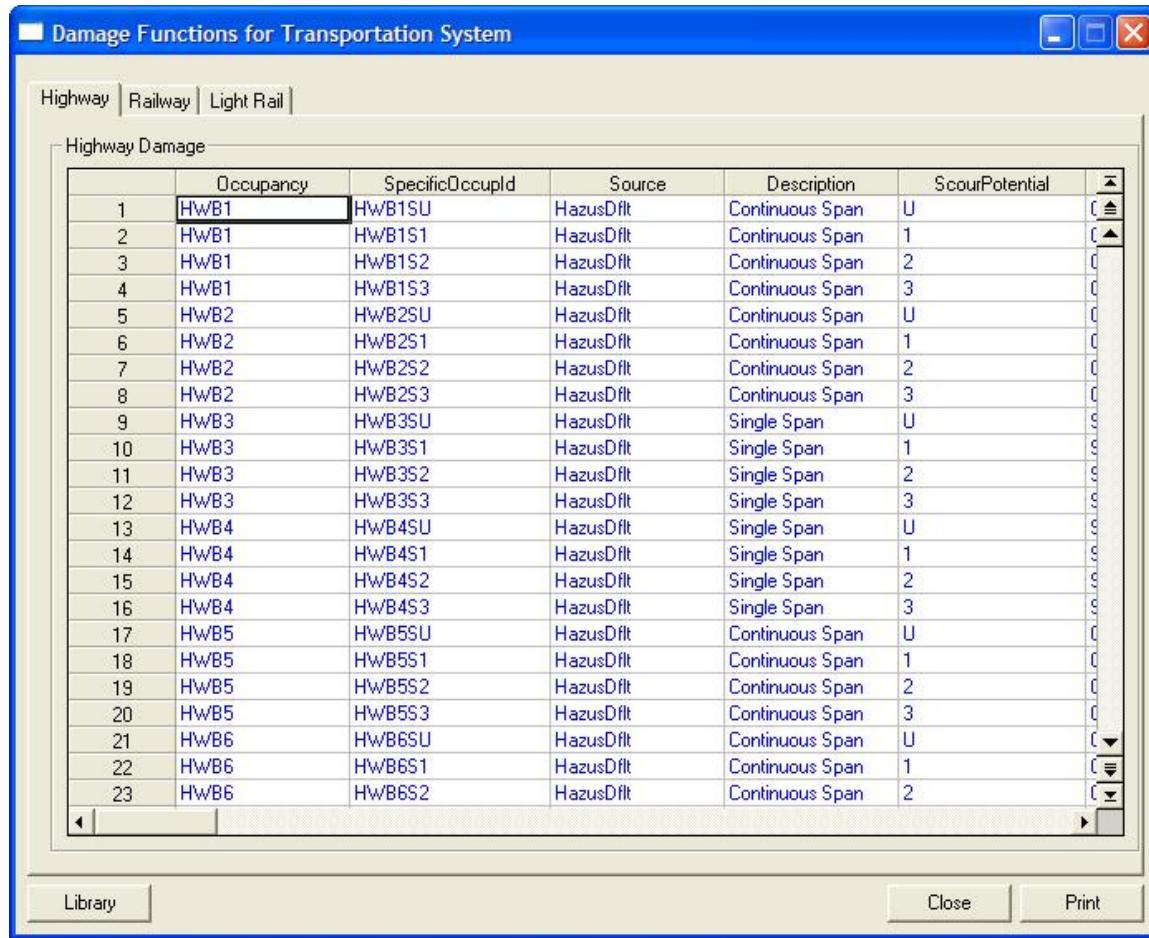
- a. The dialog has two tabs. The tabs are labeled Structure and Contents. Structure is the default view.
- b. The dialog has two combo boxes. The combo boxes are labeled Hazard Type and Occupancy. The combo boxes are available on all three tabs.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. The data for the data grid is stored in the tables ‘fIEssntFltyContDmgXRef’, ‘fIEssntFltyContDmgFn’, and ‘fIEssntFltyContUnionDetails’.
- c. The data view is the `absv_EssntFltyContDmgFn`.
- d. The Hazard Type combo box allows the user to choose between Riverine, Coastal A-Zone, and Coastal V-Zone damage functions. Riverine is the default value for the combo box
- a. Selection of Riverine (the default) allows the user to view damage functions assigned to the occupancy classifications for riverine inundation.
 - b. Selection of Coastal A-Zone allows the user to view the A-Zone damage functions assigned to the occupancy classifications for coastal inundation.
 - c. Selection of Coastal V-Zone allows the user to view the V-Zone damage functions assigned to the occupancy classifications for coastal inundation.
- e. The Occupancy combo box allows the user to navigate over the essential facilities occupancy classifications. Options include EDFLT, EFFS, EFPS, EFEQ, EFHS, EFHM, EFHL, EFMC, EFS1, EFS2, FDFLT, MDFLT, PDFLT, and SDFLT. EDFLT is the default value for the combo box.
- f. A data grid labeled Essential Facilities Structure Damage displays the assigned damage functions related to the selected hazard type shown in the Hazard Type combo box and occupancy shown in the Occupancy combo box.

- a. For example: Hazard Type Coastal V-zone and Occupancy EFPS shows all assigned damage functions for the occupancy of EFPS. In every case, this is a single damage function since the Occupancy is descriptive.
- b. The data grid is not editable and all text is displayed in blue.
- c. If the user has changed the assignment of a damage function from the default value, it is highlighted with a yellow shading to ensure the user is aware that a default value is not being used.
- g. Columns are Occupancy, SpecificOccupID, Source, Description, NumStories, Comment, DefaultFn (check boxes), Editable (check boxes), Selected (check boxes), -4 ft, -3 ft, -2 ft, -1 ft, 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, 11 ft, 12 ft, 13 ft, 14 ft, 15 ft, 16 ft, 17 ft, 18 ft, 19 ft, 20 ft, 21 ft, 22 ft, 23 ft, 24 ft, ID, Basement (check boxes), HazardRiverine (check boxes), HazardCV (check boxes), and HazardCA (check boxes).
- h. Selection of the command button Library opens up a library of structure damage functions. The Contents Library functions exactly as the Structure library discussed above. For this reason, the functions are incorporated by reference here rather than repeating the section.
 - a. Likewise, the User Defined function on the Content Library also functions exactly as discussed for the Structure damage functions. Again, in order to save time and space the functionality is incorporated by reference here.
- i. Selection of command button 'Close' closes the Essential Facilities Depth-damage Functions dialog and returns the user to the base map view.
- j. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- k. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.3. Analysis Menu, Damage Functions Submenu: Transportation Systems Dialog



**Figure 3-182: HAZUS Analysis Menu, Damage Functions Submenu:
Transportation Systems Damage Function, Highway Tab**

- a. Selection of the Transportation Systems on the Damage Functions submenu opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those components of the Transportation Systems that HAZUS performs an analysis on. The dialog has the following features:
 - a. The dialog has three tabs. The tabs are labeled Highway, Railway, and Light Rail. Highway is the default view.
 - b. The dialog does not have a combo box.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. Data for the grid is stored in the tables ‘flBridgeDmgFn’, ‘flBridgeDmgXRef’, and ‘flBridgeUnionDetails’.
- c. The view for the data grid is absv_BridgeDmgFn.
- d. The flood model methodology performs damage analysis for transportation systems bridges only. Future releases of the flood model will increase the functionality of the transportation systems parameters menu.
- a. The Specific Occupancy ID (SpecificOccupID) for bridges is a combined value that is based on the Occupancy (e.g., HWB5) and the Scour Potential (e.g., U, 1, 2, or 3). These scour potentials have been identified by the U.S. Department of Transportation as indicating an issue with the footings and or approaches of the bridge. No other Scour Potential values are a concern.
- e. The data grid is labeled Highway Damage and displays the selected damage functions used in the highway bridge damage analysis.
- a. The data grid columns are labeled: Occupancy, SpecificOccupId, Source, Description, ScourPotential, BridgeType, DefaultFn (checkbox), Editable (checkbox), Selected (checkbox), 0 yr, 25 yr, 50 yr, 75 yr, 100 yr, 125 yr, 150 yr, 175 yr, 200 yr, 225 yr, 250 yr, 275 yr, 300 yr, 325 yr, 350 yr, 375 yr, 400 yr, 425 yr, 450 yr, 475 yr, 500 yr, 525 yr, 550 yr, 575 yr, 600 yr, 625 yr, 650 yr, 675 yr, 700 yr, 725 yr, 750 yr, 775 yr, 800 yr, 825 yr, 850 yr, 875 yr, 900 yr, 925 yr, 950 yr, 975 yr, 1000 yr, ID, HazardRiverne, HazardCA, HazardCV, and Comment.

- f. Selection of the Library command button opens a dialog that allows the user to access the damage functions assigned to each specific occupancy and potential optional functions (very limited at this time) for the specific occupancies. The library dialog is discussed below.
- g. Selection of the command button ‘Close’ closes the Damage Functions for Transportation System dialog and returns the user to the base map view.
- h. Selection of the command button Print opens a standard Microsoft print dialog and allows the user to print the damage functions for the Highway bridges.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.3.1. Analysis Menu, Damage Function Submenu: Transportation Systems, Highway Tab, Library Dialog

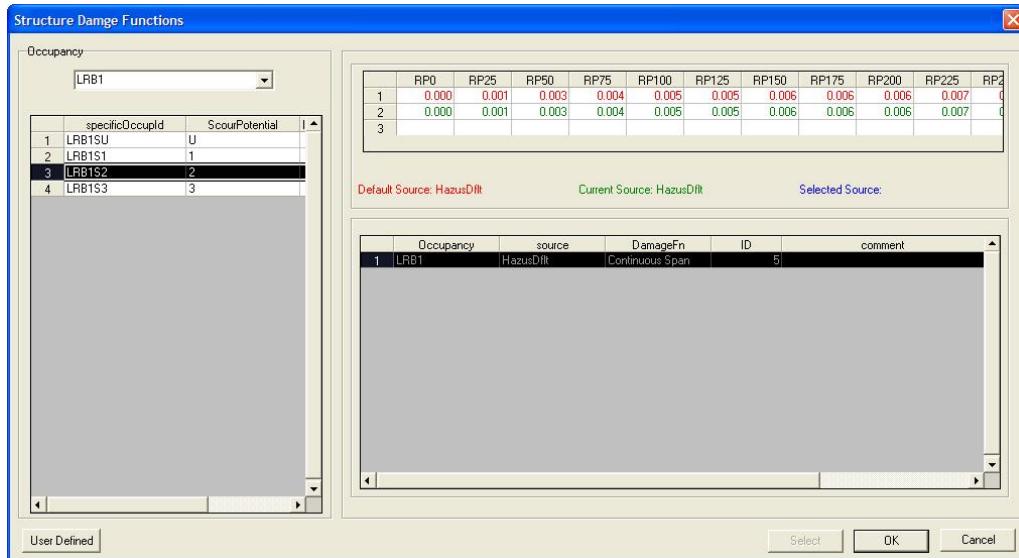


Figure 3-183: HAZUS Analysis Menu, Damage Functions Submenu: Transportation Systems, Highway Tab, and Library Dialog

- a. On the Highway tab of the Damage Functions for Transportation System dialog clicking on the command button Library opens the dialog shown above. The dialog is a custom dialog that allows the user to view the default damage function, compare to any identified optional functions, and to select or assign a different function. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog has a combo box labeled Occupancy. HWB1 is the default value.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog has three data grids that display information necessary for the user to view and select alternative damage functions.
 - f. The dialog has command buttons labeled User Defined, Select (changes to Deselect if the user has selected a function), OK, and Print.
- b. Data for the data grid is stored in the tables ‘flBridgeDmgFn’, ‘flBridgeDmgXRef’, and ‘flBridgeUnionDetails’.
- c. The data view for this dialog is absv_BridgeDmgFn.
- d. The combo box labeled Occupancy allows the user to select the occupancy that of interest to them. Options include HWB1, HWB2, HWB3, HWB4, HWB5, HWB6, HWB7, HWB8, HWB9, HWB10, HWB11, HWB12, HWB13, HWB14, HWB15, HWB16, HWB17, HWB18, HWB19, HWB20, HWB21, HWB22, HWB23, HWB24, HWB25, HWB26, HWB27, HWB28, HDFLT
 - a. Depending on the selection of Occupancy, the data grids will display information directly relevant to that occupancy.
- e. The left most data grid displays the specific occupancy used by the flood model for the assignment of damage functions.
 - a. The left most data grid columns are labeled: SpecificOccupId, ScourPotential, and ID.

- f. The top data grid is designed to display several damage functions at the same time to allow the user to review the default function versus alternative selections.
- a. The data grid has columns RP0, RP25, RP50, RP75, RP100, RP125, RP150, RP175, RP200, RP225, RP250, RP275, RP300, RP325, RP350, RP375, RP400, RP425, RP450, RP475, RP500, RP525, RP550, RP575, RP600, RP625, RP650, RP675, RP700, RP725, RP750, RP775, RP800, RP825, RP850, RP875, RP900, RP925, RP950, RP975, and RP1000.
 - b. The top data grid has unique text control that colors the text to allow the user quick visualization of the data they are reviewing.
 - c. Default damage functions are displayed on the top line of the grid and in red text.
 - d. The middle line of the data grid displays any damage function in the lower data grid that the user highlights through mouse selection. This data is displayed in green text.
 - e. If the user uses the command button select, the third line in the data grid displays the selected damage function in blue text.
 - f. Within the data frame of the data grid, the source of the damage functions is displayed. The source of the default, the highlighted, and the selected.
- g. The bottom data grid displays the library of potential damage functions that the user can select from. The library is limited for the highway bridges because no other published damage functions were identified.
- a. The data is not editable.
 - b. The data grid has columns labeled Occupancy, source, Damagefn, ID, Comment, Selected (checkbox), Editable (checkbox), defaultfn (checkbox).
 - c. If the user highlights any damage function in the lower data grid, it is displayed in the center row of the data grid above, in green text (meaning the currently highlighted function). The Select command button is also enabled allowing the user to select that function as an alternative to the default damage function.

- d. The user cannot select a different damage function as a default – they can just use alternate functions in their given study region.
- h. Selection of the Select Command button causes the highlighted damage function to be displayed in the third row of the top data grid in blue text. The function is also displayed in the bottom data grid in blue text.
 - a. Selection of a damage function changes a flag that tells the flood model to use this damage function in place of the default.
 - b. The Select command button becomes Deselect allowing the user to restore the default function if they so choose. To Deselect, the user must highlight the selected function (blue text in the bottom data grid) and hit Deselect. If the user highlights any other function the command button returns to 'Select' allowing the user to override their previous selection.
- i. Selection of OK closes the Structure Damage Functions dialog and returns the user to the Damage Functions for Transportation Systems dialog. If the user has selected an alternative function that function can be seen on the open screen. This damage function is used in subsequent loss calculations. If the user has not selected any alternative functions, the defaults are used.
- j. Selection of Cancel closes the Structure Damage Functions dialog and returns the user to the Damage Functions for Transportation Systems dialog. If the user has selected an alternative damage function, that selection is not maintained.
- k. Selection of the User Defined command button opens the dialog discussed in the subsection below.
 - a. The user can either go to the User Defined command button using the default damage function as the base, or they can select a damage function (using the Select command button) and then use the User Defined command button to work off that selected damage function.

3.2.7.3.1.3.1.1. Analysis Menu, Damage Function Submenu: Transportation Systems, Highway Tab, Library, User Defined Dialog.

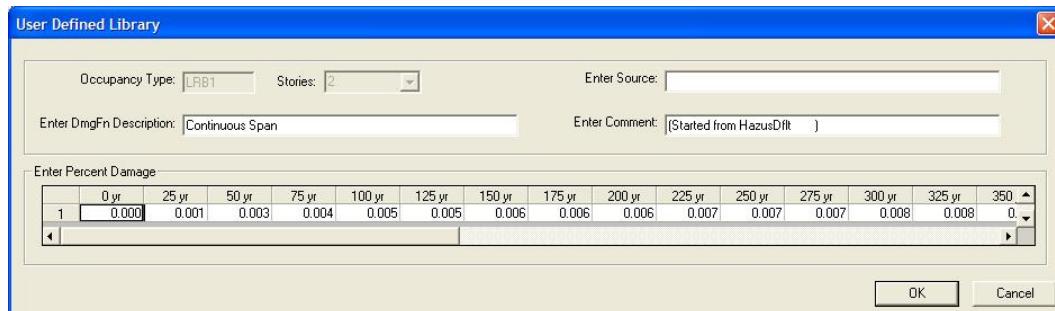


Figure 3-184: HAZUS Analysis Menu, Damage Functions Submenu: Transportation Systems, Highway Tab, Library, and User Defined Dialog

- a. Selection of the User Defined command button on the Library dialog opens the dialog shown above. The dialog allows the user to create their own damage function starting with any damage function of their choice. This feature was provided to make it easier for users to create new functions without having to start from scratch. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog has a disabled combo box labeled Stories. The value shown is the Scour Potential value of either the default damage function or a function the user may have highlighted before using the command button.
 - c. The dialog does not have radio buttons.
 - d. The dialog has four text boxes labeled Occupancy Type, Enter Source, Enter DmgFn Description, and Enter Comment. Occupancy Type is not editable and grayed out displaying the value of the source damage function. The other text boxes are editable.
 - e. The dialog has a data grid that displays the damage values the user wants to start working with. The grid is editable and is labeled Enter Percent Damage.
 - f. The dialog has command buttons labeled OK, and Cancel.

- b. Data for the data grid is stored in the table ‘flBridgeDmgFn’.
- c. There is no data view for this dialog.
- d. The Enter Source text box allows the user to provide a name for the source of their damage function (if they are looking at a published report or creating their own). If the user selects OK without completing this box, the following error message.



Figure 3-185: Enter Source Error Message

- e. The Enter DmgFn Description is pre-populated with the Description from the damage function the user started with. The user can then alter this information to better describe their custom damage function.
- f. The Enter Comment text box is pre-populated with a sentence that shows the damage function the user started with. For example they can see (Started from FIA). The user can input any value here.
- g. The data grid has columns labeled 0 yr, 25 yr, 50 yr, 75 yr, 100 yr, 125 yr, 150 yr, 175 yr, 200 yr, 225 yr, 250 yr, 275 yr, 300 yr, 325 yr, 350 yr, 375 yr, 400 yr, 425 yr, 450 yr, 475 yr, 500 yr, 525 yr, 550 yr, 575 yr, 600 yr, 625 yr, 650 yr, 675 yr, 700 yr, 725 yr, 750 yr, 775 yr, 800 yr, 825 yr, 850 yr, 875 yr, 900 yr, 925 yr, 950 yr, 975 yr, and 1000 yr.
 - a. The user must double click on a given grid cell to change the value. The user can enter any value (integer or decimal).
 - b. Input of unrealistic damage functions causes the following error message to be displayed.

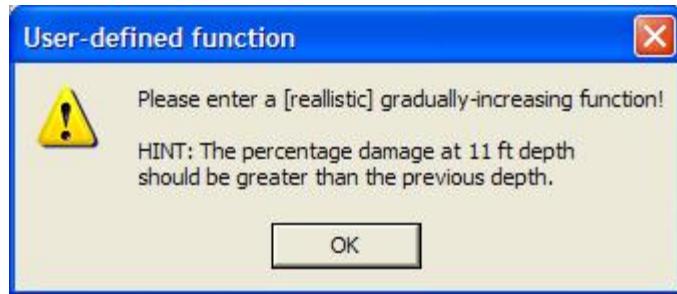
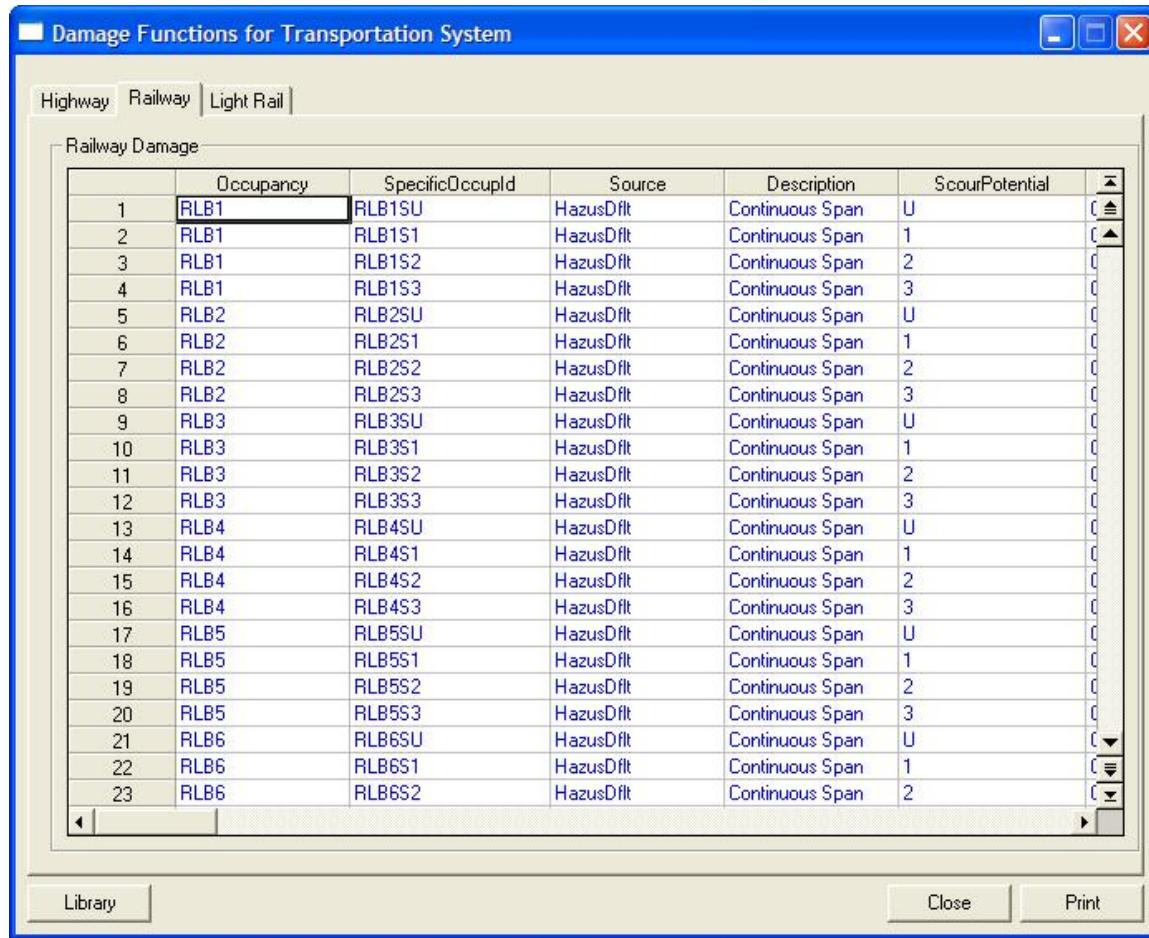


Figure 3-186: User Defined Damage Function Input Error Message

- h. Selection of OK save the user edits and adds the function to the library for the user to either use or not. The model does not automatically select the new function. The User Defined dialog closes and returns the user to the Structure Damage Function dialog.
- i. Selection of Cancel closes the User Defined dialog without saving any changes. The user is returned to the Structure Damage Function dialog.

3.2.7.3.1.3.2. Analysis Menu, Damage Functions Submenu: Transportation Systems Dialog Railway Tab



**Figure 3-187: HAZUS Analysis Menu, Damage Functions Submenu
Transportation Systems Damage Function Railway Tab**

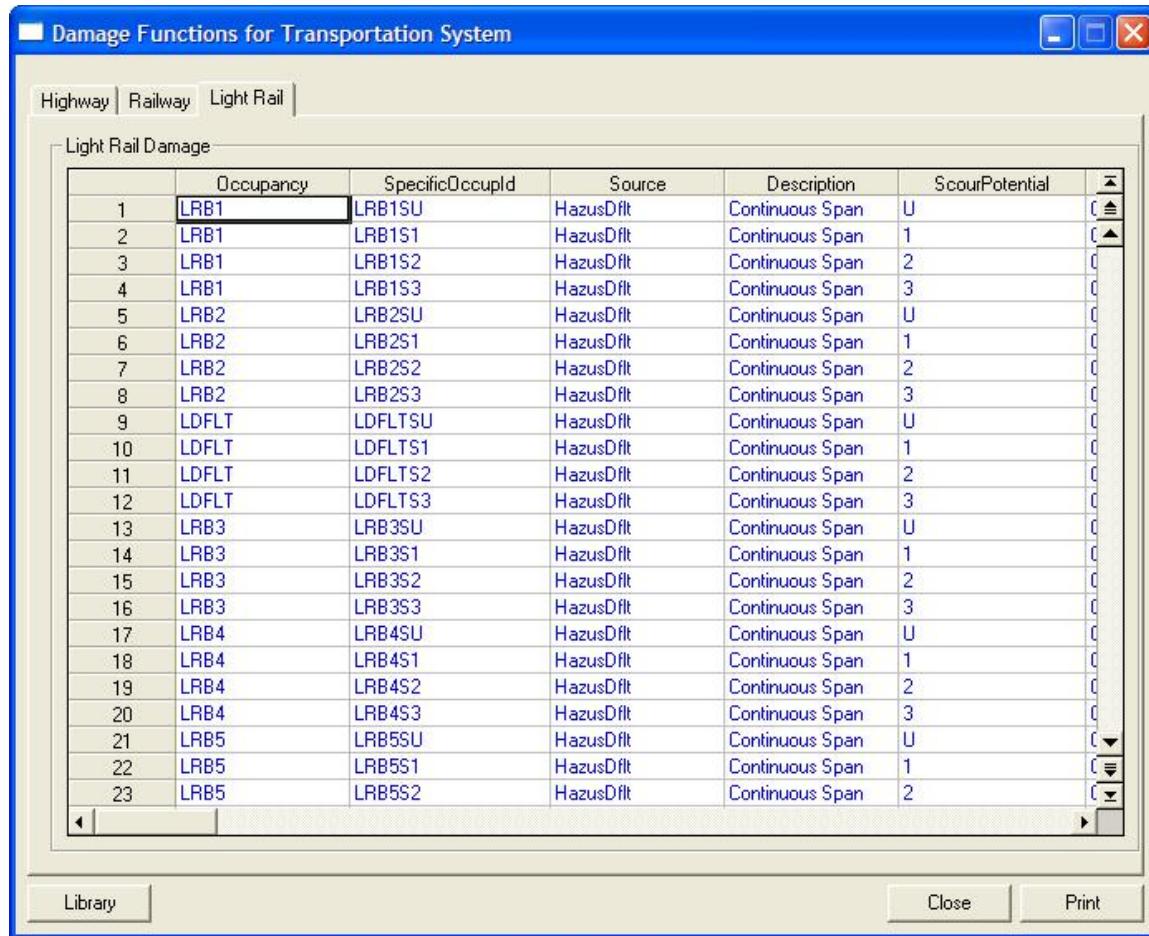
- Selection of the Railway Tab on the Damage Functions for Transportation System dialog opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those components of the Transportation Systems that HAZUS performs an analysis on. The dialog has the following features:
 - The dialog has three tabs. The tabs are labeled Highway, Railway, and Light Rail. Highway is the default view.
 - The dialog does not have a combo box.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. The data tables are the hzTranspFlty, flTranspFlty, and flRailwaybridge
- c. The data view is absv_BridgeDmgFn.
- d. The flood model methodology performs damage analysis for transportation systems bridges only. Future releases of the flood model will increase the functionality of the transportation systems parameters menu.
- a. The Specific Occupancy ID (SpecificOccupID) for bridges is a combined value that is based on the Occupancy (e.g., RLB3) and the Scour Potential (e.g., U, 1, 2, or 3). These scour potentials have been identified by the U.S. Department of Transportation as indicating an issue with the footings and or approaches of the bridge. No other Scour Potential values are a concern.
- e. The data grid is labeled Railway Damage and displays the selected damage functions used in the railway bridge damage analysis.
- a. The data grid columns are labeled: Occupcy, SpecificOccupId, Source, Description, ScourPotential, BridgeType, DefaultFn (checkbox), Editable (checkbox), Selected (checkbox), 0 yr, 25 yr, 50 yr, 75 yr, 100 yr, 125 yr, 150 yr, 175 yr, 200 yr, 225 yr, 250 yr, 275 yr, 300 yr, 325 yr, 350 yr, 375 yr, 400 yr, 425 yr, 450 yr, 475 yr, 500 yr, 525 yr, 550 yr, 575 yr, 600 yr, 625 yr, 650 yr, 675 yr, 700 yr, 725 yr, 750 yr, 775 yr, 800 yr, 825 yr, 850 yr, 875 yr, 900 yr, 925 yr, 950 yr, 975 yr, 1000 yr, ID, HazardRiverne, HazardCA, HazardCV, and Comment.

- f. Selection of the Library command button opens a dialog that allows the user to access the damage functions assigned to each specific occupancy and potential optional functions (very limited at this time) for the specific occupancies. The library dialog is discussed above in the Highway Tab section and functions exactly the same for the Railway bridges.
 - a. EXCEPTION: The only exception to the performance of the Railway library is that the Occupancy comb box displays the following options: RLB1, RLB2, RLB3, RLB4, RLB5, RLB6, RLB7, RLB8, RLB9, RLB10, and RDFLT.
- g. The User Defined command function behaves exactly as discussed in the Highway tab above.
- h. Selection of the command button 'Close' closes the Damage Functions for Transportation System dialog and returns the user to the base map view.
- i. Selection of the command button Print opens a standard Microsoft print dialog and allows the user to print the damage functions for the Railway bridges.
- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.3.3. Analysis Menu, Damage Functions Submenu: Transportation Systems Dialog, Light Rail Tab



**Figure 3-188: HAZUS Analysis Menu, Damage Functions Submenu:
Transportation Systems Damage Function, Light Rail Tab**

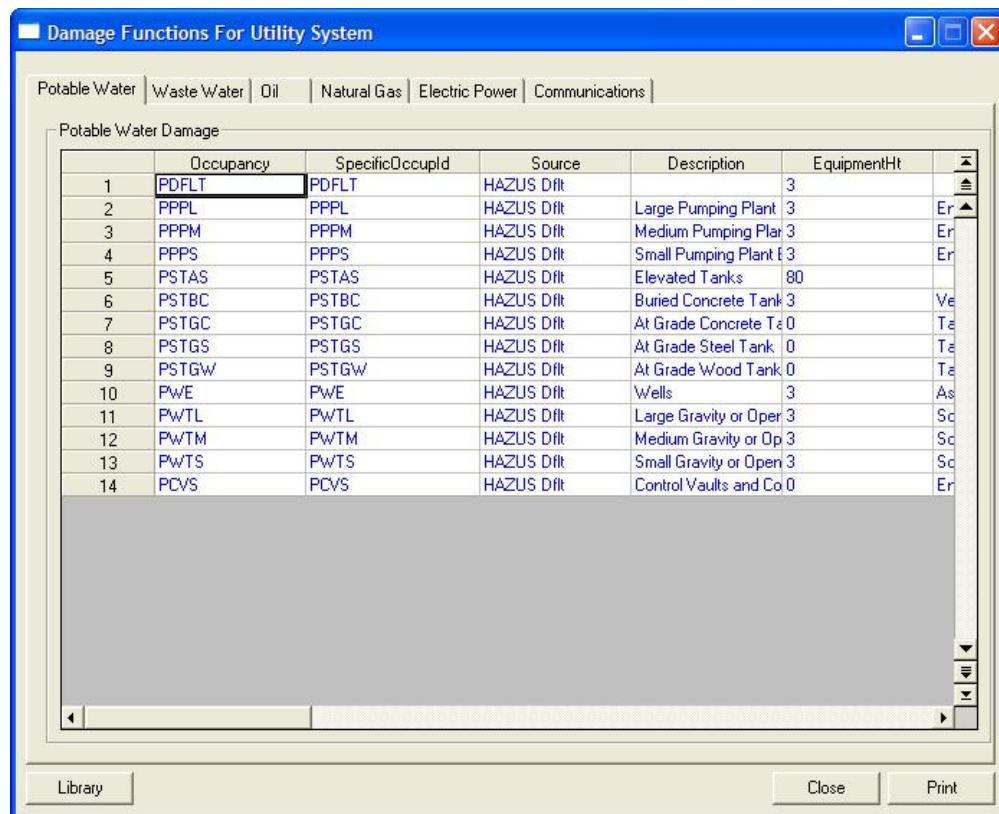
- Selection of the Light Rail Tab on the Damage Functions for Transportation System dialog opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those components of the Transportation Systems that HAZUS performs an analysis on. The dialog has the following features:
 - The dialog has three tabs. The tabs are labeled Highway, Railway, and Light Rail. Highway is the default view.
 - The dialog does not have a combo box.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. The data tables are fIBridgeDmgFn, fIBridgeDmgXRef, and fIBridgeUnionDetails.
- c. The data view is absv_BridgeDmgFn.
- d. The flood model methodology performs damage analysis for transportation systems bridges only. Future releases of the flood model will increase the functionality of the transportation systems parameters menu.
- a. The Specific Occupancy ID (SpecificOccupID) for bridges is a combined value that is based on the Occupancy (e.g., LRB6) and the Scour Potential (e.g., U, 1, 2, or 3). These scour potentials have been identified by the U.S. Department of Transportation as indicating an issue with the footings and or approaches of the bridge. No other Scour Potential values are a concern.
- e. The data grid is labeled Light Rail Damage and displays the selected damage functions used in the light rail bridge damage analysis.
- a. The data grid columns are labeled: Occupcy, SpecificOccupId, Source, Description, ScourPotential, BridgeType, DefaultFn (checkbox), Editable (checkbox), Selected (checkbox), 0 yr, 25 yr, 50 yr, 75 yr, 100 yr, 125 yr, 150 yr, 175 yr, 200 yr, 225 yr, 250 yr, 275 yr, 300 yr, 325 yr, 350 yr, 375 yr, 400 yr, 425 yr, 450 yr, 475 yr, 500 yr, 525 yr, 550 yr, 575 yr, 600 yr, 625 yr, 650 yr, 675 yr, 700 yr, 725 yr, 750 yr, 775 yr, 800 yr, 825 yr, 850 yr, 875 yr, 900 yr, 925 yr, 950 yr, 975 yr, 1000 yr, ID, HazardRiverne, HazardCA, HazardCV, and Comment.

- f. Selection of the Library command button opens a dialog that allows the user to access the damage functions assigned to each specific occupancy and potential optional functions (very limited at this time) for the specific occupancies. The library dialog is discussed above in the Highway Tab section and functions exactly the same for the Light Rail bridges.
 - a. EXCEPTION: The only exception to the performance of the Railway library is that the Occupancy comb box displays the following options: LRB1, LRB2, LDFLT, LRB3, LRB4, LRB5, LRB6, LRB7, LRB8, LRB9, and LRB10.
- g. The User Defined command function behaves exactly as discussed in the Highway tab above.
- h. Selection of the command button 'Close' closes the Damage Functions for Transportation System dialog and returns the user to the base map view.
- i. Selection of the command button Print opens a standard Microsoft print dialog and allows the user to print the damage functions for the Light Rail bridges.
- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.4. Analysis Menu, Damage Functions Submenu: Utility Systems Dialog



**Figure 3-189: HAZUS Analysis Menu, Damage Functions Submenu:
Utility Systems Damage Function, Potable Water Tab**

- Selection of Utility Systems on the Damage submenu opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those components of the Utility Systems that HAZUS performs an analysis on. The dialog has the following features:
 - The dialog has six tabs. The tabs are labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. Potable Water is the default view.
 - The dialog does not have a combo box.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box for scenario census blocks.

- e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. The data tables are fUtilFltyDmgFn, fUtilFltyDmgUnionDetails, and fUtilFltyDmgXRef.
- c. The view for the dialog is absv_UtilzPWaterDmgFn.
- d. The flood model methodology performs damage analysis for specific components of the utility systems. Future releases of the flood model will increase the functionality of the utility systems parameters menu.
- e. The data grid is labeled Potable Water Damage and displays the selected damage functions used in the damage analysis of those components of the potable water system that damage functions were available, or that were deemed sufficiently prone to flood damage that functions were developed using flood engineering experts.
- a. The data grid columns are labeled: Occupncy, SpecificOccupId, Source, Description, EquipmentHt, Comment, DefaultFn (checkbox), Editable (checkbox), Selected (checkbox), 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, ID, FunctionDepth, HazardRiverne, HazardCA, and HazardCV.
- f. Selection of the command button Library opens up a library of Utility Systems damage functions. The function of the Utility System Library is discussed below.
- g. Selection of command button ‘Close’ closes the Damage Functions for Utility System dialog and returns the user to the base map view.
- h. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.4.1. Analysis Menu, Damage Function Submenu: Utility Systems, Potable Water Tab, Library Dialog

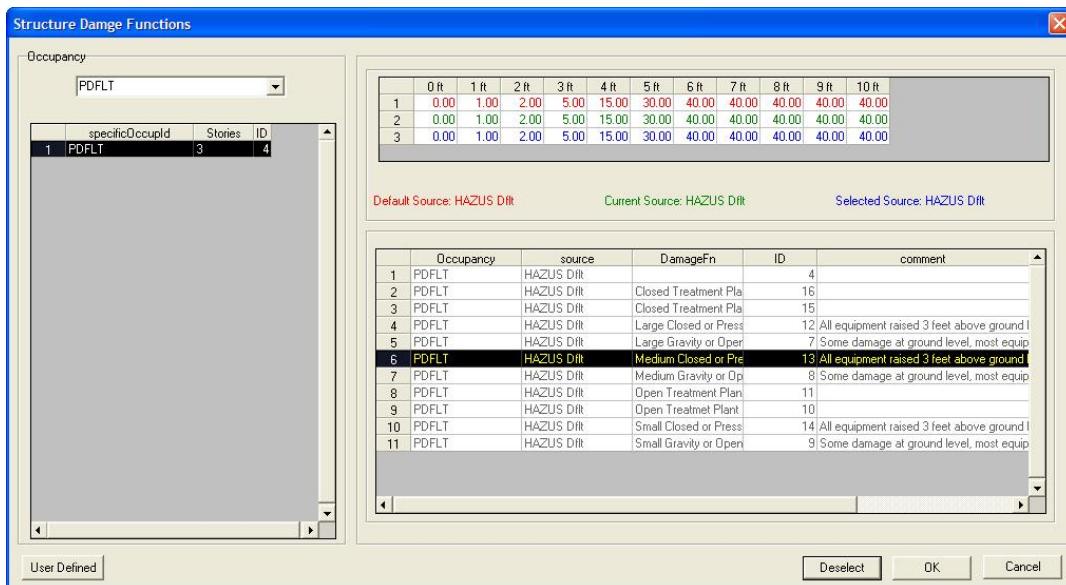


Figure 3-190: HAZUS Analysis Menu, Damage Functions Submenu: Utility Systems, Potable Water Tab, and Library Dialog

- a. On the Potable Water tab of the Damage Functions for Utility System dialog clicking on the command button Library opens the dialog shown above. The dialog is a custom dialog that allows the user to view the default damage function, compare to multiple optional functions, and to select or assign a different function. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog has a combo box labeled Occupancy. PDFLT is the default value.
 - c. The dialog does not have radio buttons.

- d. The dialog does not have a check box.
 - e. The dialog has three data grids that display information necessary for the user to view and select alternative damage functions.
 - f. The dialog has command buttons labeled User Defined, Select (changes to Deselect if the user has selected a function), OK, and Print.
- b. Data for the data grid is stored in the tables ‘fIUtilFItyDmgFn’, ‘fIUtilFItyDmgUnionDetails’, and ‘fIUtilFItyDmgXRef’.
- c. The data view for this dialog is absv_UtilzPWaterDmgFn.
- d. The combo box labeled Occupancy allows the user to select the occupancy that of interest to them. Options include PDFLT, PPPL, PPPM, PPPS, PSTAS, PSTBC, PSTGC, PSTGS, PSTGW, PWE, PWTL, PWTM, PWTS, and PCVS.
- a. Depending on the selection of Occupancy, the data grids will display information directly relevant to that occupancy.
- e. The left most data grid displays the specific occupancy used by the flood model for the assignment of damage functions.
- a. The left most data grid columns are labeled: SpecificOccupId, Stories, and ID.
- f. The top data grid is designed to display several damage functions at the same time to allow the user to review the default function versus alternative selections.
- a. The data grid has columns 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, and 10 ft.
 - b. The top data grid has unique text control that colors the text to allow the user quick visualization of the data they are reviewing.
 - i. Default damage functions are displayed on the top line of the grid and in red text.

- ii. The middle line of the data grid displays any damage function in the lower data grid that the user highlights through mouse selection. This data is displayed in green text.
 - iii. If the user uses the command button select, the third line in the data grid displays the selected damage function in blue text.
 - iv. Within the data frame of the data grid, the source of the damage functions is displayed. The source of the default, the highlighted, and the selected.
- g. The bottom data grid displays the library of potential damage functions that the user can select from. The library was developed a panel of experts to be applicable to each of the specific utility system components for the analysis of damage and functionality.
 - a. The data is not editable.
 - b. The data grid has columns labeled Occupancy, source, Damagefn, ID, Comment, Selected, Editable, defaultfn.
 - c. If the user highlights any damage function in the lower data grid, it is displayed in the center row of the data grid above, in green text (meaning the currently highlighted function). The Select command button is also enabled allowing the user to select that function as an alternative to the default damage function.
 - d. The user cannot select a different damage function as a default – they can just use alternate functions in their given study region.
- h. Selection of the Select Command button causes the highlighted damage function to be displayed in the third row of the top data grid in blue text. The function is also displayed in the bottom data grid in blue text.
 - a. Selection of a damage function changes a flag that tells the flood model to use this damage function in place of the default.
 - b. The Select command button becomes Deselect allowing the user to restore the default function if they so choose. To Deselect, the user must highlight the selected function (blue text in the bottom data grid) and hit Deselect. If the user

highlights any other function the command button returns to 'Select' allowing the user to override their previous selection.

- i. Selection of OK closes the Structure Damage Functions dialog and returns the user to the Damage Functions for Utility System dialog. If the user has selected an alternative function that function can be seen on the open screen. This damage function is used in subsequent loss calculations. If the user has not selected any alternative functions, the defaults are used.
- j. Selection of Cancel closes the Structure Damage Functions dialog and returns the user to the Damage Functions for Utility System dialog. If the user has selected an alternative damage function, that selection is not maintained.
- k. Selection of the User Defined command button opens the dialog discussed in the subsection below.
 - a. The user can either go to the User Defined command button using the default damage function as the base, or they can select a damage function (using the Select command button) and then use the User Defined command button to work off that selected damage function.

3.2.7.3.1.4.1.1. Analysis Menu, Damage Function Submenu: Utility System, Potable Water Tab, Library, User Defined Dialog.

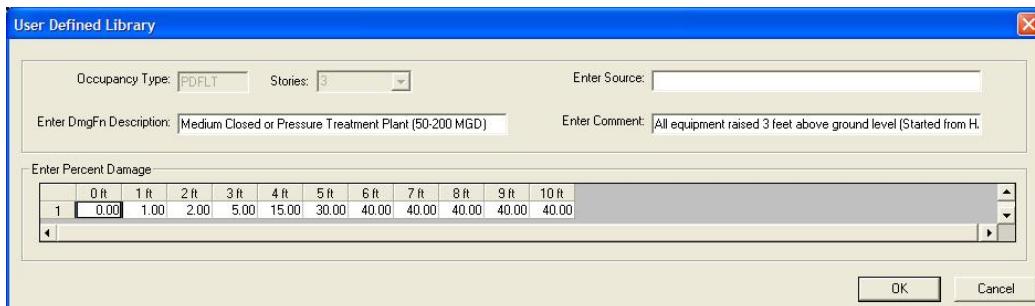


Figure 3-191: HAZUS Analysis Menu, Damage Functions Submenu: Utility Systems, Potable Water Tab, Library, User Defined Dialog

- a. Selection of the User Defined command button on the Library dialog opens the dialog shown above. The dialog allows the user to create their own damage function starting with any damage function of their choice. This feature was provided to make it easier for users to

create new functions without having to start from scratch. The dialog has the following features:

- a. The dialog does not have tabs.
 - b. The dialog has a disabled combo box labeled Stories. The value shown is the value of either the default damage function or a function the user may have highlighted before using the command button.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have check box labeled basement.
 - e. The dialog has four text boxes labeled Occupancy Type, Enter Source, Enter DmgFn Description, and Enter Comment. Occupancy Type is not editable and grayed out displaying the value of the source damage function. The other text boxes are editable.
 - f. The dialog has a data grid that displays the damage values the user wants to start working with. The grid is editable and is labeled Enter Percent Damage.
 - g. The dialog has command buttons labeled OK, and Cancel.
-
- b. Data for the data grid is stored in the table flUtilFltyDmgFn.
 - c. There is no data view for this dialog.
 - d. The Enter Source text box allows the user to provide a name for the source of their damage function (if they are looking at a published report or creating their own). If the user selects OK without completing this box, the following error message.



Figure 3-192: Enter Source Error Message

- e. The Enter DmgFn Description is pre-populated with the Description from the damage function the user started with. The user can then alter this information to better describe their custom damage function.
- f. The Enter Comment text box is pre-populated with a sentence that shows the damage function the user started with. For example they can see (Started from FIA). The user can input any value here.
- g. The data grid has columns labeled 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, and 10 ft.
 - a. The user must double click on a given grid cell to change the value. The user can enter any value (integer or decimal).
 - b. Input of unrealistic damage functions causes the following error message to be displayed.

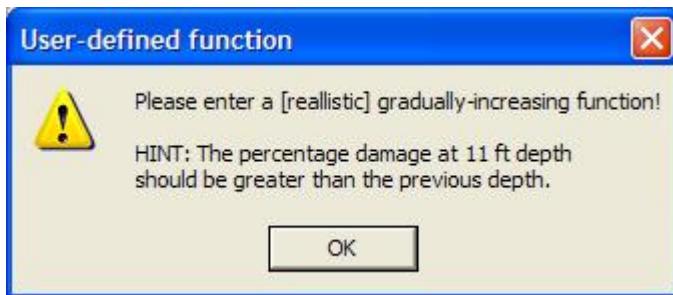
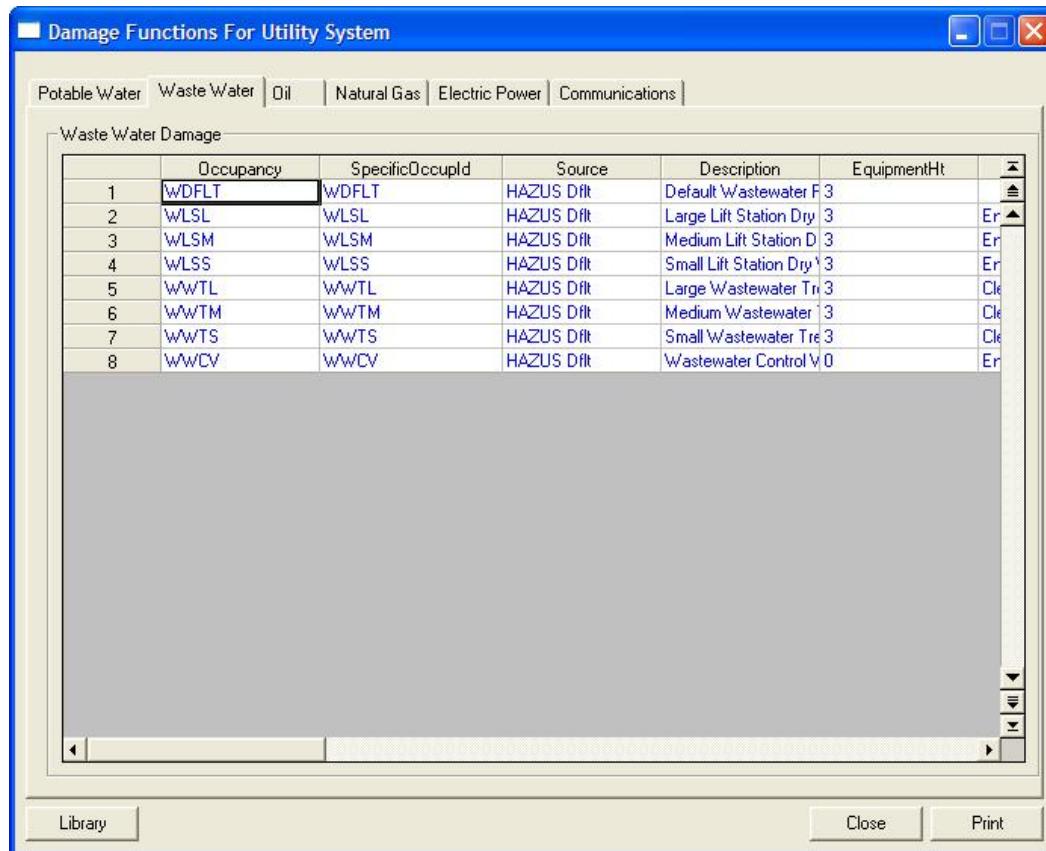


Figure 3-193: User Defined Damage Function Input Error Message

- h. Selection of OK save the user edits and adds the function to the library for the user to either use or not. The model does not automatically select the new function. The User Defined dialog closes and returns the user to the Structure Damage Function dialog.
- i. Selection of Cancel closes the User Defined dialog without saving any changes. The user is returned to the Structure Damage Function dialog.

3.2.7.3.1.4.2. Analysis Menu, Damage Functions Submenu: Utility Systems Dialog, Waste Water Tab



**Figure 3-194: HAZUS Analysis Menu, Damage Functions Submenu:
Utility Systems damage Function, Waste Water Tab**

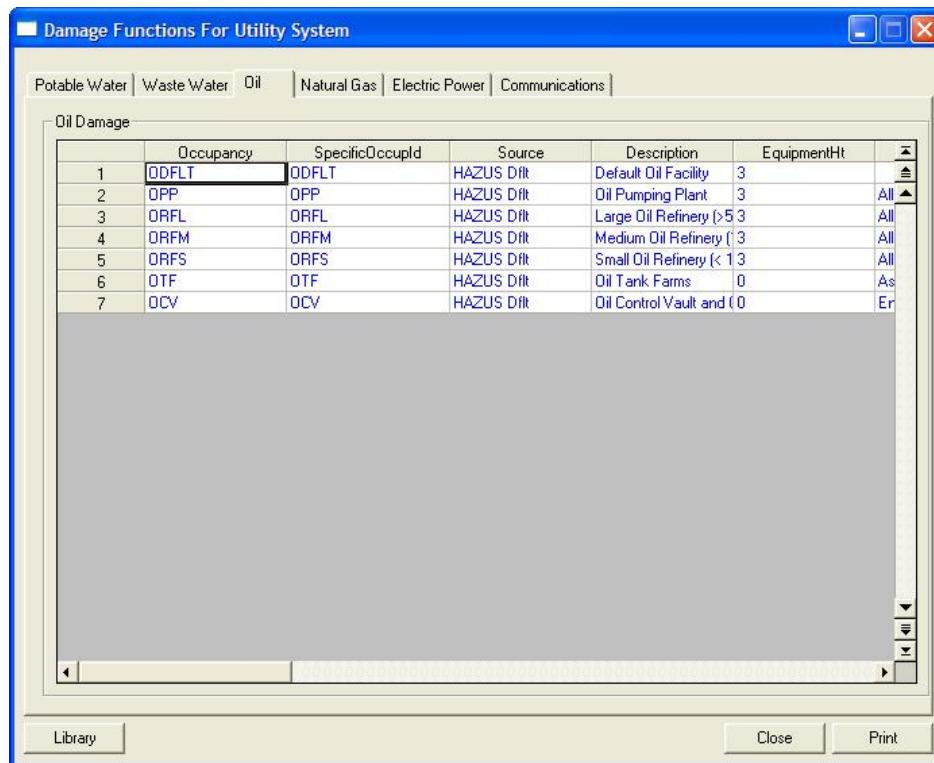
- Selection of Waste Water tab on the Damage Functions for Utility Systems dialog opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those components of the Utility Systems that HAZUS performs an analysis on. The dialog has the following features:
 - The dialog has six tabs. The tabs are labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. Potable Water is the default view.
 - The dialog does not have a combo box.
 - The dialog does not have radio buttons.

- d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. The data tables are fUtilFltDmgFn, fUtilDmgUnionDetails, and fUtilFltDmgXRef.
- c. The view is absv_UtilzWWaterDmgFn.
- d. The flood model methodology performs damage analysis for specific components of the utility systems. Future releases of the flood model will increase the functionality of the utility systems parameters menu.
- e. The data grid is labeled Waste Water Damage and displays the selected damage functions used in the damage analysis of those components of the waste water system that damage functions were available, or that were deemed sufficiently prone to flood damage that functions were developed using flood engineering experts.
- a. The data grid columns are labeled: Occupcy, SpecificOccupId, Source, Description, EquipmentHt, Comment, DefaultFn (checkbox), Editable (checkbox), Selected (checkbox), 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, ID, FunctionDepth, HazardRiverne, HazardCA, and HazardCV.
- f. Selection of the command button Library opens up a library of Utility Systems damage functions. The function of the Utility System Library is discussed below. The library for the waste water damage functions is functionally the same as that discussed above in the Potable Water section, except as noted below.
- a. EXCEPTION: The waste water damage function library's Occupancy combo box has options labeled: WDFLT, WSL, WLSM, WLSS, WWTL, WWTM, WWTS, and WWCV.

- g. Selection of command button ‘Close’ closes the Damage Functions for Utility System dialog and returns the user to the base map view.
- h. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.4.3. Analysis Menu, Damage Functions Submenu: Utility Systems Dialog, Oil Tab



**Figure 3-195: HAZUS Analysis Menu, Damage Functions Submenu:
Utility Systems Damage Function, Oil Tab**

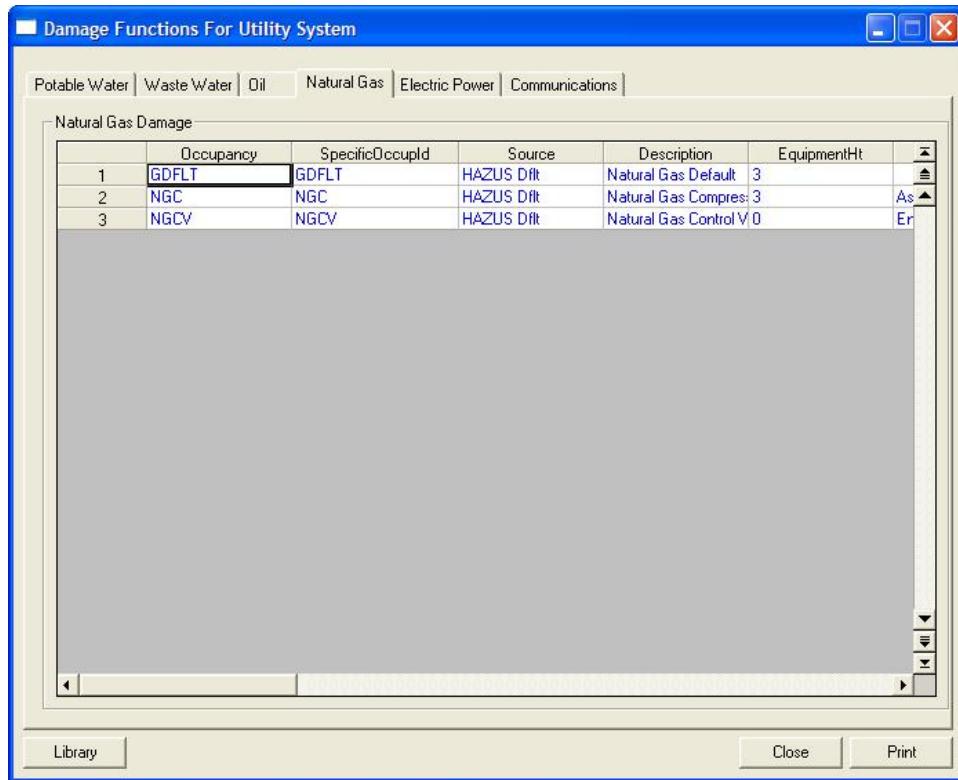
- a. Selection of Oil tab on the Damage Functions for Utility Systems dialog opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those components of the Utility Systems that HAZUS performs an analysis on. The dialog has the following features:
 - a. The dialog has six tabs. The tabs are labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. Potable Water is the default view.
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. The data tables are fUtilFltyDmgFn, fUtilFltyDmgUnionDetails, and fUtilFltyDmgXRef.
- c. The view is absv_UtilzOilDmgFn.
- d. The flood model methodology performs damage analysis for specific components of the utility systems. Future releases of the flood model will increase the functionality of the utility systems parameters menu.
- e. The data grid is labeled Oil Damage and displays the selected damage functions used in the damage analysis of those components of the Oil system that damage functions were available, or that were deemed sufficiently prone to flood damage that functions were developed using flood engineering experts.
 - a. The data grid columns are labeled: Occupncy, SpecificOccupId, Source, Description, EquipmentHt, Comment, DefaultFn (checkbox), Editable (checkbox),

Selected (checkbox), 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, ID, FunctionDepth, HazardRiverne, HazardCA, and HazardCV.

- f. Selection of the command button Library opens up a library of Utility Systems damage functions. The function of the Utility System Library is discussed below. The library for the oil damage functions is functionally the same as that discussed above in the Potable Water section, except as noted below.
 - a. EXCEPTION: The Oil damage function library's Occupancy combo box has options labeled: ODFLT, OPP, ORFL, ORFM, ORFS, OTF, and OCV.
- g. Selection of command button 'Close' closes the Damage Functions for Utility System dialog and returns the user to the base map view.
- h. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.4.4. Analysis Menu, Damage Functions Submenu: Utility Systems Dialog, Natural Gas Tab



**Figure 3-196: HAZUS Analysis Menu, Damage Functions Submenu:
Utility Systems Damage Function, Natural Gas Tab**

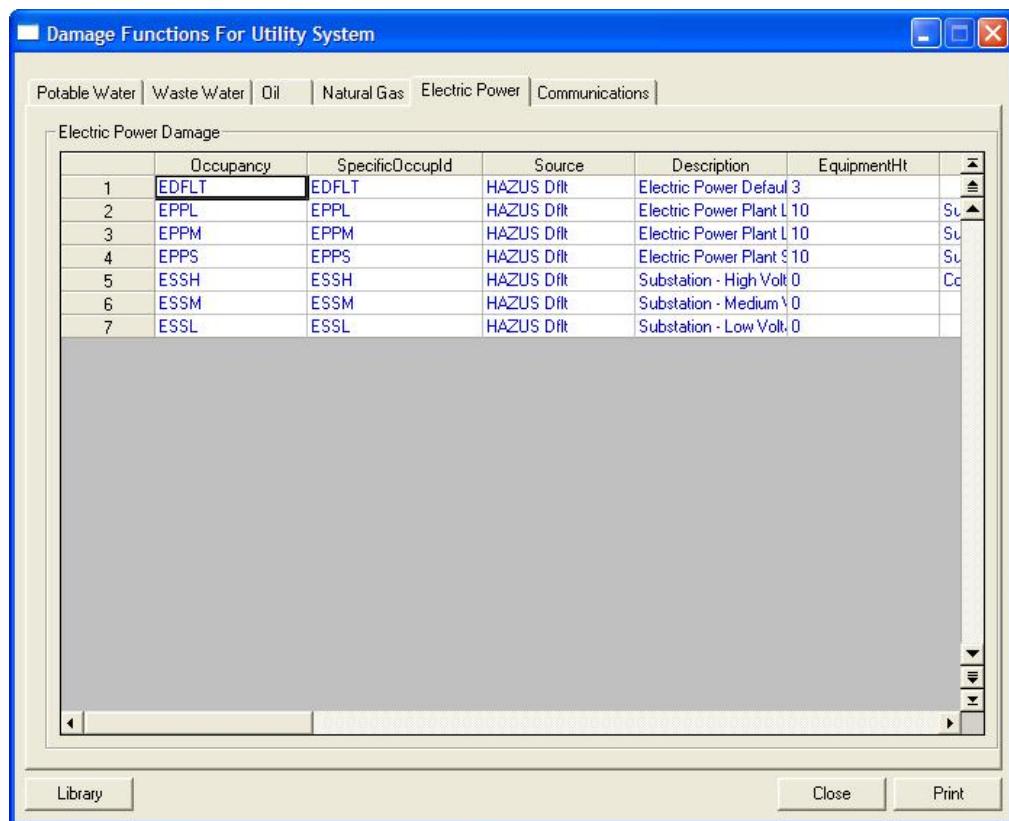
- Selection of Natural Gas tab on the Damage Functions for Utility Systems dialog opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those components of the Utility Systems that HAZUS performs an analysis on. The dialog has the following features:
 - The dialog has six tabs. The tabs are labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. Potable Water is the default view.
 - The dialog does not have a combo box.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box for scenario census blocks.

- e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. The data tables are fUtilFltyDmgFn, fUtilFltyDmgUnionDetails, and fUtilFltyDmgXRef.
- c. The data view is absv_UtilzNGasDmgFn.
- d. The flood model methodology performs damage analysis for specific components of the utility systems. Future releases of the flood model will increase the functionality of the utility systems parameters menu.
- e. The data grid is labeled Natural Gas Damage and displays the selected damage functions used in the damage analysis of those components of the Natural Gas system that damage functions were available, or that were deemed sufficiently prone to flood damage that functions were developed using flood engineering experts.
- a. The data grid columns are labeled: Occupancy, SpecificOccupId, Source, Description, EquipmentHt, Comment, DefaultFn (checkbox), Editable (checkbox), Selected (checkbox), 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, ID, FunctionDepth, HazardRiverne, HazardCA, and HazardCV.
- f. Selection of the command button Library opens up a library of Utility Systems damage functions. The function of the Utility System Library is discussed below. The library for the natural gas damage functions is functionally the same as that discussed above in the Potable Water section, except as noted below.
- a. EXCEPTION: The Natural Gas damage function library's Occupancy combo box has options labeled: GDFLT, NGC, and NGCV.
- g. Selection of command button 'Close' closes the Damage Functions for Utility System dialog and returns the user to the base map view.

- h. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.4.5. Analysis Menu, Damage Functions Submenu: Utility Systems Dialog, Electric Power Tab



**Figure 3-197: HAZUS Analysis Menu, Damage Functions Submenu:
Utility Systems Damage Function, Electric Power Tab**

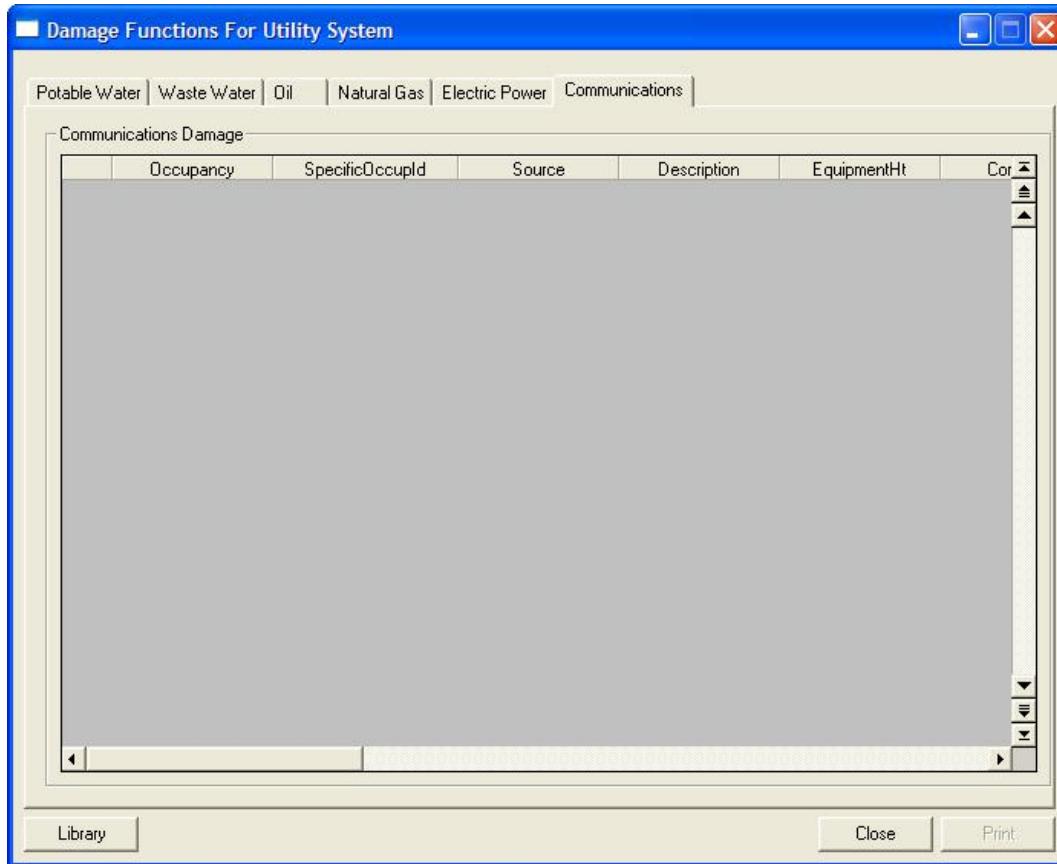
- a. Selection of Electric Power tab on the Damage Functions for Utility Systems dialog opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those components of the Utility Systems that HAZUS performs an analysis on. The dialog has the following features:
 - a. The dialog has six tabs. The tabs are labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. Potable Water is the default view.
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. The data tables are fUtilFltyDmgFn, fUtilFltyDmgUnionDetails, and fUtilFltyDmgXRef.
- c. The data view is absv_UtilzEPowerDmgFn.
- d. The flood model methodology performs damage analysis for specific components of the utility systems. Future releases of the flood model will increase the functionality of the utility systems parameters menu.
- e. The data grid is labeled Electric Power Damage and displays the selected damage functions used in the damage analysis of those components of the Electric Power system that damage functions were available, or that were deemed sufficiently prone to flood damage that functions were developed using flood engineering experts.
 - a. The data grid columns are labeled: Occupncy, SpecificOccupId, Source, Description, EquipmentHt, Comment, DefaultFn (checkbox), Editable (checkbox),

Selected (checkbox), 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, ID, FunctionDepth, HazardRiverne, HazardCA, and HazardCV.

- f. Selection of the command button Library opens up a library of Utility Systems damage functions. The function of the Utility System Library is discussed below. The library for the electric power damage functions is functionally the same as that discussed above in the Potable Water section, except as noted below.
 - a. EXCEPTION: The electric power damage function library's Occupancy combo box has options labeled: EDFLT, EPPL, EPPM, EPPS, ESSH, ESSM, and ESSL.
- g. Selection of command button 'Close' closes the Damage Functions for Utility System dialog and returns the user to the base map view.
- h. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.4.6. Analysis Menu, Damage Functions Submenu: Utility Systems Dialog, Communications Tab



**Figure 3-198: HAZUS Analysis Menu, Damage Functions Submenu:
Utility Systems Damage Function, Communications Tab**

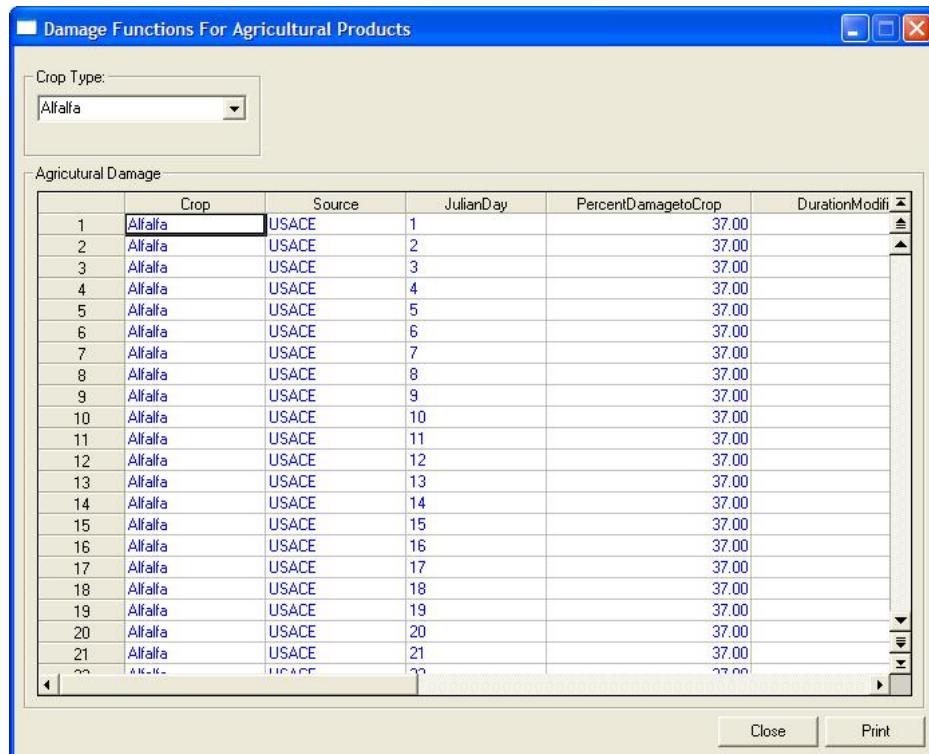
- a. Selection of Communications tab on the Damage Functions for Utility Systems dialog opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those components of the Utility Systems that HAZUS performs an analysis on. The dialog has the following features:
 - a. The dialog has six tabs. The tabs are labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. Potable Water is the default view.
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.

- d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print. Command buttons are available regardless of the tab being viewed.
- b. The data tables are flUtilFltyDmgFn, flUtilFltyDmgUnionDetails, and flUtilFltyDmgXRef.
- c. The data view is absv_UtilzCommDmgFn.
- d. The flood model methodology performs damage analysis for specific components of the utility systems. Future releases of the flood model will increase the functionality of the utility systems parameters menu.
- e. The data grid is labeled Communications Damage and displays the selected damage functions used in the damage analysis of those components of the Communications system that damage functions were available, or that were deemed sufficiently prone to flood damage that functions were developed using flood engineering experts.
- a. The data grid columns are labeled: Occupancy, SpecificOccupId, Source, Description, EquipmentHt, Comment, DefaultFn (checkbox), Editable (checkbox), Selected (checkbox), 0 ft, 1 ft, 2 ft, 3 ft, 4 ft, 5 ft, 6 ft, 7 ft, 8 ft, 9 ft, 10 ft, ID, FunctionDepth, HazardRiverne, HazardCA, and HazardCV.
- f. Selection of the command button Library opens up a library of Utility Systems damage functions. The function of the Utility System Library is discussed below. The library for the communications damage functions is functionally the same as that discussed above in the Potable Water section, except as noted below.
- a. EXCEPTION: The communications damage function library's Occupancy combo box has options labeled: combo box is null – the Flood model does not calculate damages for communication system components.

- g. Selection of command button ‘Close’ closes the Damage Functions for Utility System dialog and returns the user to the base map view.
- h. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.5. Analysis Menu, Damage Functions Submenu: Agricultural Products Dialog



**Figure 3-199: HAZUS Analysis Menu, Damage Functions Submenu:
Agricultural Products Damage Function**

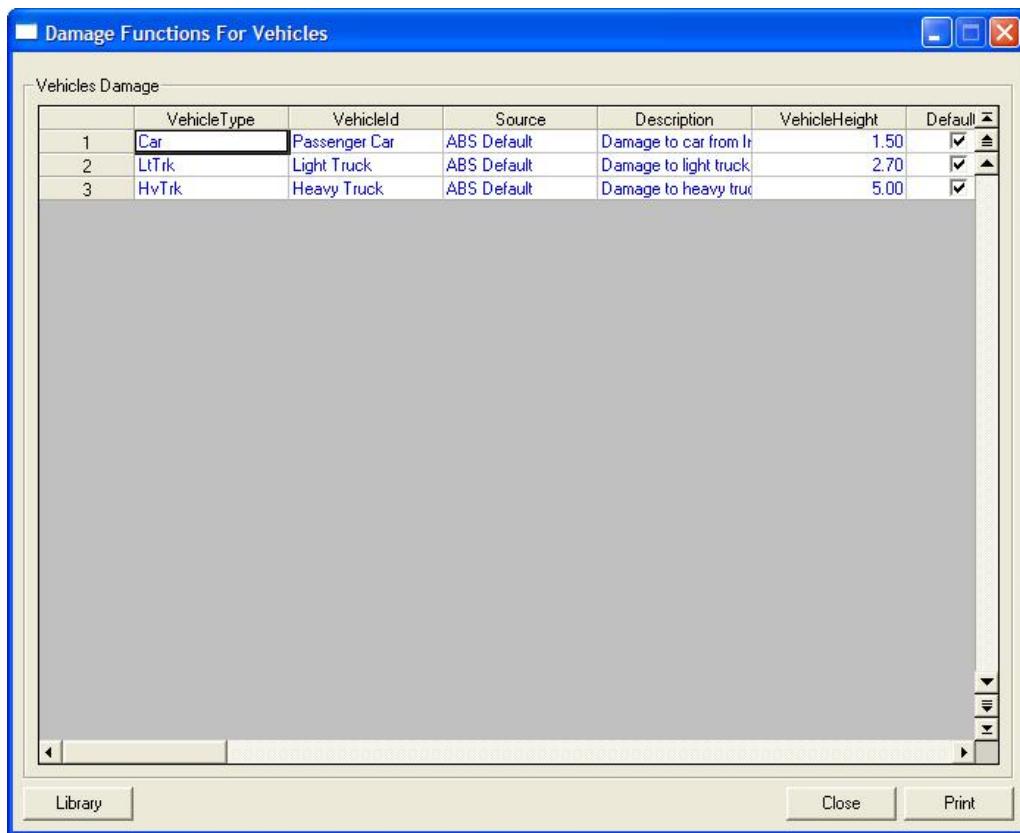
a. Selection of Agricultural Products on the Damage submenu opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions for those agricultural crops that HAZUS performs an analysis on. The dialog has the following features:

- a. The dialog does not have tabs.
 - b. The dialog has a single combo box labeled Crop Type. The default value is Alfalfa.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.
 - e. The dialog has a single data grid that is not editable. At this time, the user cannot change or alter the crop damage functions.
 - f. The dialog has command buttons labeled 'Close', and Print.
- b. The data table is flAgDmgFn.
- c. The view is absv_AgDmgFn.
- d. The flood model methodology performs damage analysis for specific crop types. Because the universe of crop types is so large and diverse across the nation, the Flood Oversight Committee recommended providing crop damage analysis for the top twenty crops for each county.
- a. The agricultural product crop damage analysis is based on the U.S. Army Corps of Engineers AGDAM methodology. This methodology estimates the potential losses to planted crops based on the Julian Calendar date of the flood compared to damage functions developed by the Corps.
 - b. The estimated losses are further modified by duration factors (0 day, 3-day, 7-day and 14-day flooding).
 - c. The methodology also attempts to capture the fact that crops, depending on when the flood occurs can be replanted and some losses recovered.

- d. Future releases of the flood model may increase the functionality of the agricultural product analysis.
- e. The data grid is labeled Agriculture Damage and displays the selected damage functions used in the damage analysis of the crops selected in the combo box
 - a. The data grid columns are labeled: Crop, Source, JulianDay, PercentDamagetoCrop, DurationModifier0-Days, DurationModifier3-Days, DurationModifier7-Days, and DurationModifier 14-Days.
- f. The combo box labeled Crop Type allows the user to select and view the available crops within the given county. Options include Alfalfa, Almonds, Barley, Corn, Corn Silage, Cotton, Flax, Fruits & Nuts, Grapes, Oats, Other Hay, Rice, Safflower, Soybeans, Sugarbeets, Tomato, Truck Crops, Walnuts, Wheat, and Winter Wheat.
- g. Selection of command button 'Close' closes the Damage Functions for Damage Functions for Agricultural Products dialog and returns the user to the base map view.
- h. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.6. Analysis Menu, Damage Functions Submenu: Vehicles Dialog



**Figure 3-200: HAZUS Analysis Menu, Damage Functions Submenu:
Damage Functions For Vehicles Dialog**

- a. Selection of Vehicles on the Damage submenu opens the dialog shown above. This dialog, based on the standard HAZUS flood dialog, allows the user to view and work with the damage functions utilized in analyzing the damages to vehicles. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box for scenario census blocks.

- e. The dialog has a single data grid that is not editable at this level. The data grid will display changes made by the user through the use of a highlighted color on the record that has been changed.
 - f. The dialog has command buttons labeled Library, Close, and Print.
- b. The data tables are flVehDmgFn, flVehDmgUnionDetails, and flVehDmgXRef.
- c. The data view is absv_VehDmgFn.
- d. The flood model methodology performs damage analysis for vehicles based on the impact of water on primary components of the vehicle that would affect the vehicles ability to be operated or restored.
- a. Flood engineering experts were brought together to develop the damage functions and the methodology for estimating damage to vehicles since there were no known published damage functions available when the model was developed.
- e. The data grid is labeled Vehicles Damage and displays the damage functions used in the damage analysis for Cars, Light Trucks, and Heavy Trucks.
- a. The data grid columns are labeled: VehicleType, VehicleID, Source, Description, VehicleHeight, DefaultFn (checkbox), Selected (checkbox), Editable (checkbox), 0 ft, 0.5 ft, 1 ft, 1.5 ft, 2 ft, 2.5 ft, 3 ft, 3.5 ft, 4 ft, 4.5 ft, 5 ft, 5.5 ft, 6 ft, 6.5 ft, 7 ft, 7.5 ft, 8 ft, 8.5 ft, 9 ft, 9.5 ft, 10 ft, 10.5 ft, 11 ft, 11.5 ft, 12 ft, 12.5 ft, 13 ft, 13.5 ft, ID, FunctDepth, HazardR, HazardCA, HazardCV, and Comment.
- f. Selection of the command button Library opens up a library of Vehicle damage functions. The function of the Vehicle Library is discussed below.
- g. Selection of command button ‘Close’ closes the Damage Functions for Vehicles dialog and returns the user to the base map view.
- h. Selection of command button Print opens the standard windows print dialog and allows the user to print the displayed damage functions.

- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.1.6.1. Analysis Menu, Damage Function Submenu: Damage Functions for Vehicles, Library Dialog

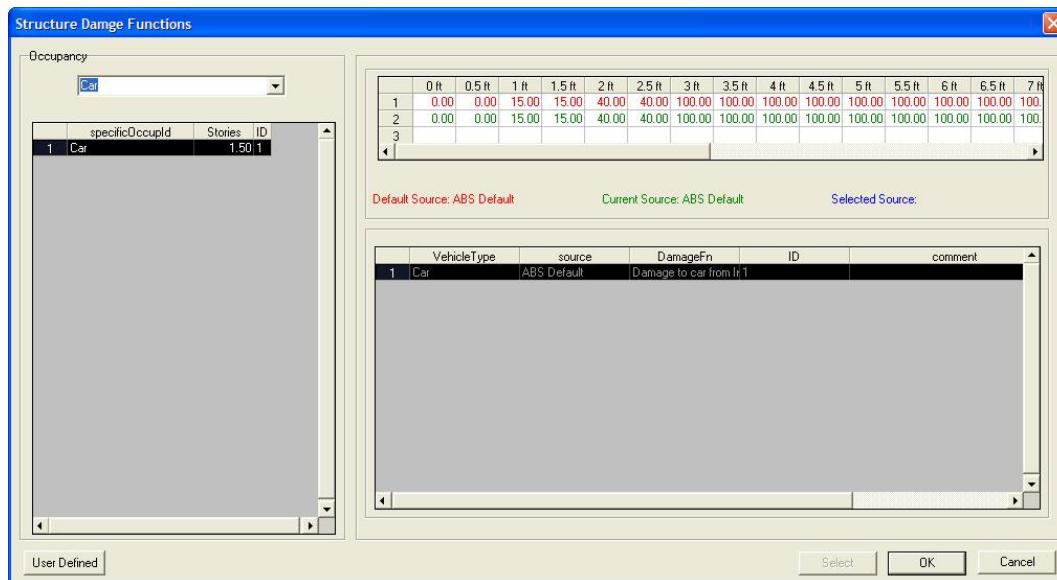


Figure 3-201: HAZUS Analysis Menu, Damage Functions Submenu: Damage Functions for Vehicles, Library Dialog

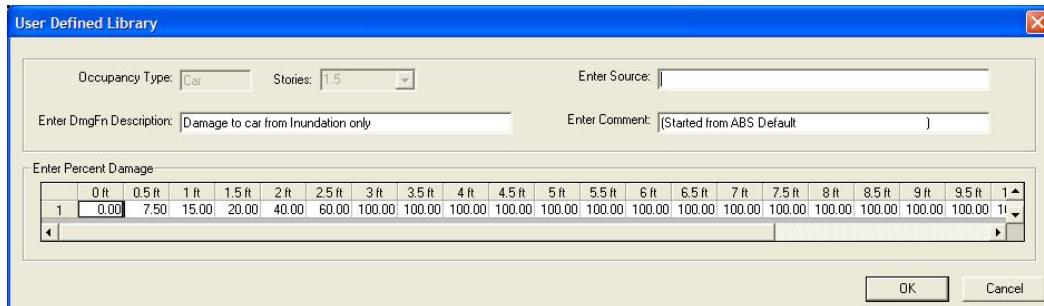
- a. On the Damage Functions for Vehicles dialog clicking on the command button Library opens the dialog shown above. The dialog is a custom dialog that allows the user to view the default damage function, compare to optional functions, and to select or assign a different function. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog has a combo box labeled Occupancy. Car is the default value.

- c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog has three data grids that display information necessary for the user to view and select alternative damage functions.
 - f. The dialog has command buttons labeled User Defined, Select (changes to Deselect if the user has selected a function), OK, and Print.
-
- b. Data for the data grid is stored in the tables ‘f1VehDmgFn’, ‘f1VehDmgUnionDetails’, and ‘f1VehDmgXRef’.
 - c. The data view for this dialog is absv_VehDmgFn.
 - d. The combo box labeled Occupancy allows the user to select the vehicle type that is of interest to them. Options include Car, LtTrk, and HvTrk.
 - a. Depending on the selection of Occupancy, the data grids will display information directly relevant to that occupancy.
 - e. The left most data grid displays the specific occupancy used by the flood model for the assignment of damage functions.
 - a. The left most data grid columns are labeled: SpecificOccupId, Stories, and ID. Stories in this case identify the height of the vehicle above grade.
 - f. The top data grid is designed to display several damage functions at the same time to allow the user to review the default function versus alternative selections.
 - a. The data grid has columns 0 ft, 0.5 ft, 1 ft, 1.5 ft, 2 ft, 2.5ft, 3 ft, 3.5 ft, 4 ft, 4.5 ft, 5 ft, 5.5 ft, 6 ft, 6.5 ft, 7 ft, 7.5 ft, 8 ft, 8.5 ft, 9 ft, 9.5 ft, 10 ft, 10.5 ft, 11 ft, 11.5 ft, 12 ft, 12.5 ft, 13 ft, and 13.5 ft.
 - b. The top data grid has unique text control that colors the text to allow the user quick visualization of the data they are reviewing.

- i. Default damage functions are displayed on the top line of the grid and in red text.
 - ii. The middle line of the data grid displays any damage function in the lower data grid that the user highlights through mouse selection. This data is displayed in green text.
 - iii. If the user uses the command button select, the third line in the data grid displays the selected damage function in blue text.
 - iv. Within the data frame of the data grid, the source of the damage functions is displayed. The source of the default, the highlighted, and the selected.
- g. The bottom data grid displays the library of potential damage functions that the user can select from. The library was developed a panel of experts to be applicable to each of the specific utility system components for the analysis of damage and functionality.
- a. The data is not editable.
 - b. The data grid has columns labeled VehicleType, source, Damagefn, ID, Comment, Selected (checkbox), Editable (checkbox), defaultfn (checkbox).
 - c. If the user highlights any damage function in the lower data grid, it is displayed in the center row of the data grid above, in green text (meaning the currently highlighted function). The Select command button is also enabled allowing the user to select that function as an alternative to the default damage function.
 - d. The user cannot select a different damage function as a default – they can just use alternate functions in their given study region.
- h. Selection of the Select Command button causes the highlighted damage function to be displayed in the third row of the top data grid in blue text. The function is also displayed in the bottom data grid in blue text.
- a. Selection of a damage function changes a flag that tells the flood model to use this damage function in place of the default.

- b. The Select command button becomes Deselect allowing the user to restore the default function if they so choose. To Deselect, the user must highlight the selected function (blue text in the bottom data grid) and hit Deselect. If the user highlights any other function the command button returns to 'Select' allowing the user to override their previous selection.
- i. Selection of OK closes the Structure Damage Functions dialog and returns the user to the Damage Functions for Utility System dialog. If the user has selected an alternative function that function can be seen on the open screen. This damage function is used in subsequent loss calculations. If the user has not selected any alternative functions, the defaults are used.
- j. Selection of Cancel closes the Structure Damage Functions dialog and returns the user to the Damage Functions for Utility System dialog. If the user has selected an alternative damage function, that selection is not maintained.
- k. Selection of the User Defined command button opens the dialog discussed in the subsection below.
 - a. The user can either go to the User Defined command button using the default damage function as the base, or they can select a damage function (using the Select command button) and then use the User Defined command button to work off that selected damage function.

3.2.7.3.1.6.1.1. Analysis Menu, Damage Function Submenu: Damage Functions for Vehicles Library, User Defined Dialog



**Figure 3-202: HAZUS Analysis Menu, Damage Functions Submenu:
Damage Functions for Vehicles, Library, and User Defined Dialog**

- a. Selection of the User Defined command button on the Library dialog opens the dialog shown above. The dialog allows the user to create their own damage function starting with any damage function of their choice. This feature was provided to make it easier for users to create new functions without having to start from scratch. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog has a disabled combo box labeled Stories. The value shown is the value of either the default damage function or a function the user may have highlighted before using the command button.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have check box labeled basement.
 - e. The dialog has four text boxes labeled Occupancy Type, Enter Source, Enter DmgFn Description, and Enter Comment. Occupancy Type is not editable and grayed out displaying the value of the source damage function. The other text boxes are editable.
 - f. The dialog has a data grid that displays the damage values the user wants to start working with. The grid is editable and is labeled Enter Percent Damage.
 - g. The dialog has command buttons labeled OK, and Cancel.
- b. Data for the data grid is stored in the table f1VehDmgFn.
- c. There is no data view for this dialog.
- d. The Enter Source text box allows the user to provide a name for the source of their damage function (if they are looking at a published report or creating their own). If the user selects OK without completing this box, the following error message.



Figure 3-203: Enter Source Error Message

- e. The Enter DmgFn Description is pre-populated with the Description from the damage function the user started with. The user can then alter this information to better describe their custom damage function.
- f. The Enter Comment text box is pre-populated with a sentence that shows the damage function the user started with. For example they can see (Started from ABS Default). The user can input any value here.
- g. The data grid has columns labeled 0 ft, 0.5 ft, 1 ft, 1.5 ft, 2 ft, 2.5ft, 3 ft, 3.5 ft, 4 ft, 4.5 ft, 5 ft, 5.5 ft, 6 ft, 6.5 ft, 7 ft, 7.5 ft, 8 ft, 8.5 ft, 9 ft, 9.5 ft, 10 ft, 10.5 ft, 11 ft, 11.5 ft, 12 ft, 12.5 ft, 13 ft, and 13.5 ft.
 - a. The user must double click on a given grid cell to change the value. The user can enter any value (integer or decimal).
 - b. Input of unrealistic damage functions causes the following error message to be displayed.

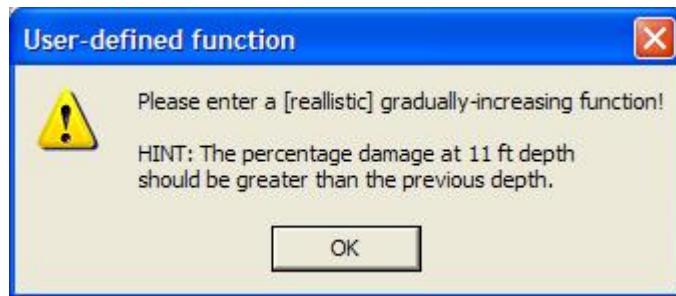


Figure 3-204: User Defined Damage Function Input Error Message

- h. Selection of OK save the user edits and adds the function to the library for the user to either use or not. The model does not automatically select the new function. The User Defined dialog closes and returns the user to the Structure Damage Function dialog.
- i. Selection of Cancel closes the User Defined dialog without saving any changes. The user is returned to the Structure Damage Function dialog.

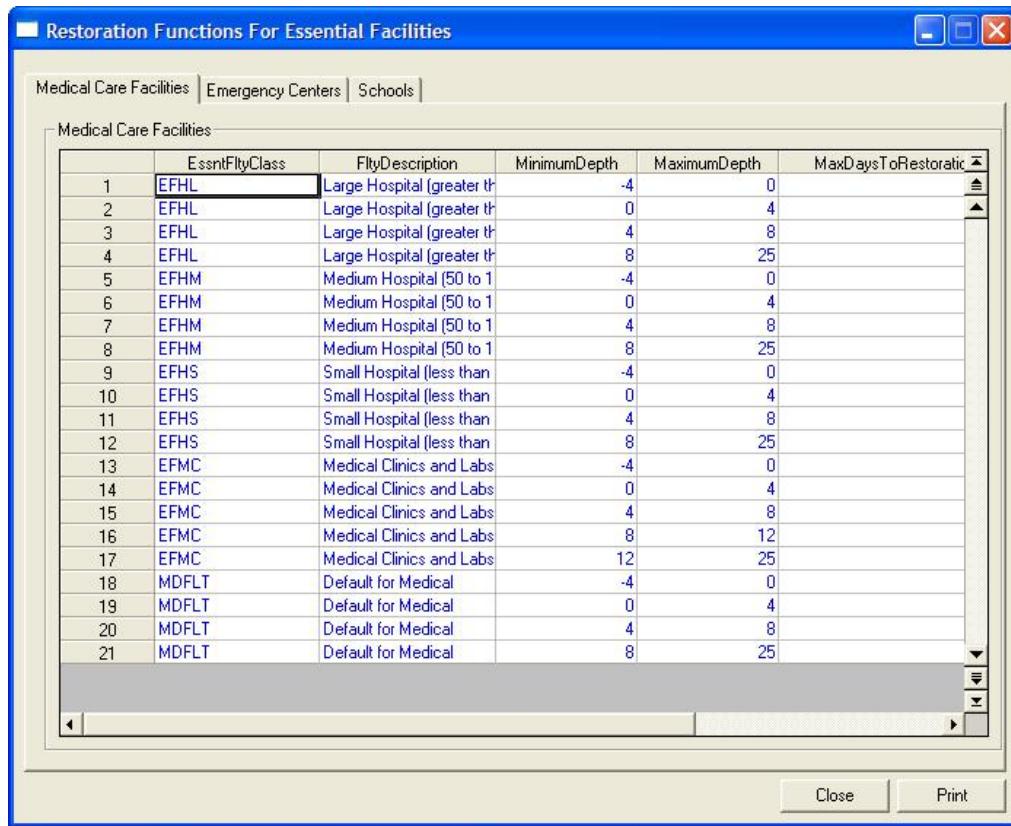
3.2.7.3.2. Analysis Menu: Restoration Functions Submenu



Figure 3-205: HAZUS Analysis Menu: Restoration Functions Submenu

- a. The restoration functions submenu allows the user to view and work with the restoration functions used to estimate the time for damaged facilities to return to a functional status. The restoration functions are unique to the flood model and have been developed through multiple government agencies and expert opinion.
- b. The user shall be able to select between Essential Facilities, Transportation Systems (currently disabled) and Utility Systems (currently disabled). Essential Facilities will be discussed in further detail in later sections.
- c. The user has the option to edit essential facility restoration functions to serve their local needs. Changes on this level are managed in the study region and not the specific scenario.

**3.2.7.3.2.1. Analysis Menu, Restoration Functions Submenu:
Essential Facilities Dialog**



**Figure 3-206: HAZUS Analysis Menu, Restoration Functions Submenu:
Essential Facilities, Medical Care Tab**

- Selection of Essential Facilities on the Restoration Functions submenu opens the Restoration Functions for Essential Facilities dialog shown above. The dialog is a standard HAZUS Flood Model dialog that allows the user to view and edit the default restoration function for essential facilities. The dialog has the following features:
 - The dialog has three tabs labeled Medical Care Facilities, Emergency Centers, and Schools. Medical Care Facilities is the default tab.
 - Tabs Medical Care Facilities and Schools do not have a combo box. Tab Emergency Centers has a combo box labeled Facility Type, Emergency Centers is the default value.
 - The dialog does not have radio buttons.

- d. The dialog does not have a check box.
 - e. The dialog has a single data grid that displays the restoration functions by occupancy. Selected columns are editable by the user.
 - f. The dialog has command buttons labeled Close and Print.
- b. The data tables are cIEF and fIRsFnEssntFlty.
- c. The data view is absv_RsFnEssntFlty.
- d. The data grid displays the restoration timelines (functions) by occupancy for Medical Care Facilities. Columns are labeled: EssntFltyClass, FltyDescription, MinimumDepth, MaximumDepth, MaxDaysToRestoration, FunctionalDepth. Columns MasDaysToRestoration and FunctionalDepth are editable and in black text. All other columns are not editable and displayed in blue text.
- a. The user must double click in a cell to edit the value.
- e. Selection of Close command button closes the Restoration Functions for Essential Facilities Dialog. If the user has made changes, a confirmation dialog opens allowing the user to accept, reject, or cancel and return to the dialog. Closing the dialog returns the user to the base map view.
- f. Selection of the Print command button opens a standard Microsoft print dialog that allows the user to print their restoration functions.
- g. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.2.1.1. Analysis Menu, Restoration Functions Submenu: Essential Facilities Dialog, Emergency Centers Tab

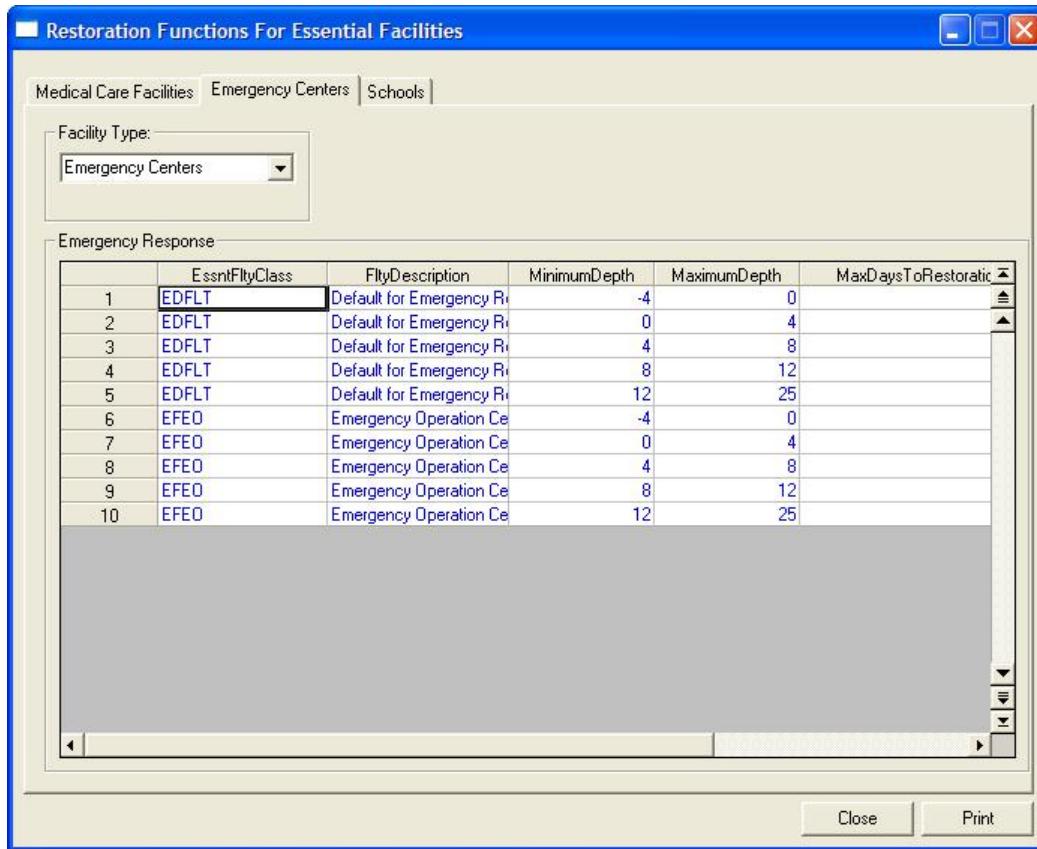


Figure 3-207: HAZUS Analysis Menu: Restoration Functions Submenu, Essential Facilities, Emergency Centers Tab

- Selection of the Emergency Centers tab on the Restoration Functions for Essential Facilities opens the dialog shown above. The dialog is a standard HAZUS flood model dialog that allows the user to view and edit the default restoration function for essential facilities. The dialog has the following features:
 - The dialog has three tabs labeled Medical Care Facilities, Emergency Centers, and Schools. Medical Care Facilities is the default tab.
 - The Emergency Centers tab has a combo box labeled Facility Type, Emergency Centers is the default value.
 - The dialog does not have radio buttons.

- d. The dialog does not have a check box.
 - e. The dialog has a single data grid that displays the restoration functions by occupancy. Selected columns are editable by the user.
 - f. The dialog has command buttons labeled Close and Print.
- b. The data tables are cIEF and fIRsFnEssntFlty.
- c. The view is absv_RSFnEssntFlty.
- d. The combo box labeled Facility Type allows the user to view restoration functions for different types of emergency centers. Options include Emergency Centers, Fire Stations, and Police Stations. Emergency Centers is the default value.
- a. The data grid discussed below displays the restoration function for the selected facility type in the combo box.
- e. The data grid displays the restoration timelines (functions) by occupancy for Emergency Center Facilities. Columns are labeled: EssntFltyClass, FltyDescription, MinimumDepth, MaximumDepth, MaxDaysToRestoration, FunctionalDepth. Columns MaxDaysToRestoration and FunctionalDepth are editable and in black text. All other columns are not editable and displayed in blue text.
- a. The user must double click in a cell to edit the value.
- f. Selection of Close command button closes the Restoration Functions for Essential Facilities Dialog. If the user has made changes, a confirmation dialog opens allowing the user to accept, reject, or cancel and return to the dialog. Closing the dialog returns the user to the base map view.
- g. Selection of the Print command button opens a standard Microsoft print dialog that allows the user to print their restoration functions.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.2.1.2. Analysis Menu, Restoration Functions Submenu: Essential Facilities Dialog, Schools Tab

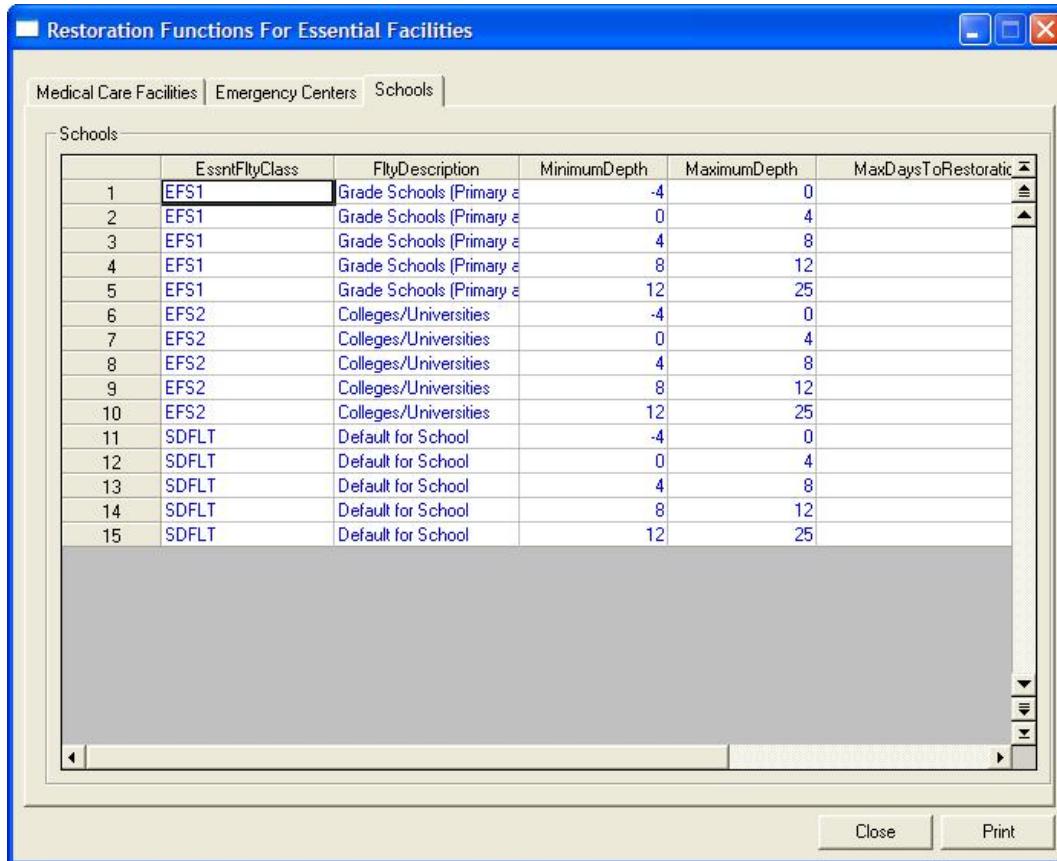


Figure 3-208: HAZUS Analysis Menu: Restoration Functions Submenu, Essential Facilities, Schools Tab

- a. Selection of the Schools tab on the Restoration Functions for Essential Facilities opens the dialog shown above. The dialog is a standard HAZUS flood dialog that allows the user to view and edit the default restoration function for essential facilities. The dialog has the following features:

- a. The dialog has three tabs labeled Medical Care Facilities, Emergency Centers, and Schools. Medical Care Facilities is the default tab.
 - b. The Schools tab does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog has a single data grid that displays the restoration functions by occupancy. Selected columns are editable by the user.
 - f. The dialog has command buttons labeled Close and Print.
-
- b. The data tables are cIEF and fIRsFnEssntFlty.
 - c. The data view is absv_RsFnEssntFlty.
 - d. The data grid displays the restoration timelines (functions) by occupancy for School Facilities. Columns are labeled: EssntFltyClass, FltyDescription, MinimumDepth, MaximumDepth, MaxDaysToRestoration, FunctionalDepth. Columns MaxDaysToRestoration and FunctionalDepth are editable and in black text. All other columns are not editable and displayed in blue text.
 - a. The user must double click in a cell to edit the value.
 - e. Selection of Close command button closes the Restoration Functions for Essential Facilities Dialog. If the user has made changes, a confirmation dialog opens allowing the user to accept, reject, or cancel and return to the dialog. Closing the dialog returns the user to the base map view.
 - f. Selection of the Print command button opens a standard Microsoft print dialog that allows the user to print their restoration functions.
 - g. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.2.2. Analysis Menu, Restoration Functions Submenu: Transportation Systems

- a. The Transportation Systems selection on the Restoration Functions submenu is currently disabled because of the lack of published data on timelines for the restoration of transportation systems that are being analyzed in HAZUS. This feature may be enabled in future versions of the Flood Model as the science evolves.

3.2.7.3.2.3. Analysis Menu, Restoration Functions Submenu: Utility Systems

- a. The Utility Systems selection on the Restoration Functions submenu is currently disabled because of the lack of published data on timelines for the restoration of utility components that are being analyzed in HAZUS. This feature may be enabled in future versions of the Flood Model as the science evolves.

3.2.7.3.3. Analysis Menu: Parameters Submenu

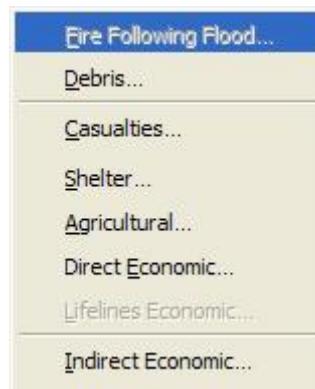


Figure 3-209: HAZUS Analysis Menu: Parameters Submenu

- a. This menu gives the user access to a submenu that allows the user to further tailor their analysis to reflect local conditions that the user is likely to have knowledge or experience.

- b. The submenu includes Fire Following Flood (currently disabled), Debris, Casualties, Shelter, Agricultural, Direct Economic, Lifelines Economic (currently disabled), and Indirect Economic
- c. Each submenu selection shall be discussed in greater detail in the following sections.
- d. Selection or changes in the parameters shall edit the results for every scenario that is subsequently run within the study region. In some cases, the parameter is required before the analysis can be completed (specifically the Agricultural).

3.2.7.3.3.1. Analysis Menu, Parameters Submenu, Fire Following Flood.

- a. This menu item is currently disabled and is provided here to remain in line with the original earthquake model. As data and published documentation that provides the capability of estimating the likelihood of a fire following (or during) a flood matures, this feature may be enabled and added to the flood model.

3.2.7.3.3.2. Analysis Menu, Parameters Submenu, Debris Dialog

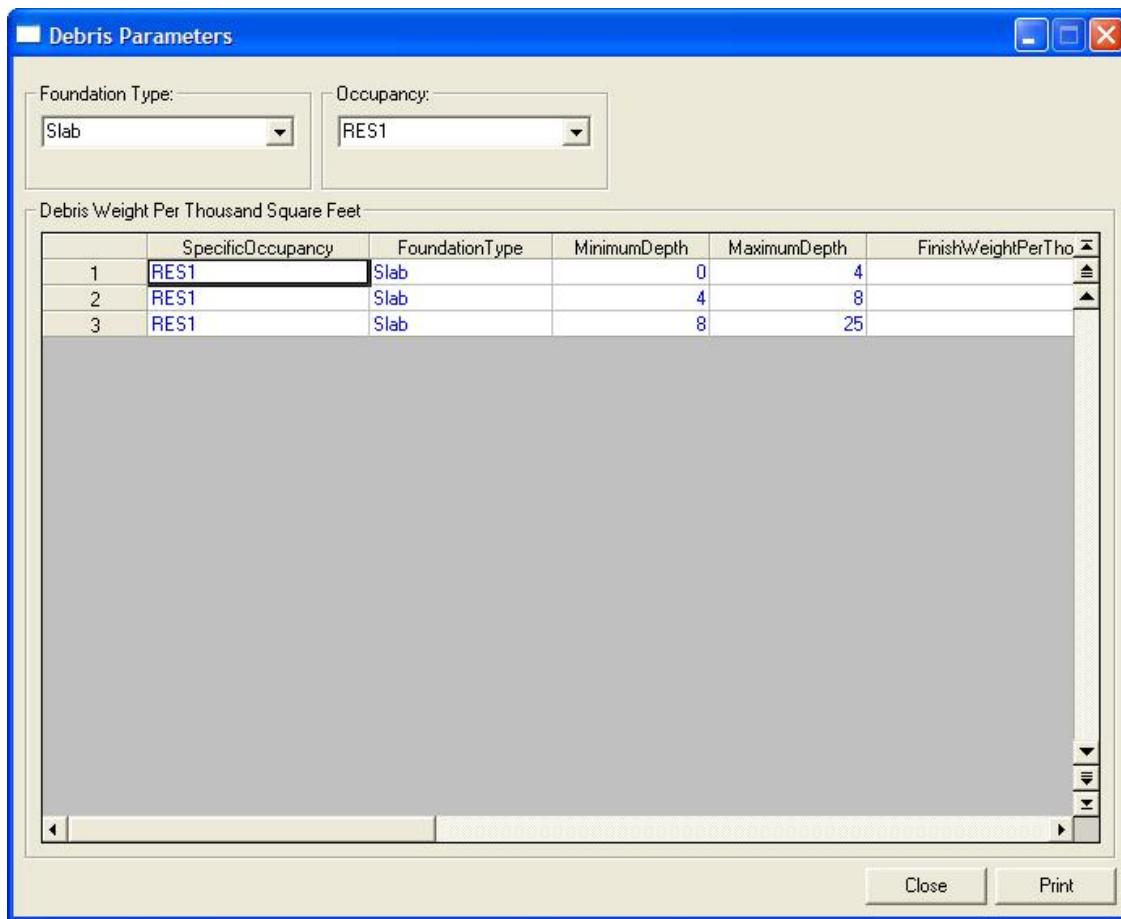


Figure 3-210: HAZUS Analysis Menu: Parameters Submenu, Debris Dialog

- a. Selection of the Debris menu item on the Parameters submenu opens the dialog shown above. The dialog is a standard HAZUS flood dialog that allows the user to view and edit the default restoration function for essential facilities. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog has two combo boxes that are labeled Foundation Type and Occupancy.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.

- e. The dialog has a single data grid that displays the debris production by occupancy. The data grid is labeled Debris Weight Per Thousand Square Feet. Selected columns are editable by the user.
 - f. The dialog has command buttons labeled Close and Print.
- b. The data tables are cISOccupancy and fIDebris.
- c. The view is absv_Debris.
- d. The combo box labeled Foundation Type allows the user to view and edit the debris production by occupancy by foundation type. The options include Slab and Footing. Slab is the default.
- e. The combo box labeled Occupancy allows the user to select the specific occupancy classification for which the debris production parameters are displayed.
- a. The combo box options are:
- f. The data grid displays a number of columns that are a mix of editable and non-editable field. The data grid column names are:
- a. SpecificOccupancy, FoundationType, MinimumDepth, MaximumDepth, FinishWeightPerTHousSqFt, StructureWeightPerThousSqFt, and FoundationWeightPerThousSqFt.
 - b. Columns SpecificOccupancy, FoundationType, MinimumDepth, and MaximumDepth are not editable and displayed in blue text.
 - c. Columns FinishWeightPerTHousSqFt, StructureWeightPerThousSqFt, and FoundationWeightPerThousSqFt are editable. The user must double click on a cell to change the value.
- g. Selection of Close command button closes the Debris Parameters dialog. If the user has made changes, a confirmation dialog opens allowing the user to accept, reject, or cancel and return to the dialog. Closing the dialog returns the user to the base map view.

- h. Selection of the Print command button opens a standard Microsoft print dialog that allows the user to print their restoration functions.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.3.3. Analysis menu, Parameters Submenu, Casualties Dialog

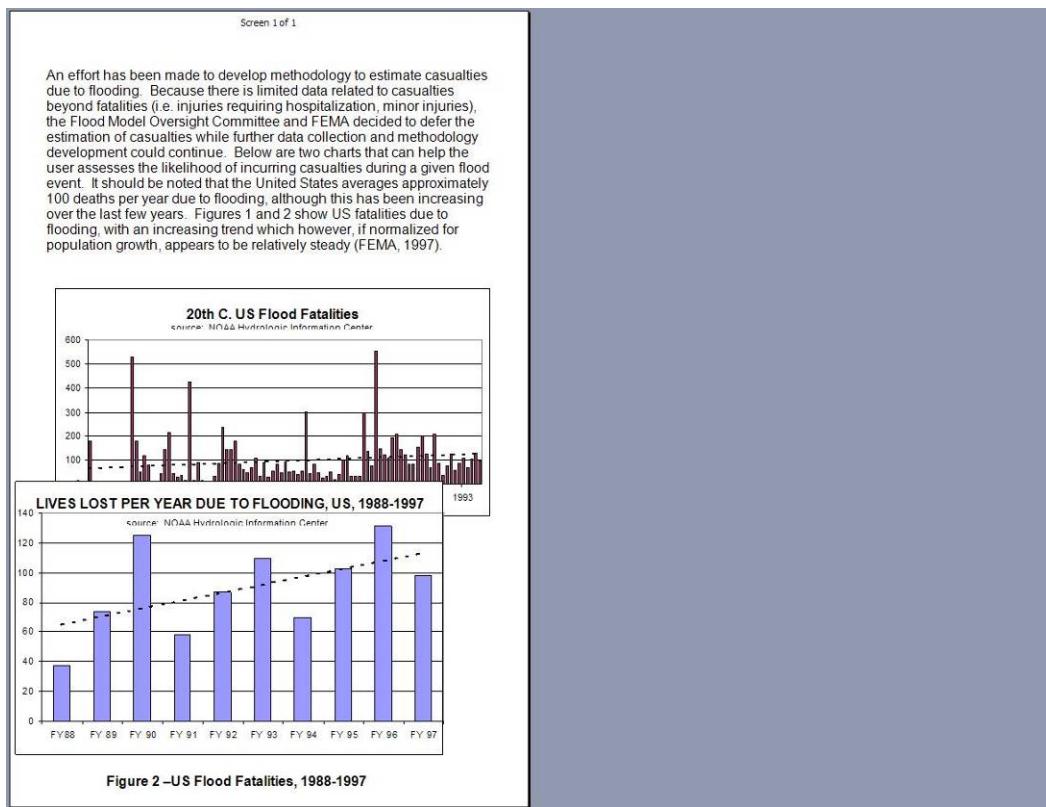


Figure 3-211: HAZUS Analysis Menu: Parameters Submenu, Casualties Dialog

- a. The HAZUS flood model does not perform casualty analysis. This is primarily because a number of the casualties in flooding are caused by personal indiscretion that put people in

harms way (such as driving into the flood waters). Additionally, a number of casualties occur during the cleanup process. Finally, the total number of casualties due to flooding is relatively small on a national basis assuming people respond correctly to the flood warning.

- b. The HAZUS flood model provides a word document that describes the reasoning for the decision and background data associated with the decision making process.

3.2.7.3.3.4. Analysis Menu, Parameters Submenu, Shelter Dialog

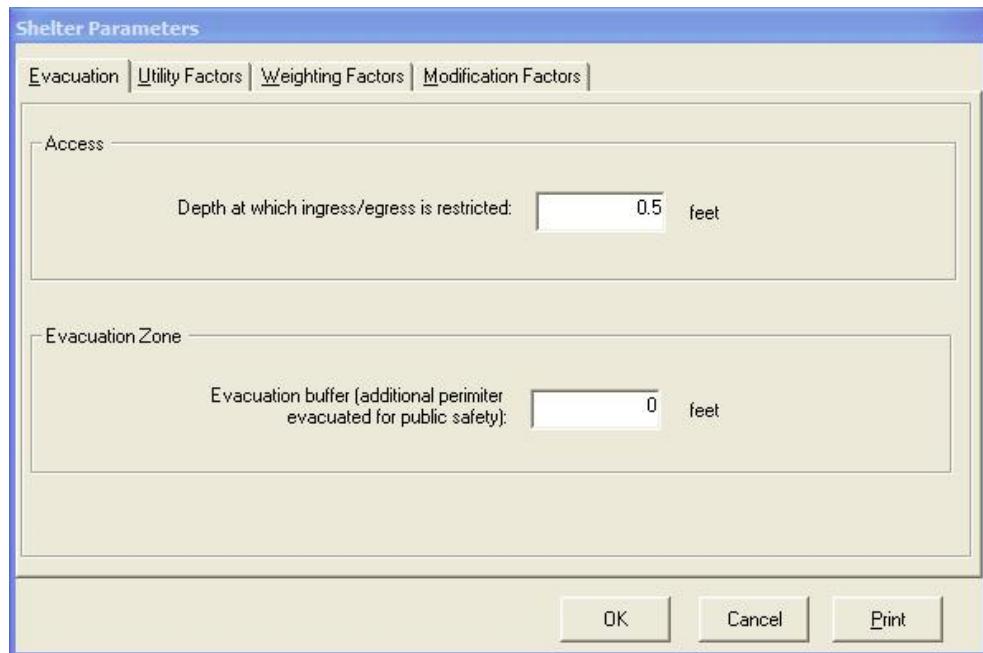


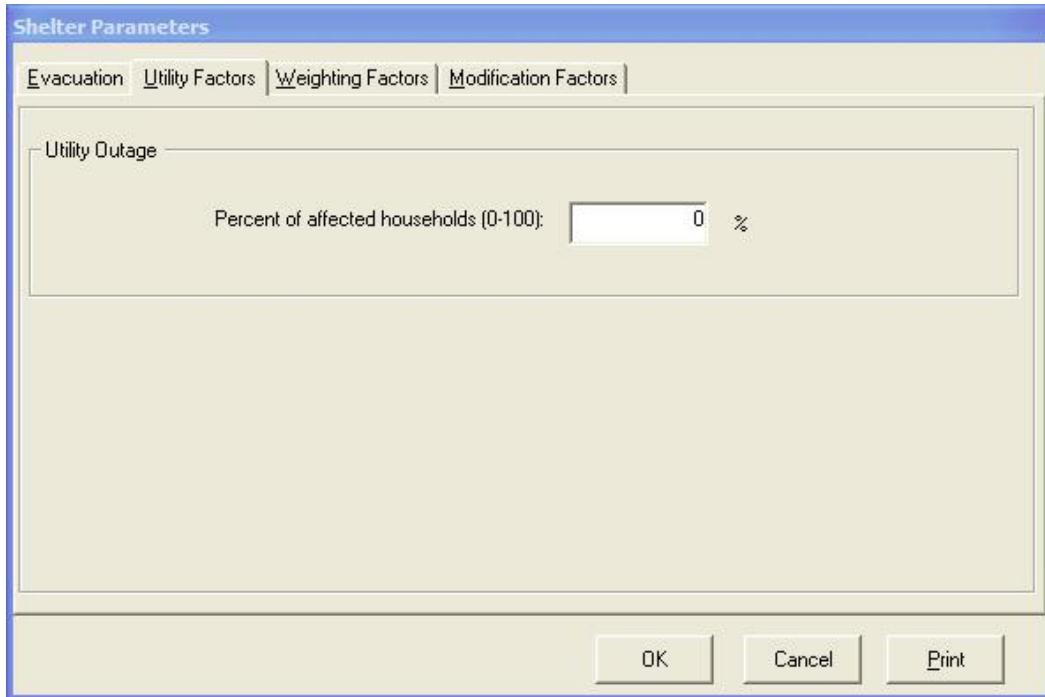
Figure 3-212: HAZUS Analysis Menu: Parameters Submenu, Shelter Dialog, Evacuation Tab

- a. Selection of the Shelter menu item on the Parameters submenu opens the dialog shown above. The dialog is a custom dialog that allows the user to view and edit the default parameters for the calculation of shelter requirements. The dialog has the following features:
 - a. The dialog has four tabs. The tabs are labeled Evacuation, Utility Factors, Weighting Factors, and Modification Factors. The Evacuation tab is the default.

- b. With the exception of the Modification Factors tab, none of the tabs have a combo box. The combo box on the Modification Factors allows the user to view and adjust parameters for Income and Age.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The Weighting Factors and Modification Factors tabs are the only tabs with data grids.
 - f. The Evacuation and Utility Factors tabs have editable text boxes for the user to view and change parameters.
 - g. The dialog has command buttons labeled OK, Cancel, and Print.
- b. The Evacuation tab shall have two text boxes that are editable by the user and pre-populated with the default values used in the HAZUS Flood analysis.
- a. The first text box is labeled Access and allows the user to set the depth of flooding where access to an area is restricted. The default value is 0.5 feet. The flood model identifies the percentage of the census block that is at 0.5 feet or greater and estimates the total population that is displaced due to access restrictions.
 - b. The second text box is labeled Evacuation buffer (additional perimeter evacuated for public safety). This default value is 0 feet meaning the evacuation zone is set by the depth grid developed by HAZUS. This is also the lower bound. Increasing the number extends the boundary and creates a larger displaced population.
- c. Selection of the Command Button OK brings up a standard save changes confirmation dialog if the user has made changes. If the user has not made any changes, OK will close the Shelter Parameters dialog and return the user to the base map view.
- d. Selection of Cancel closes the dialog and discards any changes the user may have made, returning the user to the base map view.

- e. Selection of the command button Print allows the user to print the data on the evacuation tab.

3.2.7.3.3.4.1. Analysis Menu, Parameters Submenu, Shelter Dialog, Utility Factors Tab

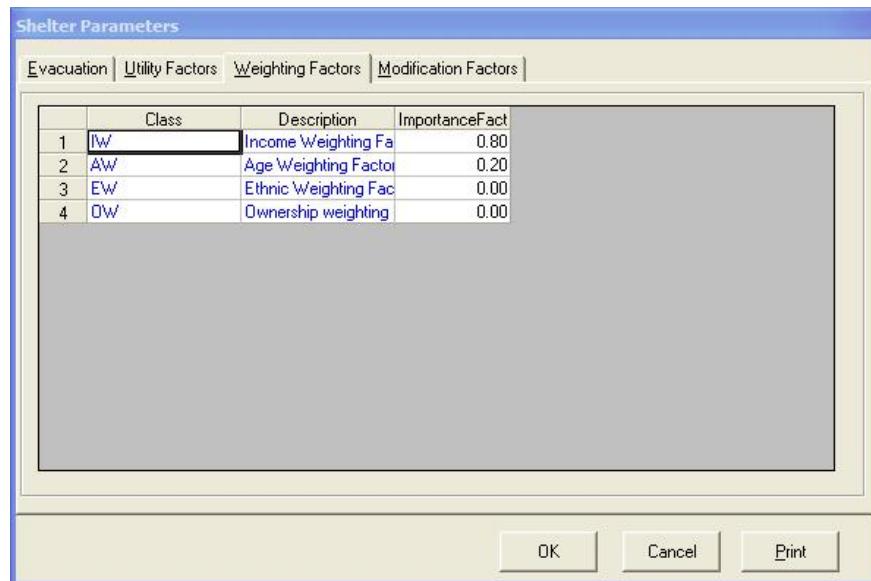


**Figure 3-213: HAZUS Analysis Menu: Parameters Submenu,
Shelter Dialog, Utility Factors Tab**

- a. Selection of the Utility Factors tab opens the dialog shown above. The dialog is a custom dialog that allows the user to view and edit the default parameters for the calculation of shelter requirements. The dialog has the following features:
- The dialog has four tabs. The tabs are labeled Evacuation, Utility Factors, Weighting Factors, and Modification Factors. The Evacuation tab is the default.
 - The dialog does not have a combo box.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box.

- e. The dialog has a single editable text box for the user to view and change parameters.
 - f. The dialog has command buttons labeled OK, Cancel, and Print.
- b. The Utility tab shall have a single text box that is editable by the user and pre-populated with the default values used in the HAZUS Flood analysis.
- a. The text box is labeled Utility Outage and allows the user to input a percentage of households that have typically been affected by a lack of power during typical floods. This is anticipated to be a parameter that locals can adjust based on their experience.
- c. Selection of the Command Button OK brings up a standard save changes confirmation dialog if the user has made changes. If the user has not made any changes, OK will close the Shelter Parameters dialog and return the user to the base map view.
- d. Selection of Cancel closes the dialog and discards any changes the user may have made, returning the user to the base map view.
- e. Selection of the command button Print allows the user to print the data on the evacuation tab.

3.2.7.3.3.4.2. Analysis Menu, Parameters Submenu, Shelter Dialog, Weighting Factors Tab



**Figure 3-214: HAZUS Analysis Menu: Parameters Submenu,
Shelter Dialog, Weighting Factors Tab**

- a. Selection of the Weighting Factors tab opens the dialog shown above. The dialog is a custom dialog that allows the user to view and edit the default parameters for the calculation of shelter requirements. The dialog has the following features:
 - a. The dialog has four tabs. The tabs are labeled Evacuation, Utility Factors, Weighting Factors, and Modification Factors. The Evacuation tab is the default.
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog does not have a text box
 - f. The dialog has a single data grid that is partially editable.
 - g. The dialog has command buttons labeled OK, Cancel, and Print.

- b. The Weighting Factors Tab has a single data grid that allows the user to view and edit the weighting factors associated with Income, Age, Ethnicity, and Ownership.
 - a. The data grid columns are Class, Description, and ImportanceFactor.
 - b. The user can edit the field ImportanceFactor by double clicking on the cell.
 - i. Income adjusts the people seeking shelter because higher income people generally seek hotels or other facilities rather than shelter sites. The default value is 80% of median income.
 - ii. Age adjusts people seeking shelter under the assumption that older people and youth are more likely to need shelter. The default value is 20% of the population.
 - iii. Ethnicity is provided to be consistent with the earthquake model, but there are no indications that flooding has the same dependencies that earthquakes do. This value is set to zero.
 - iv. Similarly, Ownership is provided to be consistent with the earthquake model but there are no indications that ownership makes a difference in seeking shelter during a flood event. The default value is set to zero.
 - c. Selection of the Command Button OK brings up a standard save changes confirmation dialog if the user has made changes. If the user has not made any changes, OK will close the Shelter Parameters dialog and return the user to the base map view.
 - d. Selection of Cancel closes the dialog and discards any changes the user may have made, returning the user to the base map view.
 - e. Selection of the command button Print allows the user to print the data on the evacuation tab.

3.2.7.3.3.4.3. Analysis Menu, Parameters Submenu, Shelter Dialog, Modification Factors Tab

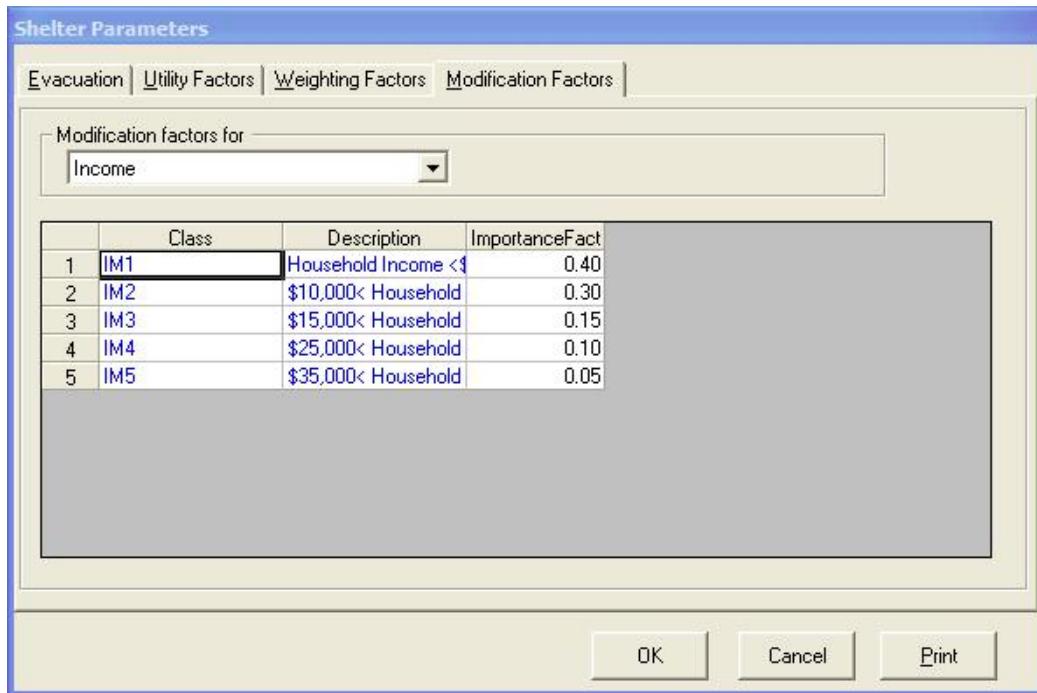


Figure 3-215: HAZUS Analysis Menu: Parameters Submenu, Shelter Dialog, Modification Factors Tab

- Selection of the Modification Factors tab opens the dialog shown above. The dialog is a custom dialog that allows the user to view and edit the default parameters for the calculation of shelter requirements. The dialog has the following features:
 - The dialog has four tabs. The tabs are labeled Evacuation, Utility Factors, Weighting Factors, and Modification Factors. The Evacuation tab is the default.
 - The dialog has a combo box labeled Modification Factors for. Options include Income and Age. Income is the default value.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box.
 - The dialog does not have a text box.

- f. The dialog has a single data grid that displays the parameter values. Some of the columns are editable.
 - g. The dialog has command buttons labeled OK, Cancel, and Print.
- b. The Modification Factors tab has a single combo box that allows the user to view the modification factors associated with Income or Age.
- c. The Modification Factors Tab has a single data grid that allows the user to view and edit the weighting factors associated with Income or Age depending on the selection in the combo box.
- a. The data grid columns are Class, Description, and ImportanceFactor.
 - b. The user can edit the field ImportanceFactor by double clicking on the cell.
 - i. The user can adjust the percentage of population seeking shelter based on median income.
 - ii. Age can be adjusted by the percentage of population in the age groups shown in Table 3-22.

Table 3-22: Flood Model Default Modification Factors

CLASS	Description	Default Value
Income		
IM1	Household Income < \$10,000	0.62
IM2	\$10,000 <= Household Income < \$15,000	0.42
IM3	\$15,000 <= Household Income < \$25,000	0.29
IM4	\$25,000 <= Household Income < \$35,000	0.22
IM5	\$35,000 <= Household Income	0.13
Age		
AM1	Population Under 16 Years Old	0.40
AM2	Population Between 16 and 65 Years Old	0.40
AM3	Population Over 65 Years Old	0.40

- d. Selection of the Command Button OK brings up a standard save changes confirmation dialog if the user has made changes. If the user has not made any changes, OK will close the Shelter Parameters dialog and return the user to the base map view.
- e. Selection of Cancel closes the dialog and discards any changes the user may have made, returning the user to the base map view.
- f. Selection of the command button Print allows the user to print the data on the evacuation tab.

3.2.7.3.3.5. Analysis Menu, Parameters Submenu, Agricultural Parameters Dialog



Figure 3-216: HAZUS Analysis Menu: Parameters Submenu, Agricultural Parameters Dialog

- a. Selection of the Agricultural menu item on the Parameters submenu opens the dialog shown above. The dialog is a custom dialog that allows the user to input the date of their scenario flood so the flood model can calculate the damage to agricultural crops. The dialog has the following features:
 - a. The dialog does not have any tabs.
 - b. The dialog has two combo boxes. The boxes are labeled Day and Month. There is no default value for either box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog does not have any data grids.

- f. The dialog does not have any text boxes.
 - g. The dialog has command buttons labeled OK and Cancel.
- b. The Agricultural parameters dialog is designed to take user input of the calendar dates and convert them to Julian day for the flood models analysis.
- a. The first combo box is labeled Day and the selection options are 1 to 31. This allows the user to select the calendar day of the month that the user is assuming their scenario flood occurs.
 - b. The second combo box is labeled Month and the selection options are January, February, March, April, May, June, July, August, September, October, November, and December.
 - c. The user must provide a selection in both combo boxes in order for the user to click OK and not receive an error message.
- c. Selection of the Command Button OK stores the user's input in an ini file for subsequent use if the user selects the Agricultural Product analysis. The dialog closes and returns the user to the base map view.
- d. Selection of Cancel closes the dialog and discards any changes the user may have made, returning the user to the base map view.

3.2.7.3.3.6. Analysis Menu, Parameters Submenu, Direct Economic Dialog

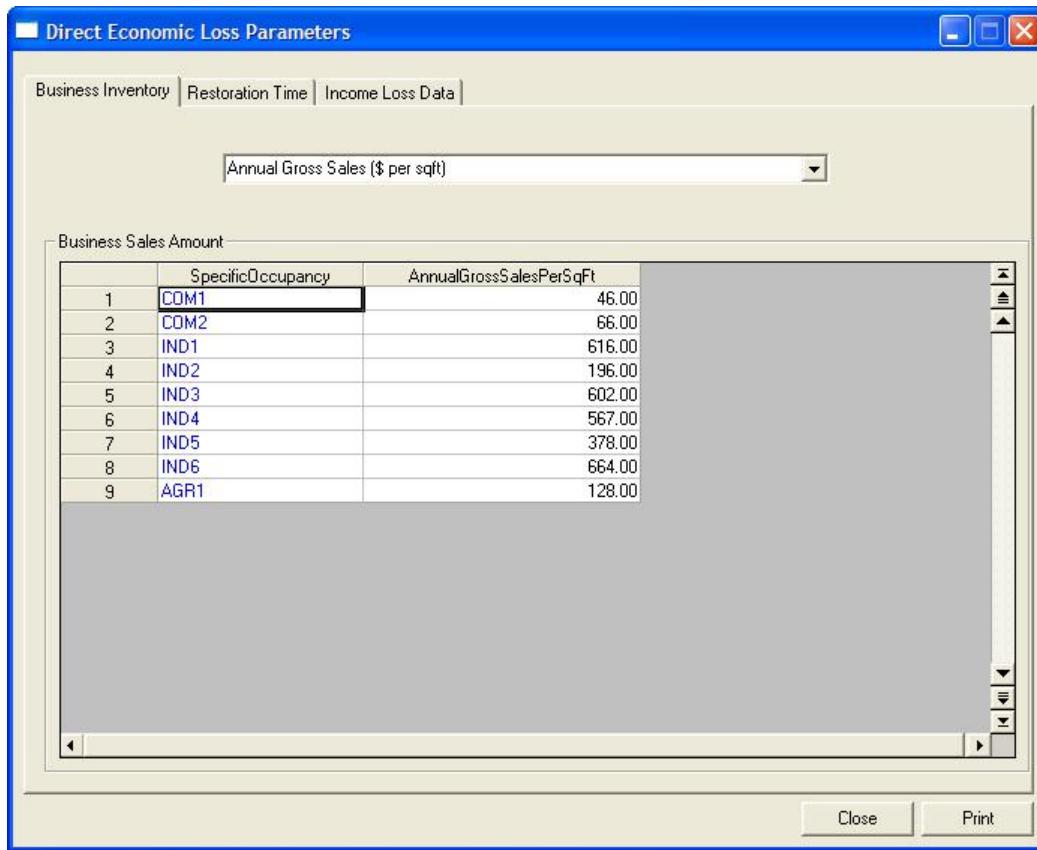


Figure 3-217: HAZUS Analysis Menu: Parameters Submenu, Direct Economic Dialog, Business Inventory Tab

- Selection of the Direct Economic menu item on the Parameters submenu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and allows modify parameters that impact the direct economic loss analysis for the general building stock. The dialog has the following features:
 - The dialog has three tabs. The tabs are labeled Business Inventory, Restoration Time, and Income Loss Data. Business Inventory is the default tab.
 - Each tab has a single combo box.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box.

- e. Each tab has a single data grid.
 - f. The dialog does not have any text boxes.
 - g. The dialog has command buttons labeled Close and Print.
- b. Data for the data grid is stored in the tables 'cISOccupancy' and 'fIBldgEconParamSalesAndInv'.
- c. The view for the data grid changes depending on the selection in the combo box.
- a. The views are absv_AnnualGrossSales and absv_BusinessInv.
- d. The combo box allows the user to view two pieces of data related to business inventory. These dialogs relate to those occupancies that are known to carry business inventory (COM1, COM2, IND1, IND2, IND3, IND4, IND5, IND6 and AGR1). The selection options are Annual Gross Sales (\$ per sqft) and Business Inventory (% of gross annual sales).
- a. Annual Gross Sales (\$ per sqft) is the default value.
- e. The data grid displays different data depending on the selection in the combo box.
- a. When the combo box selection is Annual Gross Sales (\$ per sqft) the data grid has two columns labeled SpecificOccupancy and AnnualGrossSalesPerSqFt. The SpecificOccupancy column is not editable and displayed in blue text. The AnnualGrossSalesPerSqFt column is editable and displayed in black text.
 - i. To edit the data, the user must double click on a cell.
- f. Selection of Close closes the dialog and returns the user to the base map view. If the user has changed a parameter, a standard Save Change dialog will popup to verify the users desire to make the change.
- g. Selection of Print brings up a standard Microsoft print dialog that allows the user to print the data in the data grid.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	Y
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.7.3.3.6.1. Analysis Menu, Parameters Submenu, Direct Economic Dialog, Restoration Time Tab

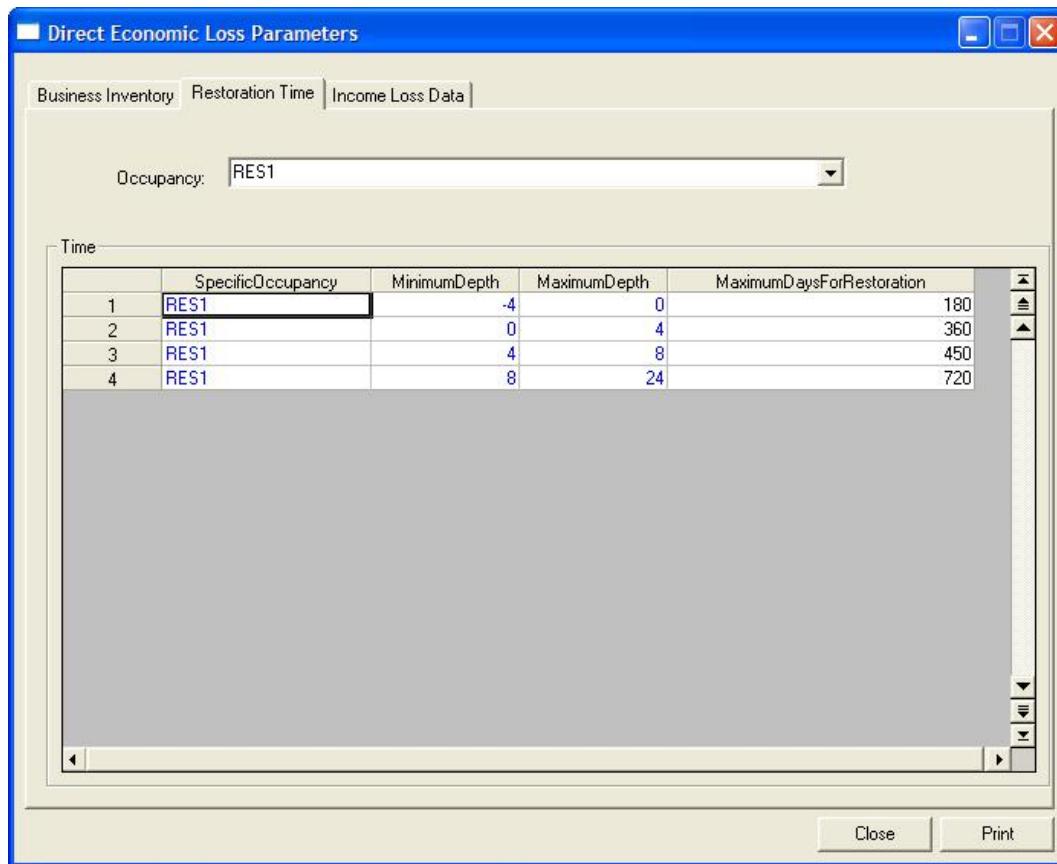


Figure 3-218: HAZUS Analysis Menu: Parameters Submenu, Direct Economic Dialog, Restoration Time Tab

- a. Selection of the Restoration Time tab on the Direct Economic Loss Parameters tab opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and allows modify parameters that impact the direct economic loss analysis for the general

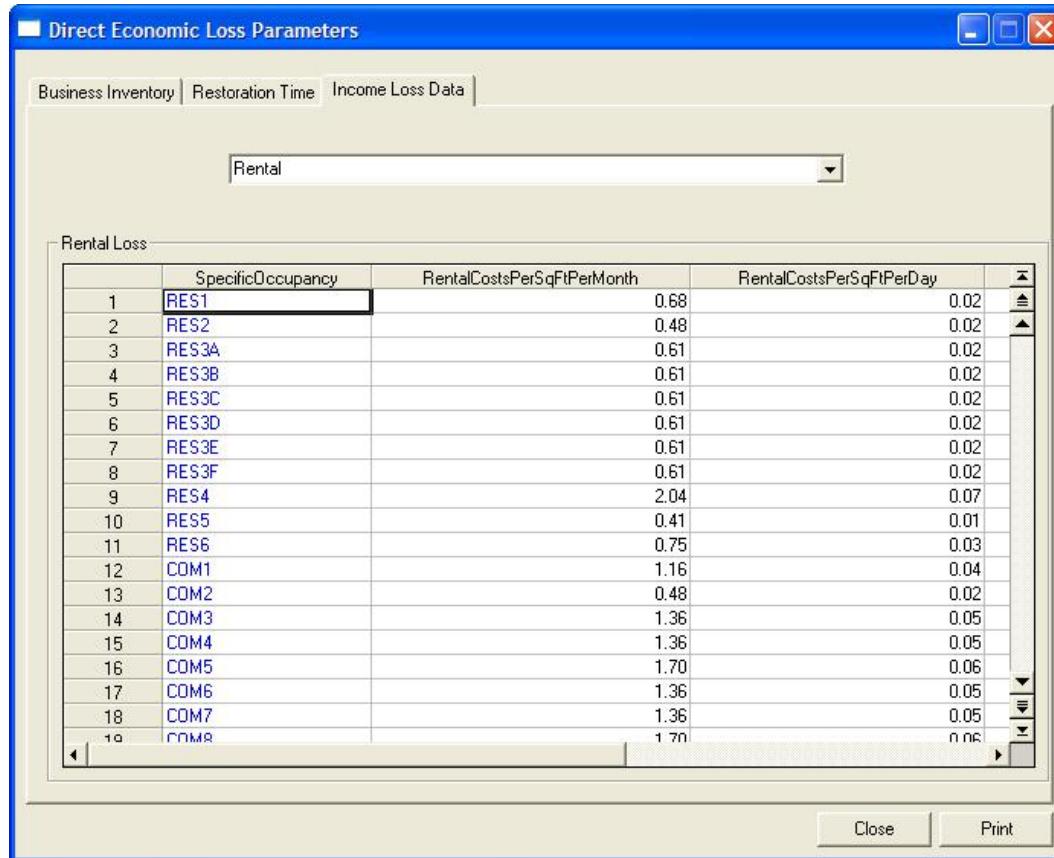
building stock. In this case, the user can adjust the restoration time for each specific occupancy. The dialog has the following features:

- a. The dialog has three tabs. The tabs are labeled Business Inventory, Restoration Time, and Income Loss Data. Business Inventory is the default tab.
 - b. Each tab has a single combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. Each tab has a single data grid.
 - f. The dialog does not have any text boxes.
 - g. The dialog has command buttons labeled Close and Print.
- b. Data for the data grid is stored in the tables ‘cISOccupancy’ and ‘fIRsFnGBS’.
 - c. The view for the data grid is absv_RsFnGBS.
 - d. The combo box allows the user to select the specific occupancy for which they would like to view the restoration data. RES1 is the default value. Options include: RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, AGR1, REL1, GOV1, GOV2, EDU1, EDU2.
 - e. The data grid displays the restoration timeline data for each specific occupancy. The data grid columns are labeled SpecificOccupancy, MinimumDepth, MaximumDepth, and MaximumDaysForRestoration.
 - a. All of the columns with the exception of the MaximumDaysForRestoration are not editable and displayed in blue text. MaximumDaysForRestoration is displayed in black text.
 - i. To edit the data, the user must double click on a cell.

- f. Selection of Close closes the dialog and returns the user to the base map view. If the user has changed a parameter, a standard Save Change dialog will popup to verify the users desire to make the change.
- g. Selection of Print brings up a standard Microsoft print dialog that allows the user to print the data in the data grid.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

**3.2.7.3.3.6.2. Analysis Menu, Parameters Submenu, Direct Economic Dialog,
Income Loss Data Tab**



**Figure 3-219: HAZUS Analysis Menu: Parameters Submenu,
Direct Economic Dialog, Income Loss Data Tab**

- a. Selection of the Income Loss Data tab on the Direct Economic Loss Parameters tab opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and allows modify parameters that impact the direct economic loss analysis for the general building stock. In this case the user can adjust the parameters associated with activities that are income producing. The dialog has the following features:
 - a. The dialog has three tabs. The tabs are labeled Business Inventory, Restoration Time, and Income Loss Data. Business Inventory is the default tab.
 - b. Each tab has a single combo box.
 - c. The dialog does not have radio buttons.

- d. The dialog does not have a check box.
 - e. Each tab has a single data grid.
 - f. The dialog does not have any text boxes.
 - g. The dialog has command buttons labeled Close and Print.
- b. Data for the data grid is stored in the tables ‘cISOccupancy’, ‘fIBldgEconParamRental’, ‘fIBldgEconParamOwnerOccupied’, ‘fIBldgEconParamWagecapitalIncome’, and ‘fIBldgEconParamRecaptureFactors’.
- c. The view for the data grid changes depending on the selection in the combo box. The views are shown below.

Combo Box Selection	View
Rental	absv_RentalParam
Percent Owner Occupied	absv_OwnerOccupied
Wages and Capital Related Income	absv_WageCapitalIncome
Recapture Factors	absv_RecaptureFactors

- d. The combo box allows the user to select the specific parameter that they wish to review. Options include Rental, Percent Owner Occupied, Wages and Capital Related Income, and Recapture Features. Rental is the default value.
- e. The data grid display changes depending on the combo box selection.
- a. For Rental: The data grid has columns labeled SpecificOccupancy, RentalCostPerSqFtPerMonth, RentalCostPerSqFtPerDay, and DisruptionCostPerSqFt. The SpecificOccupancy column is not editable and displayed in blue text. The other columns can be edited (double click on the cell) and are in black text.
 - b. For Percent Owner Occupied: The data grid has columns labeled SpecificOccupancy and PctOwnerOccupied. The column labeled PctOwnerOccupied is editable via double click on the cell and is displayed in black text.

- c. For Wages and Capital Related Income: The columns are labeled SpecificOccupancy, AnnualIncomePerSqFt, DailyIncomePerSqFt, DailyWagePerSqFt, EmployeePerSqFt, and DailyOutputPerSqFt. Except for the SpecificOccupancy column all columns are editable and displayed in black text.
- d. For Recapture Features: The columns are labeled SpecificOccupancy, PctWageRecapture, PctEmploymentRecapture, PctIncomeRecapture, and PctOutputRecapture. Except for the SpecificOccupancy column all columns are editable ad displayed in black text.
- f. Selection of Close closes the dialog and returns the user to the base map view. If the user has changed a parameter, a standard Save Change dialog will popup to verify the users desire to make the change.
- g. Selection of Print brings up a standard Microsoft print dialog that allows the user to print the data in the data grid.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data*	Y

The Recapture Features data grid does not allow the user to view the Meta Data.

3.2.7.3.3.7. Analysis Menu, Parameters Submenu, Lifelines Economic Dialog

- a. The Lifelines Economic selection on the Parameters Submenu is currently disabled.

3.2.7.3.3.8. Analysis Menu, Parameters Submenu, Indirect Economic Dialog

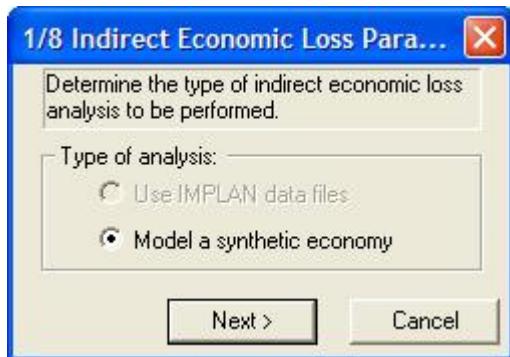


Figure 3-220: HAZUS Analysis Menu: Parameters Submenu, Indirect Economic Dialog

- a. Selection of the Indirect Economic on the Parameters Submenu opens a stream of dialogs that allows the user to make modifications to the inputs for the Indirect Economic Loss module within HAZUS. Some of the dialogs are based on the standard HAZUS Flood dialog and others are custom in nature, such as the first dialog shown above. The dialog has the following features:
 - a. The dialog does not have tabs
 - b. The dialog does not have a combo box.
 - c. The dialog has two radio buttons. The radio buttons are labeled Use IMPLAN data files and Model a synthetic Economy. The IMPLAN data selection is currently disabled.
 - d. The dialog does not have a check box.
 - e. The dialog does not have data grids.
 - f. The dialog does not have any text boxes.
 - g. The dialog has command buttons labeled Next> and Cancel.
- b. Selection of Next> closes the dialog and opens the next dialog in the series as discussed below.
- c. Selection of Cancel closes the dialog and returns the user to the base map view.

3.2.7.3.3.8.1. Analysis Menu, Parameters Submenu, Indirect Economic Parameters, 2/8

Indirect Economic Loss Parameters – Synthetic Economy Dialog

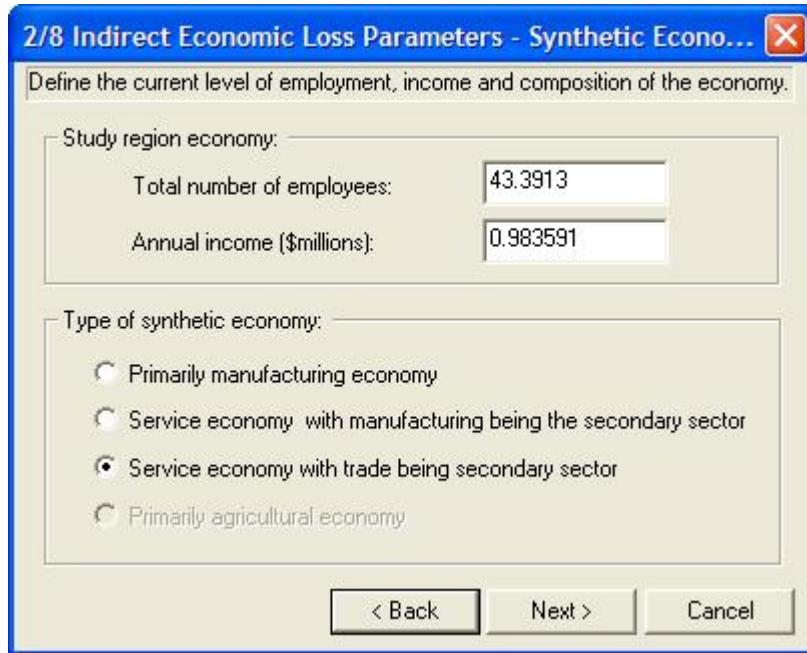


Figure 3-221: HAZUS Analysis Menu: Parameters Submenu, Indirect Economic Parameters, 2/8 Indirect Economic Loss Parameters – Synthetic Economy Dialog

- a. Selection of the Next> on the 1/8 Indirect Economic loss Parameters dialog opens the next dialog in the stream. This dialog is a custom dialog allowing the user to further define the synthetic economy of their study region. The dialog has the following features:
 - a. The dialog does not have tabs
 - b. The dialog does not have a combo box.
 - c. The dialog has four radio buttons. The radio buttons are labeled Primarily manufacturing economy, Service economy with manufacturing being the secondary sector, Service economy with trade being secondary sector, and Primarily agriculture economy. The last radio button (Agriculture) is currently disabled.
 - d. The dialog does not have a check box.
 - e. The dialog does not have data grids.

- f. The dialog has two text boxes for user data input. The text boxes are labeled Total number of employees and Annual income (\$millions). These boxes are filled with the default data for the county.
- g. The dialog has command buttons labeled <Back, Next> and Cancel.
- b. Selection of the radio buttons allows the user to select the type of economy that defines the primary source of income for the study region on a macro level. This has an impact on the rebalancing equations that are used once the economy is shocked by the flood scenario.
- c. Selection of <Back closes the 2/8 Indirect Economic Loss Parameters – Synthetic Economy dialog and returns the user to the 1/8 Indirect Economic Loss Parameters dialog. Any changes made by the user are lost.
- d. Selection of Next> closes the 2/8 Indirect Economic Loss Parameters – Synthetic Economy dialog and opens the 3/8 Indirect Economic Loss Parameters – Global Economic Factors dialog. Changes made by the user are saved.
- e. Selection of Cancel closes the 2/8 Indirect Economic Loss Parameters – Synthetic Economy dialog and returns the user to the 1/8 Indirect Economic Loss Parameters dialog. Any changes made by the user are lost.

3.2.7.3.3.8.2. Analysis Menu, Parameters Submenu, Indirect Economic Parameters, 3/8 Indirect Economic Loss Parameters – Global Economic Factors Dialog



Figure 3-222: HAZUS Analysis Menu: Parameters Submenu, Indirect Economic Parameters, 3/8 Indirect Economic Loss Parameters – Global Economic Factors Dialog

- a. Selection of the Next> on the 2/8 Indirect Economic loss Parameters – Synthetic Economy dialog opens the next dialog in the stream. This dialog is a custom dialog allowing the user to further define the synthetic economy of their study region. The dialog has the following features:
 - a. The dialog does not have tabs
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog does not have data grids.
 - f. The dialog has four text boxes for user data input. The text boxes are labeled Percent of rebuilding, Unemployment rate at the time of the disaster, Level or outside aid and/or insurance, Interest rates on loans. These boxes are filled with the default data for the county.
 - g. The dialog has command buttons labeled <Back, Next> and Cancel.
- b. Changes to the data in the text boxes are used in the flood models analysis of the indirect economic losses. The user can change none, some, or all of the data.
- c. Selection of <Back closes the 3/8 Indirect Economic Loss Parameters dialog and returns the user to the 2/8 Indirect Economic Loss Parameters dialog. Any changes made by the user are lost.
- d. Selection of Next> closes the 3/8 Indirect Economic Loss Parameters – Global Economic Factors dialog and opens the 4/8 Indirect Economic Loss Parameters – Economic Factors dialog. Changes made by the user are saved.
- e. Selection of Cancel closes the 3/8 Indirect Economic Loss Parameters – Global Economic Factors dialog and returns the user to the 1/8 Indirect Economic Loss Parameters dialog. Any changes made by the user are lost.

3.2.7.3.3.8.3. Analysis Menu, Parameters Submenu, Indirect Economic Parameters, 4/8

Indirect Economic Loss Parameters – Economic Factors Dialog

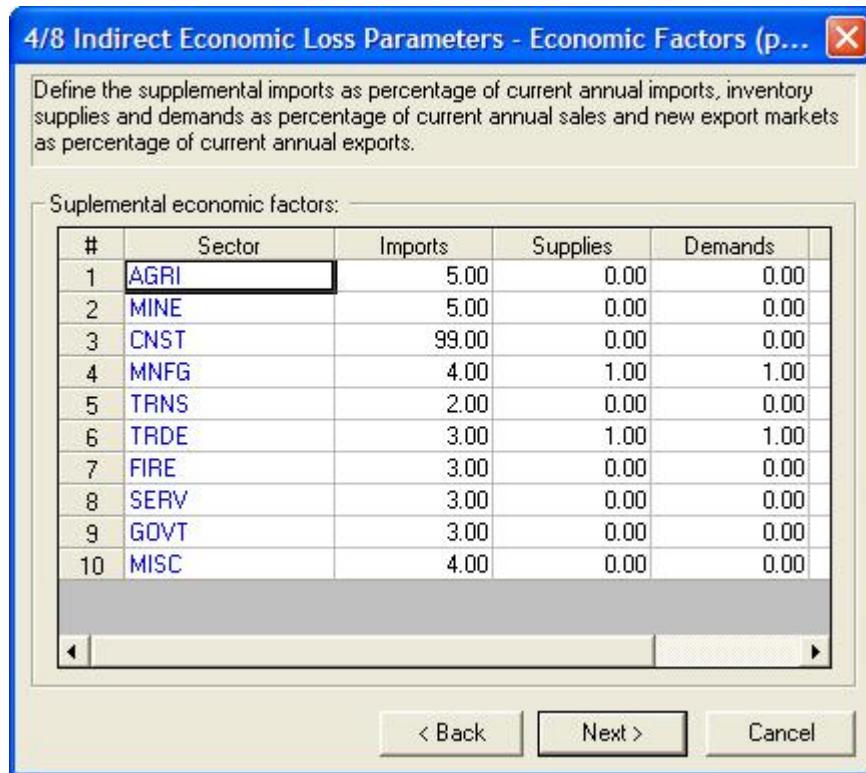


Figure 3-223: HAZUS Analysis Menu: Parameters Submenu, Indirect Economic Parameters, 4/8 Indirect Economic Loss Parameters – Economic Factors Dialog

- Selection of the Next> on the 3/8 Indirect Economic loss Parameters – Global Economic Factors dialog opens the next dialog in the stream. This is a custom dialog allowing the user to further define the synthetic economy of their study region. The dialog has the following features:
 - The dialog does not have tabs
 - The dialog does not have a combo box.
 - The dialog does not have radio buttons.
 - The dialog does not have a check box.
 - The dialog has a single data grid labeled Supplemental economic factors:

- f. The dialog does not have any text boxes.
 - g. The dialog has command buttons labeled <Back, Next> and Cancel.
- b. The data grid allows the user to make changes to the supplemental imports for the county's economy. The data grid has columns labeled Sector, Imports, Supplies, Demands, Imports, Supplies, Demands, and NewExports. Column Sector is not editable and is displayed in blue text. All other columns are editable.
- a. The data grid is populated with default data for the county.
 - b. Currently the grid has a bug that does not allow the user to save changes upon hitting the Next> key.
- c. Selection of <Back closes the 4/8 Indirect Economic Loss Parameters – Economic Factors dialog and returns the user to the 3/8 Indirect Economic Loss Parameters – Global Economic Factors dialog. Any changes made by the user are lost.
- d. Selection of Next> closes the 4/8 Indirect Economic Loss Parameters – Economic Factors dialog and opens the 5/8 Indirect Economic Loss Parameters – Restoration dialog. Changes made by the user are saved.
- e. Selection of Cancel closes the 4/8 Indirect Economic Loss Parameters – Economic Factors dialog and returns the user to the 1/8 Indirect Economic Loss Parameters dialog. Any changes made by the user are lost.

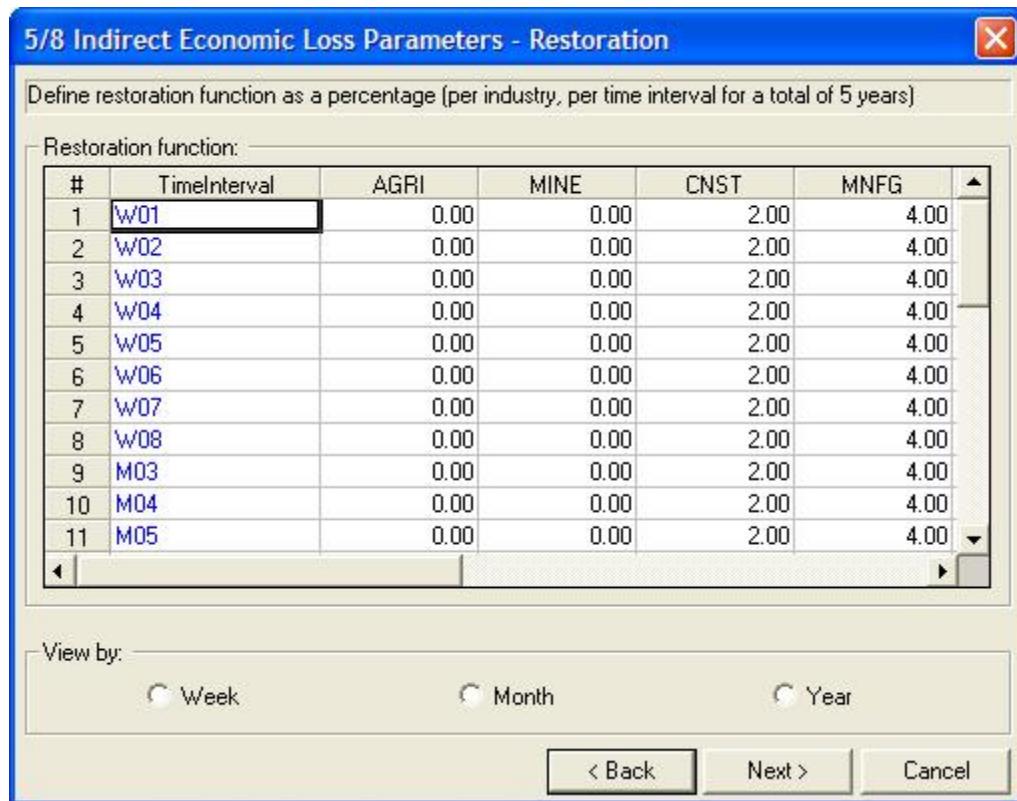
3.2.7.3.3.8.4. Analysis Menu, Parameters Submenu, Indirect Economic Parameters, 5/8**Indirect Economic Loss Parameters – Restoration Dialog**

Figure 3-224: HAZUS Analysis Menu: Parameters Submenu, Indirect Economic Parameters, 5/8 Indirect Economic Loss Parameters – Restoration Dialog

- a. Selection of the Next> on the 4/8 Indirect Economic loss Parameters – Economic Factors dialog opens the next dialog in the stream. This is a custom dialog allowing the user to further define the synthetic economy of their study region. The dialog has the following features:
 - a. The dialog does not have tabs
 - b. The dialog does not have a combo box.
 - c. The dialog has three radio buttons labeled Week, Month, and Year.
 - d. The dialog does not have a check box.
 - e. The dialog has a single data grid labeled Restoration function:

- f. The dialog does not have any text boxes.
 - g. The dialog has command buttons labeled <Back, Next> and Cancel.
- b. The data grid allows the user to change or further refine the restoration functions for the synthetic economy providing restoration values over a period of 5 years. The data grid has columns labeled TimeInterval, AGRI, MINE, CNST, MNFG, TRNS, TRDE, FIRE, SERV, GOVT, and MISC. The column TimeInterval is the only column that is not editable and is displayed in blue text.
- a. The data grid is populated with default data for the county.
 - b. The data is uniquely provided to allow the user to create restoration values by week for the first two months following a disaster (W01-W08) then by month over the subsequent 22 months (M03 – M24) and finally for the remaining 3 years (Y03-Y05).
 - c. Currently the grid has a bug that does not allow the user to save changes upon hitting the Next> key.
- c. The radio buttons are intended to allow the user to filter the grid to view the 8-week interval (Week), the 22 months (Month), or the 3 years (Year). Currently the functionality is not available and may be eliminated because the data grid is not as extensive as initially envisioned.
- d. Selection of <Back closes the 5/8 Indirect Economic Loss Parameters – Restoration dialog and returns the user to the 4/8 Indirect Economic Loss Parameters – Economic Factors dialog. Any changes made by the user are lost.
- e. Selection of Next> closes the 5/8 Indirect Economic Loss Parameters – Restoration dialog and opens the 6/8 Indirect Economic Loss Parameters – Rebuilding Expenditure dialog. Changes made by the user are saved.
- f. Selection of Cancel closes the 5/8 Indirect Economic Loss Parameters – Restoration dialog and returns the user to the 1/8 Indirect Economic Loss Parameters dialog. Any changes made by the user are lost.

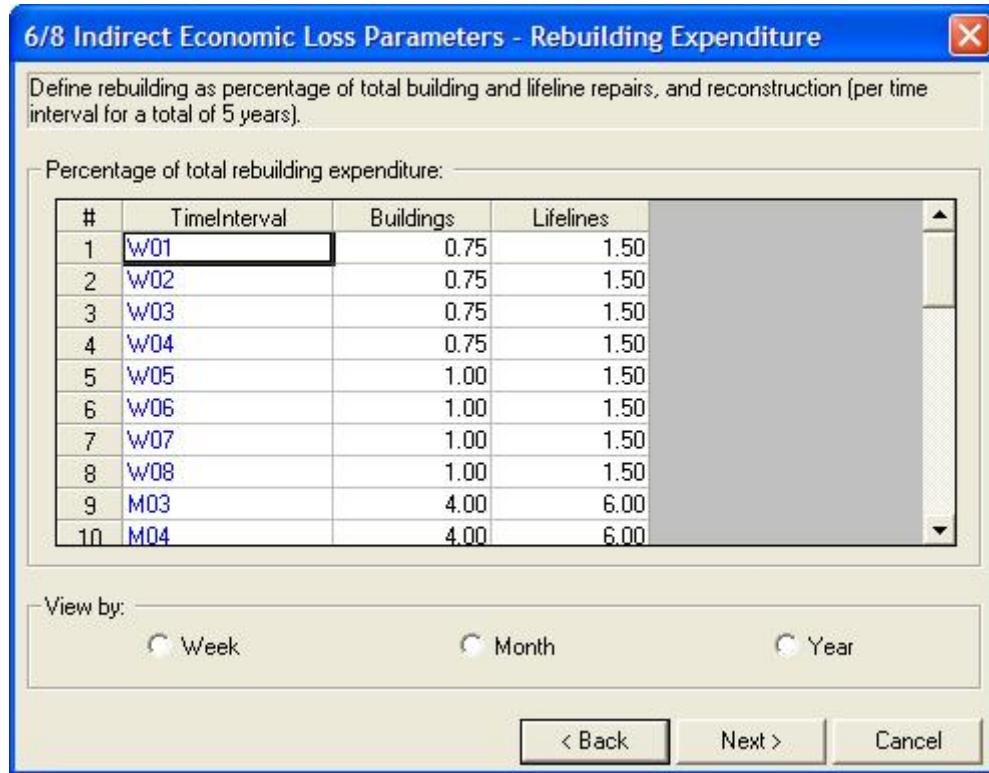
3.2.7.3.3.8.5. Analysis Menu, Parameters Submenu, Indirect Economic Parameters, 6/8**Indirect Economic Loss Parameters – Rebuilding Expenditure Dialog**

Figure 3-225: HAZUS Analysis Menu: Parameters Submenu, Indirect Economic Parameters, 6/8 Indirect Economic Loss Parameters – Rebuilding Expenditure Dialog

- a. Selection of the Next> on the 5/8 Indirect Economic loss Parameters – Restoration dialog opens the next dialog in the stream. This is a custom dialog allowing the user to further define the synthetic economy of their study region. The dialog has the following features:
 - a. The dialog does not have tabs
 - b. The dialog does not have a combo box.
 - c. The dialog has three radio buttons labeled Week, Month, and Year.
 - d. The dialog does not have a check box.
 - e. The dialog has a single data grid labeled Percentage of total rebuilding expenditure:

- f. The dialog does not have any text boxes.
 - g. The dialog has command buttons labeled <Back, Next> and Cancel.
- b. The data grid allows the user to define or further refine the rebuilding as a percentage of total repairs for the region providing values over a period of 5 years. The data grid has columns labeled TimeInterval, Buildings and Lifelines. The column TimeInterval is the only column that is not editable and is displayed in blue text.
- a. The data grid is populated with default data for the county.
 - b. The data is uniquely provided to allow the user to create rebuilding values by week for the first two months following a disaster (W01-W08) then by month over the subsequent 22 months (M03 – M24) and finally for the remaining 3 years (Y03-Y05).
 - c. Currently the grid has a bug that does not allow the user to save changes upon hitting the Next> key.
- c. The radio buttons are intended to allow the user to filter the grid to view the 8-week interval (Week), the 22 months (Month), or the 3 years (Year). Currently the functionality is not available and may be eliminated because the data grid is not as extensive as initially envisioned.
- d. Selection of <Back closes the 6/8 Indirect Economic Loss Parameters – Rebuilding Expenditure dialog and returns the user to the 5/8 Indirect Economic Loss Parameters – Restoration dialog. Any changes made by the user are lost.
- e. Selection of Next> closes the 6/8 Indirect Economic Loss Parameters – Rebuilding Expenditure dialog and opens the 7/8 Indirect Economic Loss Parameters - Stimulus dialog. Changes made by the user are saved.
- f. Selection of Cancel closes the 6/8 Indirect Economic Loss Parameters - Rebuilding Expenditure dialog and returns the user to the 1/8 Indirect Economic Loss Parameters dialog. Any changes made by the user are lost.

3.2.7.3.3.8.6. Analysis Menu, Parameters Submenu, Indirect Economic Parameters, 7/8

Indirect Economic Loss Parameters – Stimulus Dialog

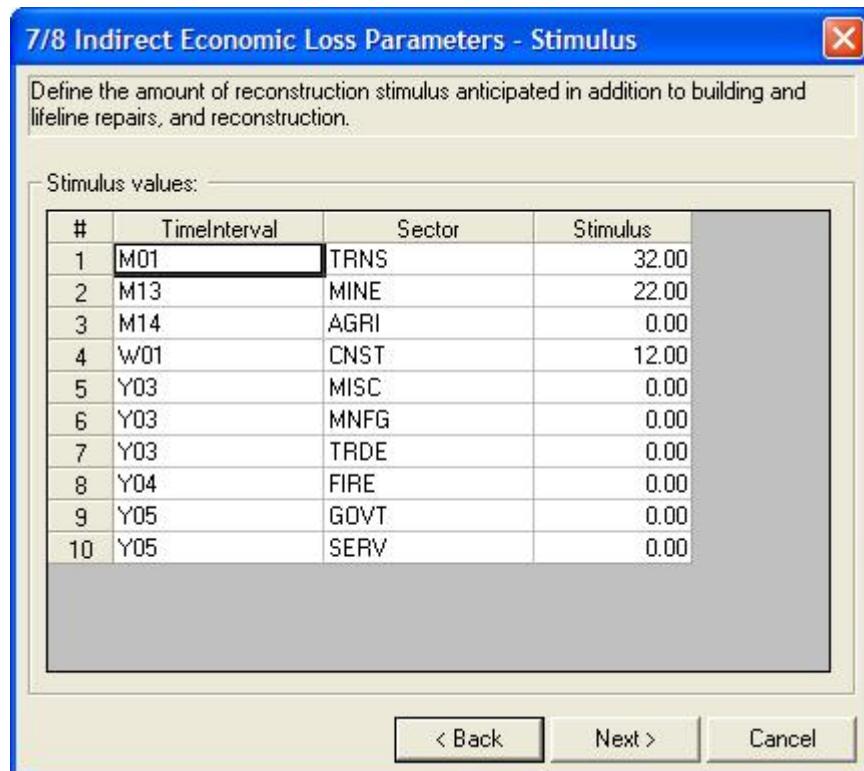


Figure 3-226: HAZUS Analysis Menu: Parameters Submenu, Indirect Economic Parameters, 7/8 Indirect Economic Loss Parameters – Stimulus Dialog

- a. Selection of the Next> on the 6/8 Indirect Economic loss Parameters – Rebuilding Expenditure dialog opens the next dialog in the stream. This is a custom dialog allowing the user to further define the synthetic economy of their study region. The dialog has the following features:
 - a. The dialog does not have tabs
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog has a single data grid labeled Stimulus values:

- f. The dialog does not have any text boxes.
 - g. The dialog has command buttons labeled <Back, Next> and Cancel.
- b. The data grid allows the user to define or further refine the reconstruction stimulus that is over and above the construction due to repairs for the region providing values over a period of 5 years. The data grid has columns labeled TimeInterval, Sector and Stimulus.
- a. The data grid is populated with default data for the county.
 - b. The data is uniquely provided to allow the user to create rebuilding values by week for the first two months following a disaster (W01 W08) then by month over the subsequent 22 months (M03 – M24) and finally for the remaining 3 years (Y03-Y05).
 - c. Currently the grid has a bug that does not allow the user to save changes upon hitting the Next> key.
- c. Selection of <Back closes the 7/8 Indirect Economic Loss Parameters – Stimulus dialog and returns the user to the 6/8 Indirect Economic Loss Parameters – Rebuilding Expenditure dialog. Any changes made by the user are lost.
- d. Selection of Next> closes the 7/8 Indirect Economic Loss Parameters – Stimulus dialog and opens the 8/8 Indirect Economic Loss Parameters - Completed dialog. Changes made by the user are saved.
- e. Selection of Cancel closes the 7/8 Indirect Economic Loss Parameters - Stimulus dialog and returns the user to the 1/8 Indirect Economic Loss Parameters dialog. Any changes made by the user are lost.

3.2.7.3.3.8.7. Analysis Menu, Parameters Submenu, Indirect Economic Parameters, 8/8

Indirect Economic Loss Parameters – Completed! Dialog

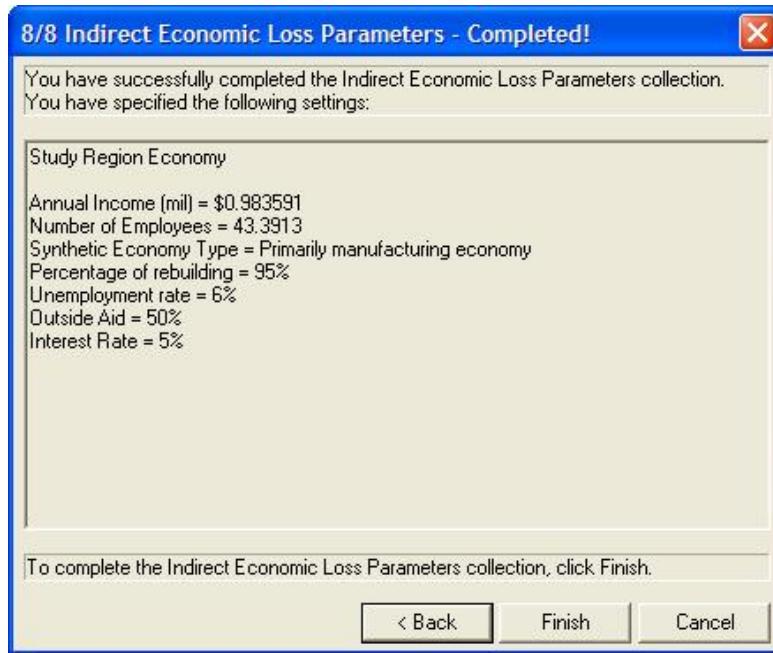


Figure 3-227: HAZUS Analysis Menu: Parameters Submenu, Indirect Economic Parameters, 8/8 Indirect Economic Loss Parameters – Completed! Dialog

- a. Selection of the Next> on the 7/8 Indirect Economic loss Parameters – Stimulus dialog opens the next dialog in the stream. This is a custom dialog allowing the user to review their economy for the IELM in the study region. The dialog has the following features:
 - a. The dialog does not have tabs
 - b. The dialog does not have a combo box.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog does not have a data grid
 - f. The dialog has a single non-editable text box that displays the users economic parameters.
 - g. The dialog has command buttons labeled <Back, Finish and Cancel.

- b. The text box provides a high level snapshot view of the primary economic parameters that are used in the IELM engines.
- c. Selection of <Back closes the 8/8 Indirect Economic Loss Parameters – Completed! dialog and returns the user to the 7/8 Indirect Economic Loss Parameters – Stimulus dialog.
- d. Selection of Finish closes the 8/8 Indirect Economic Loss Parameters – Completed! dialog and returns the user to the base map view.
- e. Selection of Cancel closes the 8/8 Indirect Economic Loss Parameters – Completed! dialog and returns the user to the 1/8 Indirect Economic Loss Parameters dialog. Any changes made by the user are lost.

3.2.7.3.4. Analysis Menu: 3rd Party models



Figure 3-228: HAZUS Analysis Menu: 3rd Party models Submenu

- a. The 3rd Party models submenu allows the user to launch or access values from related 3rd party tools that perform some level of flood analysis. These include ALOHA, MARPLOT, FLDWAV, and Flood View.
- b. The HAZUS Flood Model is not responsible for developing any of the 3rd party tools nor does HAZUS verify that the analysis performed in the 3rd party models was performed correctly. HAZUS merely accesses the necessary components to launch the other tool.

3.2.7.3.4.1. Analysis Menu, 3Rd Party models Submenu, ALOHA

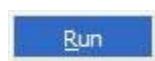


Figure 3-229: HAZUS Analysis Menu: 3rd Party Submenu, ALOHA Dialog

- a. Selection of ALOHA on the 3rd Party models submenu opens the menu item Run as shown above. Selection of this menu item will launch ALOHA.

- b. The HAZUS flood model looks for the executable file that launches ALOHA. If the model cannot find the executable, the following error message pops-up.
- Selection of Yes command button launches a search of the computers local drives for the executable file.
 - Selection of command button No closes the dialog and returns the user to the base map view.

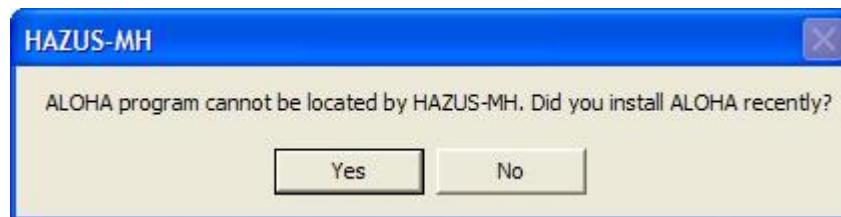


Figure 3-230: HAZUS Analysis Menu: 3rd Party Submenu ALOHA Error Dialog

- c. If the search does not turn up the executable file, the following message pops-up.
- Selection of the OK command button closes the dialog and returns the user to the base map view.

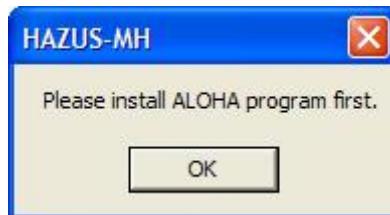


Figure 3-231: HAZUS Analysis Menu: 3rd Party Submenu, ALOHA Error Dialog

3.2.7.3.4.2. Analysis Menu, 3Rd Party models Submenu, MARPLOT

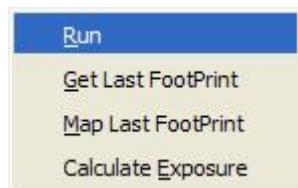


Figure 3-232: HAZUS Analysis Menu: 3rd Party Submenu, MARPLOT Submenu

- a. Selection of MARPLOT on the 3rd Party models submenu opens the submenu shown above. The submenu gives the user the option to Run MARPLOT, Get Last FootPrint, MapLastFootPrint, and Calculate Exposure.
 - a. Selection of Run causes the flood model to look for and launch the executable file for the MARPLOT software.
 - b. Selection of the GetLastFootPrint accesses the last footprint developed and opens the file.
 - c. Selection of Map Last FootPrint adds the footprint to the table of contents and displays it in the Map control for the user on their study region.
 - d. Selection of Calculate Exposure launches a routine that overlays the footprint over the Census Block boundaries to identify the total exposure (GBS) within the footprint.
- b. The HAZUS flood model looks for the executable file that launches MARPLOT. If the model cannot find the executable, the following error message pops-up.
 - a. Selection of Yes command button launches a search of the computers local drives for the executable file.
 - b. Selection of command button No closes the dialog and returns the user to the base map view.

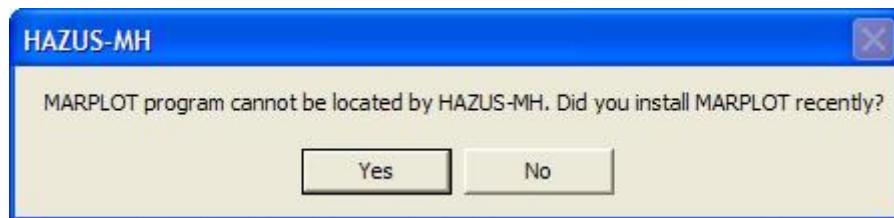


Figure 3-233: HAZUS Analysis Menu: 3rd Party Submenu, MARPLOT Error Dialog

- c. If the search does not turn up the executable file, the following message pops-up.
 - a. Selection of the OK command button closes the dialog and returns the user to the base map view.

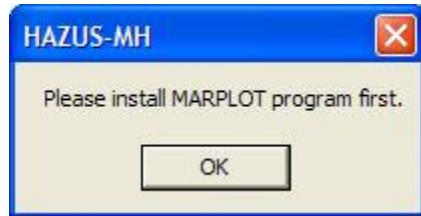


Figure 3-234: HAZUS Analysis Menu: 3rd Party Submenu, MARPLOT Error Dialog

3.2.7.3.4.3. Analysis Menu, 3Rd Party models Submenu, FLDWAV

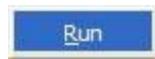


Figure 3-235: HAZUS Analysis Menu: 3rd Party Submenu, FLDWAV Dialog

- a. Selection of FLDWAV on the 3rd Party models submenu opens the menu item Run as shown above. Selection of this menu item will launch FLDWAV.
 - a. If the user does not have FLDWAV installed on their computer, the Run dialog is disabled.

3.2.7.3.4.4. Analysis Menu, 3Rd Party models Submenu, FloodView

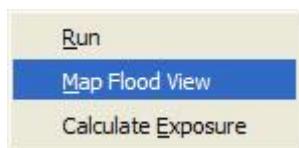


Figure 3-236: HAZUS Analysis Menu: 3rd Party Submenu, FloodView Dialog

- a. Selection of FloodView on the 3rd Party models submenu opens the submenu shown above. The user can select between Run, MapFloodView, and Calculate Exposure.
 - a. Selection of Run causes the flood model to look for and launch the executable file for the FloodView software.
 - b. Selection of Map Flood View adds the floodplain boundary developed by FloodView to the table of contents and displays it in the Map control for the user on their study region.

- c. Selection of Calculate Exposure launches a routine that overlays the bounding polygon over the Census Block boundaries to identify the total exposure (GBS) within the polygon.
- b. The HAZUS flood model looks for the executable file that launches FloodView. If the model cannot find the executable, the following error message pops-up.
 - a. Selection of Yes command button launches a search of the computers local drives for the executable file.
 - b. Selection of command button No closes the dialog and returns the user to the base map view.

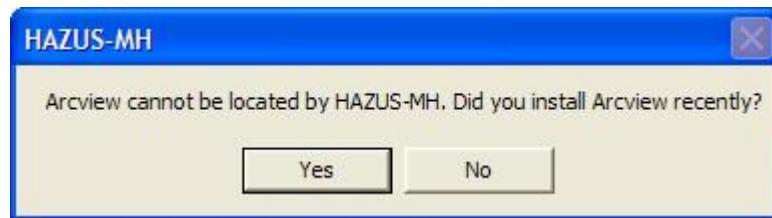


Figure 3-237: HAZUS Analysis Menu: 3rd Party Submenu, FloodView Error Dialog

- c. If the search does not turn up the executable file, the following message pops-up.
 - a. Selection of the OK command button closes the dialog and returns the user to the base map view.

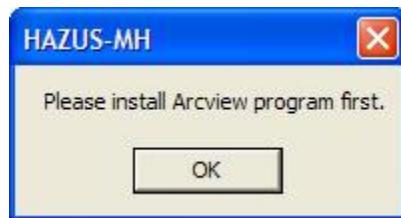


Figure 3-238: HAZUS Analysis Menu: 3rd Party Submenu, FloodView Error Dialog

3.2.7.3.5. Analysis Menu: Flood Warning

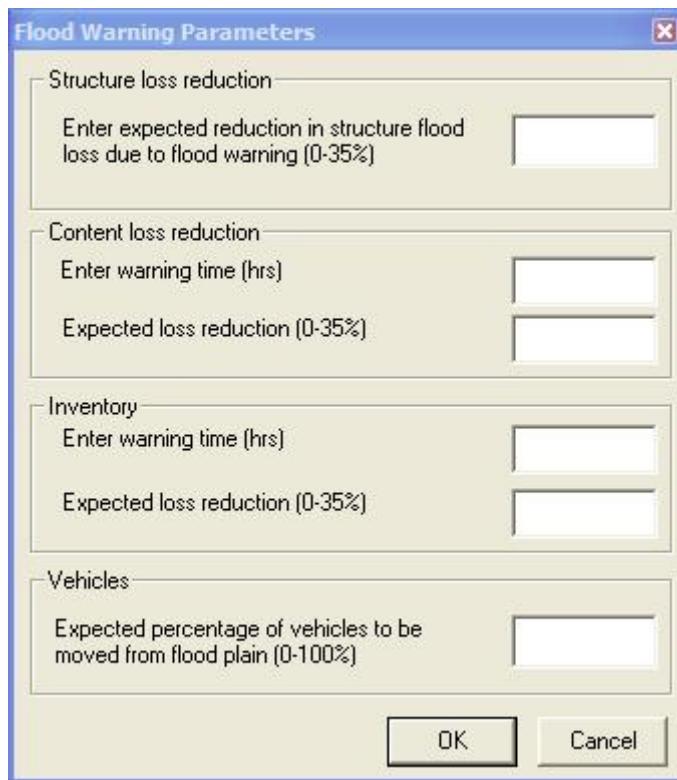


Figure 3-239: HAZUS Analysis Menu: Flood Warning Dialog

- a. Selection of Flood Warning on the Analysis menu launches the dialog shown above. The dialog is a custom dialog designed to allow the users to alter the results based on their experience with their community and the impact of flood warnings. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog does not have combo boxes.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog does not have a data grid.
 - f. The dialog has six editable text boxes that allow the user to input data for their scenario. The user can enter values in none, some, or all of the boxes.

- g. The dialog has command buttons labeled OK and Cancel.
- b. The text box labeled Structure Loss Reduction allows the user to reduce the flood losses for the general building stock by up to 35%. The 35% percent value is the maximum value that damages can typically be reduced based on the U.S. Army Corps of Engineers Day curve.
- c. The text boxes labeled Content Loss Reduction allows the user to enter either a warning time (hours) or expected loss reduction. If the user inputs a warning time, the Day curve is used to estimate the reduction. If the user inputs a percent reduction (maximum 35%) then that value is used.
- d. The text boxes labeled Inventory functions exactly the same as the Content Loss Reduction boxes.
- e. The text box labeled Vehicles allows the user to establish the percentage of vehicles that may be removed from the flooded area prior to the flood occurring. Unlike the other flood warning parameters, the Day curve does not address vehicles and no known maximum (aside from 100%) has been developed.
- f. These parameters are simple multipliers that reduce the overall losses in the results tables.
- g. Selection of the command button OK saves the user input and closes the dialog returning the user to the base map view.
- h. Selection of the command button Cancel closes the dialog and any changes made by the user are lost.

3.2.7.3.6. Analysis Menu: Annualized Loss

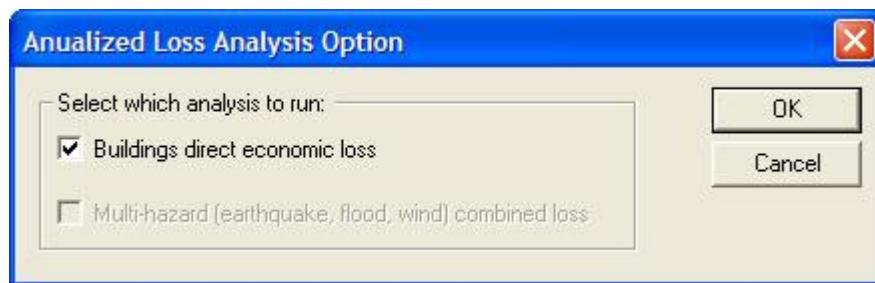


Figure 3-240: HAZUS Analysis Menu: Annualized Loss Dialog

- a. Selection of the Annualized Loss on the Analysis menu launches the dialog shown above. The dialog is a custom dialog that allows the user to select one of two parameters for their annualized analysis. The dialog has the following functions:
- a. The dialog does not have tabs
 - b. The dialog does not have combo boxes.
 - c. The dialog does not have radio buttons.
 - d. The dialog has two check boxes. One check box is labeled Buildings direct economic loss. The second check box is labeled Multi-hazard (earthquake, flood, wind) combined loss. This checkbox is enabled only if the user has established a multi-hazard study region during region creation.
 - e. The dialog does not have a data grid
 - f. The dialog does not have text boxes.
 - g. The dialog has command buttons labeled OK and Cancel.
- b. Selection of the command button OK launches the Annualized Loss Analysis.
- c. Selection of Cancel closes the dialog and returns the user to the base map view.
- d. If the user has not run the General Building Stock analysis prior to trying to launch the Annualized analysis, the following error message pops-up.

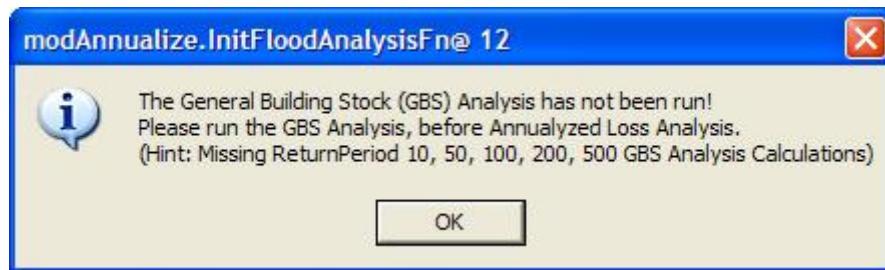


Figure 3-241: HAZUS Analysis Menu: Annualized Loss Error Message

- e. Selection of OK closes the dialog and returns the user to the base map view.

3.2.7.3.7. Analysis Menu: Quick Analysis

- a. This menu item is disabled unless the user has closed all open Scenarios and has created a Quick Look area under the Hazard menu.
- b. Selection of this command item launches the quick look analysis. The analysis is performed for General Building Stock and the results are displayed in a fashion entirely different from the other analysis. This is to ensure that the user cannot get confused about the scientific validity of the analysis.
- c. The analysis is launched automatically.

3.2.7.3.8. Analysis Menu: Run

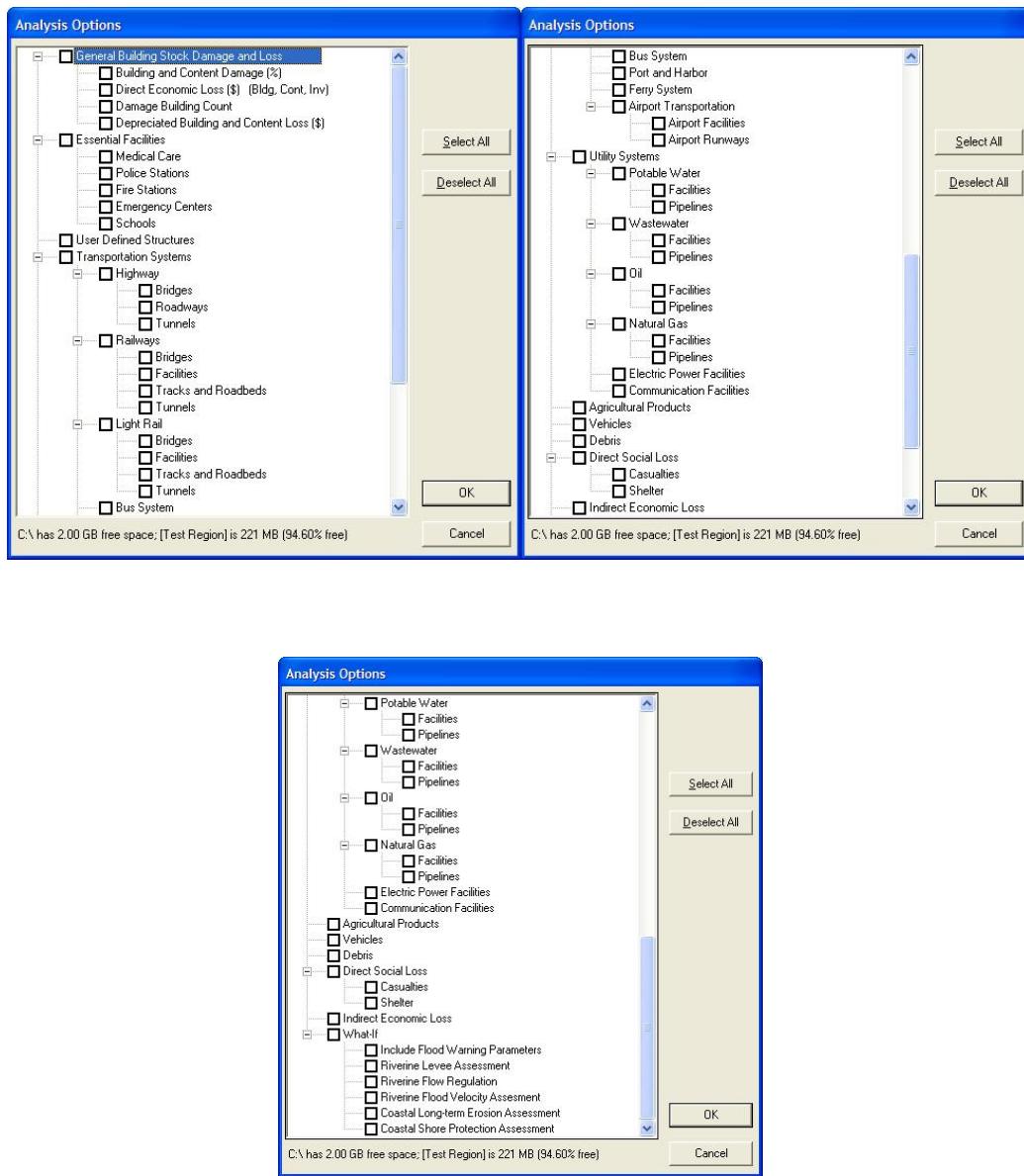


Figure 3-242: HAZUS Analysis Menu: Run Dialog

- Selection of Run on the Analysis Menu opens the dialog seen in the three images above. This dialog is a custom dialog that allows the user to select their analysis options for their scenario. The dialog has the following features:
 - The dialog does not have tabs.
 - The dialog does not have combo boxes.

- c. The dialog does not have radio buttons.
 - d. The dialog has a tree of check boxes that outlines all of the available analysis options.
 - e. The dialog does not have a data grid.
 - f. The dialog does not have text boxes.
 - g. The dialog has command buttons Select All, Deselect All, OK and Cancel.
- b. The run dialog tree is organized in the same fashion as the inventory menu. The analysis options are based partially on the capabilities of the flood model and partially to remain consistent with the earthquake model. This means there are some check boxes on the tree that do not result in subsequent analysis.
- a. General Building Stock Damage and Loss
 - i. Building and Content Damage (%)
 - ii. Direct Economic Loss (\$) (Bldg, Cont, Inv)
 - iii. Damage Building Count
 - iv. Depreciated Building and Content Loss (\$)
 - b. Essential Facilities
 - i. Medical Care
 - ii. Police Stations
 - iii. Fire Stations
 - iv. Emergency Centers
 - v. Schools
 - c. User Defined Structures

- d. Transportation Systems
 - i. Highway
 - ii. Bridges
 - iii. Roadways (No Analysis)
 - iv. Tunnels (No Analysis)
 - v. Railways
 - vi. Bridges
 - vii. Facilities
 - viii. Tracks and Roadbeds (No Analysis)
 - ix. Tunnels (No Analysis)
 - x. Light Rail
 - xi. Bridges
 - xii. Facilities
 - xiii. Tracks and Roadbeds (No Analysis)
 - xiv. Tunnels (No Analysis)
 - xv. Bus System (No Analysis)
 - xvi. Port and Harbor (No Analysis)
 - xvii. Ferry (No Analysis)
 - xviii. Airport Transportation
 - xix. Airport Facilities
 - xx. Airport Runways (No Analysis)

- e. Utility Systems
 - i. Potable Water
 - ii. Facilities
 - iii. Pipelines (No Analysis)
 - iv. Wastewater
 - v. Facilities
 - vi. Pipelines (No Analysis)
 - vii. Oil
 - viii. Facilities
 - ix. Pipelines (No Analysis)
 - x. Natural Gas
 - xi. Facilities
 - xii. Pipelines (No Analysis)
 - xiii. Electric Power Facilities
 - xiv. Communications Facilities
- f. Agricultural Products
- g. Vehicles
- h. Debris
- i. Direct Social
 - i. Casualties (No Analysis)
 - ii. Shelter

- j. Indirect Economic Loss
- k. What-If
 - i. Include Flood Warning Parameters
 - ii. Riverine Levee Assessment
 - iii. Riverine Flow Regulation
 - iv. Riverine Velocity Assessment
 - v. Coastal Long-term Erosion Assessment
 - vi. Coastal Shore Protection Assessment
- c. The user can scroll up and down the menu and select those items that they would like to have analyzed. Some items are dependent on a prior item being analyzed. In these cases, if the user selects the dependent analysis, the required analysis is automatically selected as well.
 - a. For example, in order to perform the Direct Economic Loss for buildings, the Building and Content Damage have to be performed and it is therefore selected if the user selects Direct Economic Loss without selecting Building and Content.
- d. Selection of command button Select All puts a check in every box in the tree (selects all).
- e. Selection of the command button Deselect All removes all checks from the check boxes.
- f. Selection of OK launches the selected analyses, closes the dialog returns the user to the base map view while the analysis runs (not status bars do appear).
- g. Selection of Cancel closes the dialog and returns the user to the base map view. All checks are removed.

3.2.8. Results Menu

3.2.8.1. Results Menu Available in Earthquake Model

- a. The menu provides options that help the user view analysis results that the user has RUN for the current study region and current scenario event. The user shall be able to view results three ways: as a table in a dialog box, as thematic maps, and as summary reports.
- b. This menu allows the user to View, Map, and Print results of the last HAZUS-MH earthquake analysis. Results available in HAZUS-MH-SR2 shall also be available in the HAZUS-MH earthquake model.

3.2.8.1.1. Ground Motion or Ground Failure

3.2.8.1.1.1. Ground Motion (By Census Tract)

- a. The user shall be able to view and thematically map the ground motion in terms of spectral acceleration and spectral velocity at 0.3 sec and 1.0 sec after the event, Peak Ground Acceleration (PGA) and Peak Ground Velocity (PGV), and other ground motion parameters.
- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selections are the only options available when viewing the table.

3.2.8.1.1.2. Contours or Ground Failure Maps

- a. The user shall be able to thematically map the ground motion (spectral acceleration at 0.3 and 1.0 sec, PGA and PGV) and ground failure (liquefaction and landslide) contour maps.
- b. A context menu is not available with this dialog. The contour and ground failure maps are generated for viewing only and shall not be used in the analysis.

3.2.8.1.2. General Building Stock

- a. The user shall be able to view and thematically map the damage state probabilities, both structural and nonstructural, for buildings in general by census tracts. The buildings would

be classified as having no damage, slight damage, moderate damage, extensive damage, or complete damage. The damage state probabilities will be presented to the user by:

- Specific Occupancy and General Occupancy
- Specific Building Type and General Building Type

3.2.8.1.2.1. By Occupancy

- a. This menu selection shall allow the user to view the damage state probabilities (DSP) for the general building stock based on the occupancy classification. Through the dialog box, the user shall be able to view the DSP for the structural, nonstructural (drift-sensitive and nonstructural) acceleration-sensitive components of the building stock. The user shall also be able to view the DSP for any general occupancy (e.g., RES, COM, IND) or specific occupancy (e.g., RES1, RES5, COM8).
- b. The tables shall have buttons that allow the user to Close the window, Map selected data, and Print the table.
- c. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selections are the only options available when viewing the table.

3.2.8.1.2.2. By Building Type

- a. This menu selection shall allow the user to view the DSP for the general building stock based on the model building type classification.
- b. Through the dialog box, the user shall be able to view the DSP for the structural, nonstructural (drift-sensitive and nonstructural) acceleration-sensitive components of the building stock.
- c. The user shall also be able to view the DSP for any general building type (e.g., wood, steel, concrete) or specific occupancy (e.g., W1, S2L, RM1L). The user shall also be able to view the DSP for various design levels within each building type.
- d. The table shall have buttons that allow the user to Close the Window, Map selected data, and Print the table.

- e. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selections are the only options available when viewing the table.

3.2.8.1.2.3. By Count

- a. This menu selection shall allow the user to view the estimated number of buildings in each damage state for the general building stock. Through the dialog box, the user shall be able to view the number of damaged buildings by occupancy or by building type. The user shall also be able to view the building count information by general or specific occupancy/building type.
- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selections are the only options available when viewing the table.

3.2.8.1.2.4. Advanced Engineering Building Model (AEBM)

- a. This menu selection shall allow the user to view results from the AEBM analysis. Results include damage state probabilities, casualties (daytime and nighttime), and economic losses.
- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selections are the only options available when viewing the table.

3.2.8.1.3. Essential Facilities

- a. The user shall be able to view and thematically map the damage to essential facilities in terms of DSP (both structural and functionality). The essential facilities would be classified as having no damage, slight damage, moderate damage, extensive damage, or complete damage.

- b. The functionality shall be provided at restoration periods of 1 day, 3 days, 7 days, 30 days, and 90 days after the event.
- c. The user shall have the capability to View, Map, and Print analysis results. For this menu selection, results include the DSP and functionality estimates for essential facilities.
- d. The dialog shall be arranged so that tabs exist for medical care, emergency response, and schools. Within each tab, a pull-down menu shall allow the user to view the estimates of building damage and functionality.
- e. The tables shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- f. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selections are the only options available when viewing the table.

3.2.8.1.4. Military Installations

- a. The user shall be able to view and thematically map the damage to military installation facilities in terms of DSP for both structural and nonstructural. The military installations would be classified as having no damage, slight damage, moderate damage, extensive damage, or complete damage.
- b. This menu selection shall allow the user to view the DSP for the military installations.
- c. Through the dialog box, the user will be able to view the DSP for the structural, nonstructural (drift-sensitive and nonstructural) acceleration-sensitive components of the facilities.
- d. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- e. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.5. User-Defined Structures

- a. The user shall be able to view and thematically map the damage to user-defined structures in terms of DSP, both structural and nonstructural. User-defined structures would be classified as having no damage, slight damage, moderate damage, extensive damage, or complete damage.
- b. This menu selection shall allow the user to view the DSP for the user-defined building inventory.
- c. Through the dialog box, the user shall be able to view the DSP for the structural, nonstructural (drift-sensitive and nonstructural) acceleration-sensitive components of the building.
- d. The user shall have the capability to View, Map, and Print analysis results. For this menu selection, results include the DSP for buildings identified in the user-defined structures inventory.
- e. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- f. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.6. Lifeline Systems

3.2.8.1.6.1. Transportation Systems

- a. The user shall be able to view and thematically map the damage to transportation systems in terms of DSP and functionality. The transportation systems would be classified as having no damage, slight damage, moderate damage, extensive damage, or complete damage.
- b. The functionality shall be provided at restoration periods of 0 days, 1 day, 3 days, 7 days, 30 days, and 90 days after the event.
- c. The user shall have the capability to View, Map, and Print analysis results. For this menu selection, results include the DSP and functionality estimates for transportation system components.

- d. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- e. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.6.2. Utility Systems

- a. The user shall be able to view and thematically map the damage to utility systems facilities in terms of DSP and functionality. The utility system facilities would be classified as having no damage, slight damage, moderate damage, extensive damage, or complete damage.
- b. The functionality shall be provided at restoration periods of 0 days, 1 day, 3 days, 7 days, 30 days, and 90 days after the event.
- c. The user shall be able to view and thematically map the damage to utility system pipelines in terms of repair rates and leaks and breaks. The user shall also be able to view and thematically map the system performance for potable water and electric power systems in terms of number of households without potable water or electric power.
- d. The user shall be able to view and thematically map the potable water network system facility pressure, link output, and system performance.
- e. The user shall have the capability to View, Map, and Print analysis results. For this menu selection, results include the DSP and functionality estimates for utility system components. In addition are results on the number of pipe breaks/leaks and system performance for electrical power and potable water systems.
- f. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- g. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.7. Inundation

- a. The user shall be able to view and thematically map the population, dollars, and residential, commercial, and industrial square footage exposed to inundation due to the earthquake scenario event. Inundation results shall be provided by census tract for dams, tsunami, seiche, and levees.
- b. The user shall have the ability to View, Map, and Print analysis results. For this menu selection, results include the number of people and the amount of building exposure that may be inundated based on the user-defined inundation map. For this menu option, the dialog shall have four tabs: Dams, Levees, Seiche, and Tsunami.
- c. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- d. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.8. Fire Following Earthquake

- a. The user shall be able to view and thematically map the burnt area, number of ignitions, population exposed, dollars exposed, and fire demand due to fire following an earthquake scenario event.
- b. The user shall have the ability to View, Map, and Print analysis results. For this menu selection, results include the number of fire ignitions and the estimated amount of burned area. In addition, estimates are provided for the number of people and building value exposed to the fire.
- c. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- d. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.9. Debris

- a. The user shall be able to view debris results as tons of debris generated in each census tract. The user shall be able to view results by debris type: brick, wood, and other, and reinforced concrete and steel.
- b. The user shall have the ability to View, Map, and Print analysis results. For this menu selection, results include the tonnage of debris broken into three categories: reinforced concrete and steel; brick, wood, and other; and total debris.
- c. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- d. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.10. Casualties

- a. The user shall be able to view and thematically map the casualty results by census tract. Indoor and outdoor casualties at daytime, nighttime, and commute time shall be provided by four severity levels (minor injuries to fatal injuries). The casualties shall be presented to the user by:
 - General Occupancy
 - Specific Building Type
 - General Building Type
- b. Annualized casualty results having the same specifications as those listed above shall also be available for viewing and thematic mapping.

3.2.8.1.10.1. By Occupancy

- a. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

- b. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.10.2. By Building Type

- a. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- b. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.10.3. Annualized: By Occupancy

- a. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- b. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.10.4. Annualized: By Building Type

- a. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- b. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.11. Shelter

- a. The user shall be able to view and thematically map the shelter requirement results by census tract. The shelter results shall be displayed as displaced houses and short-term shelter needs for each census tract.

- b. The user shall have the capability to View, Map, and Print analysis results. For this menu selection, results include the tonnage of debris broken into two categories: Displaced Households and Number of People Requiring Short-term Shelter.
- c. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- d. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.12. Building Economic Loss

- a. The user shall be able to view and thematically map the direct loss by census tract. The direct economic loss shall be presented in terms of structural and nonstructural loss, contents loss, inventory loss, business income loss, wage loss, rental income loss, relocation expenses, and business interruption. The direct loss shall be presented to the user by:
 - General Occupancy
 - Specific Occupancy
 - General Building Type
 - Specific Building Type
- b. Annualized direct loss results having the same specifications as those listed above shall also be available for viewing and thematic mapping.

3.2.8.1.12.1. (Annualized) By Occupancy

- a. Depending on the last hazard selected and run (annualized or not), this option shall show either regular results or annualized results, and the menu should change to reflect that.
- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

- c. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.12.2. (Annualized) By Building Type

- a. Depending on the last hazard selected and run (annualized or not), this option shows either regular results or annualized results, and the menu should change to reflect that.
- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

3.2.8.1.13. Military Installations Economic Loss

- a. This menu selection shall allow the user to view the estimated economic loss for military installations.
- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking the mouse button while the cursor is in the data table will allow the user to activate a context menu. The Data Dictionary and Analysis Information sections are the only options available when viewing the table.

3.2.8.1.14. Lifelines Economic Loss

3.2.8.1.14.1. Transportation Systems

- a. The user shall be able to view and thematically map the loss to transportation systems.
- b. This menu selection shall allow the user to view the estimated economic loss for the lifeline transportation systems.
- c. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.

- d. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selections are the only options available when viewing the table.

3.2.8.1.14.2. Utility Systems

- a. The user shall be able to view and thematically map the loss to utility systems. This menu selection shall allow the user to view the estimated economic loss for the lifeline utility systems.
- b. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- c. Right clicking while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selections are the only options available when viewing the table.

3.2.8.1.15. Indirect Economic Loss

- a. The user shall be able to view the indirect economic impact of the earthquake scenario event on the income and employment of the study region. The indirect economic impact shall be computed for all the ten industry sectors¹ into which all the industries have been categorized in HAZUS with and without outside aid.
- b. This menu selection shall allow the user to view the estimated indirect economic impacts for the study regions. Indirect economic impacts include the change in the available personal income and changes to the employment base of the region.
- c. The table shall have buttons that allow the user to Close the window, Map selected data, and Print the active table.
- d. Right clicking the mouse button while the cursor is in the data table shall allow the user to activate a context menu. The Data Dictionary and Analysis Information selection are the only options available when viewing the table.

¹ The ten industry sectors are agriculture, mining, construction, manufacturing, transportation, trade, financial services, government, and miscellaneous.

3.2.8.1.16. Summary Report

- a. Crystal Reports shall be used to generate summary reports for the earthquake analysis results. It is assumed that the functionality and the list of reports shall be the same as for HAZUS-MH-SR2.

Table 3-23 summarizes the major feature attributes related to the HAZUS Results menu. For a complete description of the attributes, see Appendix A.

Table 3-23: Earthquake Model Results Menu Attributes Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Ground Motion or Failure	A	C	H	L	
General Building Stock	A	C	H	L	
Essential Facilities	A	C	H	L	
Military Installations	A	I	H	L	
User-Defined Structures	A	I	H	L	
Lifeline Systems	A	C	H	L	
Inundation	A	U	H	L	
Fire Following Earthquake	A	C	H	L	
Debris	A	C	H	L	
Casualties	A	C	H	L	
Shelter	A	C	H	L	
Building Economic Loss	A	C	H	L	
Military Installation Economic Loss	A	U	H	L	
Lifeline Economic Loss	A	C	H	L	
Indirect Economic Loss	A	C	H	L	
Summary Reports	A	C	H	L	

3.2.8.2. Results Menu Available in Hurricane Model

The Results menu shall have the options shown below.

3.2.8.2.1. Wind Speeds

- a. The user shall be able to view and map the wind speeds
 - By return period and census tracts for a probabilistic scenario
 - By census tract for a user-defined (deterministic) scenario

- b. The wind speeds results data browser shall have the OK, Cancel, and Map buttons enabled.
- c. The Map button shall be enabled when the user selects a column of data to be mapped.
- d. The Map button shall be disabled if no column is selected.

3.2.8.2.2. General Building Stock

3.2.8.2.2.1. By Occupancy

- a. The user shall be able to view and map the DSP by general and specific occupancy class.

3.2.8.2.2.2. By Building Type

- a. The user shall be able to view and map the DSP by general and specific building type.
- b. Damage results for probabilistic scenarios shall be viewable in the following formats:
 - Expected fraction of building stock (by occupancy and building type)
 - Expected count (by occupancy and building type)
- c. The General Building Stock results data browser shall have the OK, Cancel, and Map buttons enabled.
- d. The Map button shall be enabled when the user selects a column of data to be mapped.
- e. The Map button shall be disabled if no column is selected.
- f. The user shall be able to map the general building stock results.

3.2.8.2.3. Essential Facilities

- a. The user shall be able to view the damage state and functionality for the following essential facilities:
 - Schools
 - Medical Care Facilities
 - Emergency Response Facilities

- Police Stations
 - Fire Stations
- b. The essential facilities data browser shall have the OK and Cancel buttons enabled.
- c. Damage and functionality results shall be computed for each essential facility type (schools, police stations, fire stations, medical care facilities, and [deferred] military installations).

3.2.8.2.4. (Deferred) Military Installations

3.2.8.2.5. User Defined Facilities

3.2.8.2.5.1. Damage State Probabilities

3.2.8.2.6. (Deferred) Transportation Systems

3.2.8.2.7. (Deferred) Utility Systems

3.2.8.2.8. Debris

- a. The user shall be able to view the debris results as tons of debris generated in each census tract.
- b. The user shall be able to view results by the debris type:
- Brick, wood, and other
 - Reinforced concrete and steel
- c. The debris results data browser shall have the OK and Cancel buttons enabled.
- d. The debris results data browser shall be modeless and resizable.

3.2.8.2.9. (Deferred) Casualties

3.2.8.2.10. Shelter

- a. The user shall be able to view and/or map the shelter requirements results by census tract.
- b. The shelter results will be displayed as displaced houses and short-term shelter needs for each census tract.
- c. The Shelter Results data browser shall be modeless and resizable.

3.2.8.2.11. Building Economic Loss

- a. Loss results for probabilistic scenarios shall be viewable in the following formats:
 - Average annual losses
 - Return period losses (return periods will be specified by the user during the analysis options setup)
- b. The user shall be able to create maps of all census tract loss results.

3.2.8.2.12. (Deferred) Military Installations Economic Loss

3.2.8.2.13. (Deferred) Lifelines Economic Loss

3.2.8.2.14. (Deferred) Indirect Economic Loss

3.2.8.2.15. Summary Reports

- a. Summary reports shall be generated for the following items:
 - Inventory
 - Building stock dollar exposure by building type
 - Building stock dollar exposure by occupancy
 - Transportation systems dollar exposure
 - Utility systems dollar exposure
 - Buildings
 - Building damage by general occupancy
 - Building damage by building type
 - Building damage by count by general occupancy
 - Building damage by count by building type
 - (Deferred) Hospitals functionality

- (Deferred) Emergency response facilities functionality
 - (Deferred) Schools functionality
 - (Deferred) Military installations structural damage by class
 - (Deferred) Lifelines
 - Induced
 - Debris generated
 - Losses
 - (Deferred) Casualties
 - Shelter requirements
 - Direct economic losses for buildings
 - (Deferred) Economic losses for military installations
 - (Deferred) Direct economic losses for transportation
 - (Deferred) Direct economic losses for utilities
 - (Deferred) Indirect economic impact
- b. Summary reports shall be produced using Crystal Reports 7.0.
- c. All summary reports shall be printable.

3.2.8.3. Results Menu Available in Flood Model



Figure 3-243: HAZUS Results Menu

- a. The Results menu allows the user access to the results of their analysis. To the maximum extent practical, the flood model attempted to make the results of the flood model look and feel similar to the earthquake model but keep the results within the context of the flood community. One key modification is using percent damage rather than damage states. Damage states are largely unknown in the flood community, but the use of percent damage is widely accepted.
- b. The menu has the following options including View Current Scenario Results By, Flood Hazard Maps, General Building Stock Damage, General Building Stock Economic Loss, Essential Facilities, User Defined Facilities, Advanced Building Analysis (disabled), Transportation Systems Damage/Economic Loss, Utility Systems Damage/Economic Loss,

Agriculture Loss, Vehicle Damage/Economic Loss, Debris Generation, Casualties, Shelter, Indirect Economic Loss, Quick Analysis Report (disabled), and Summary Reports.

- c. With the exception of the Flood Hazard Maps and the Summary Reports menu items, all the menu items open dialogs that allow the user to view results in tabular format. Unless specified, the results are not editable.
- d. With the exception of the View Results By... menu item, all of the Results Menu items are disabled until the user has selected a return period from the current scenario for which the results can be viewed.
- e. Once the user has selected a return period from the open study case to view, the appropriate menu items that have been analyzed are enabled.

3.2.8.3.1. Results Menu: View Results by Dialog

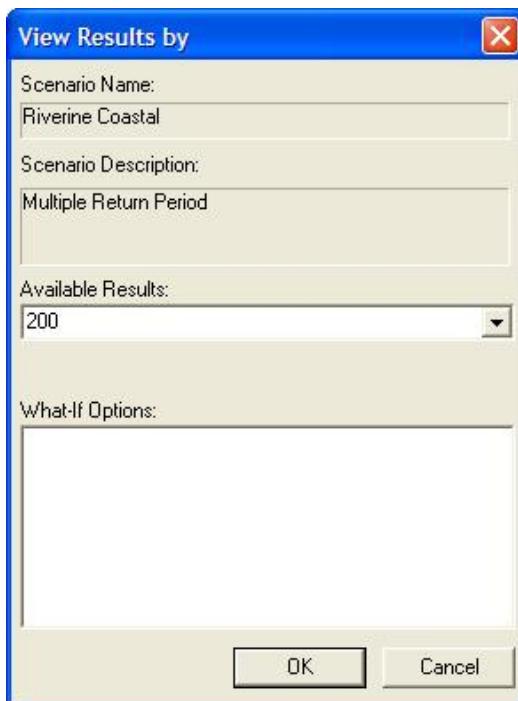


Figure 3-244: HAZUS Results Menu: View Results By Dialog

- a. Selection of View Results By on the Results menu launches the dialog shown above. The dialog is a custom dialog designed to allow the users to select the results they want to view from the list of available return periods/discharges, etc. The dialog has the following features:

- a. The dialog does not have tabs.
 - b. The dialog has a single combo box labeled Available Results from which the selection of return periods or discharges can be made. The default value is the smallest return interval available.
 - c. The dialog does not have radio buttons.
 - d. The dialog does not have a check box.
 - e. The dialog does not have a data grid.
 - f. The dialog has two non-editable text boxes and one display box.
 - g. The dialog has command buttons labeled OK and Cancel.
-
- b. The user is required to select a specific return period from the open scenario for which results will be displayed.
 - c. The combo box is populated from the list of available return periods or discharges available. If the user has created a mixed case (different return periods on each reach) the term “Mixed” will appear in the combo box.
 - d. The non-editable text boxes are labeled Scenario Name and Scenario Description respectively. They provide the name and description that the user provided when creating their scenario on the Hazard Menu. The What-If Options displays the names of any “what-if” scenarios the user may have run.
 - e. Selection of OK closes the dialog and returns the user to the base map view. All available analysis results are now available to the user.
 - f. Selection of Cancel closes the dialog without opening any results files. Menu items on the Results menu remain disabled.

3.2.8.3.2. Results Menu: Flood Hazard Maps Submenu

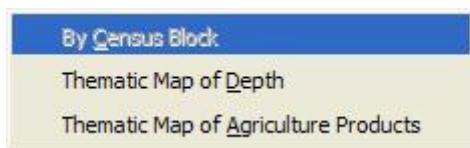


Figure 3-245: HAZUS Results Menu: Flood Hazard Maps Submenu

- a. Selection of the Flood Hazard Maps on the Result menu allows the user to access a submenu of options for viewing geographic representation of the flood hazard.
- b. The Flood Hazard Maps submenu has three options, one of which is disabled and should be removed from the dialog. Options include By Census Block (disabled), Thematic Map of Depth, and Thematic Map of Agriculture Products.
 - a. The By census Block was initially envisioned to provide a histogram of the flood depths within each given census block similar to the ground shaking map in the earthquake model. Because the depth grids are displayed for the user, this menu item did not result in net value to the users and has been disabled.
 - b. Selection of the Thematic Map of Depth allows the user to view the depth grid display of the flood depth grid for selected scenario return period. The HAZUS Flood model always places the largest flood extent or highest return interval onto the table of contents and map view by default. That is, if the user runs a suite, for example, the 500-year flood grid is added to the table of contents. This menu item allows the user to add any depth grid to the table of contents and map view easily.

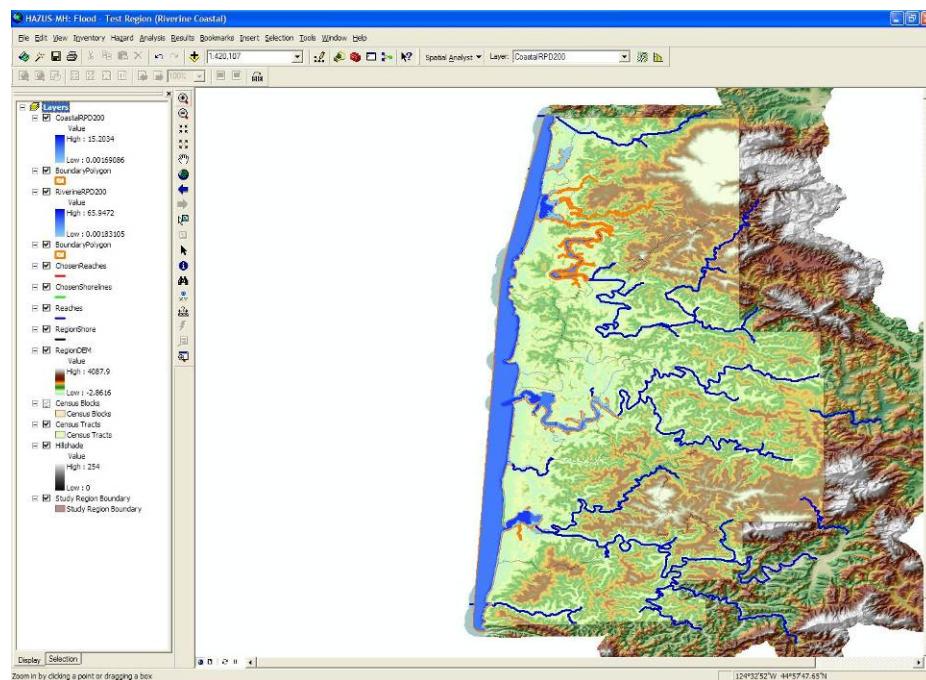
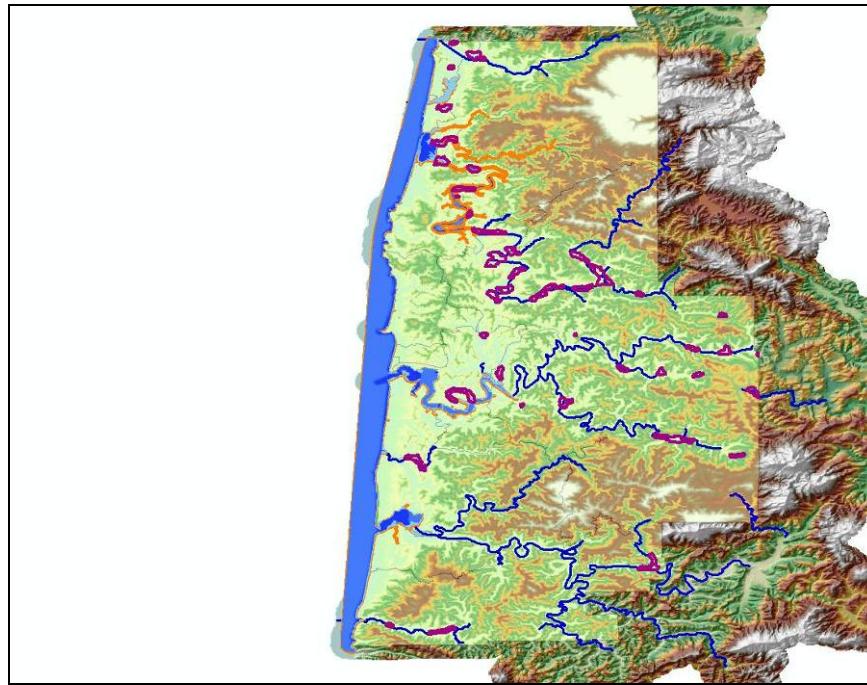


Figure 3-246: HAZUS Results Menu, Flood Hazard Maps, Example Thematic Map of Depth Grid

- c. Selection of the Thematic of Agriculture Products allows the user to quickly view the subcounty polygons and identify any areas where damages may have been developed for agricultural products.



**Figure 3-247: HAZUS Results Menu, Flood Hazard Maps,
Example Thematic Map of Agricultural Products**

3.2.8.3.3. Results Menu: General Building Stock Damage Submenu



Figure 3-248: HAZUS Results Menu: General Building Stock Damage Submenu

- a. Selection of the General Building Stock Damage opens the above submenu. This submenu provides the user access to tabular views of the results of the General Building Stock damage estimation.
- b. The submenu options include: By Occupancy, By Building Type and By Count.

**3.2.8.3.3.1. Results Menu, General Building Stock Damage Submenu:
By Occupancy Dialog**

CensusBlock	TotalSquareFootage	SqFtWithSubstantialDmg	UndamagedSqFt	SqFtC
1 410419501001044	0.03	0.00	0.02	
2 410419501001060	0.03	0.01	0.01	
3 410419501001067	0.00	0.00	0.00	
4 410419501001069	0.00	0.00	0.00	
5 410419501001070	0.51	0.24	0.20	
6 410419501001071	0.00	0.00	0.00	
7 410419501001072	2.49	0.77	1.42	
8 410419501001073	2.34	1.41	0.55	
9 410419501001074	0.00	0.00	0.00	
10 410419501001075	0.28	0.13	0.07	
11 410419501001076	2.45	1.05	1.13	
12 410419501001077	1.44	1.01	0.17	
13 410419501001078	2.39	1.57	0.40	
14 410419501001079	0.88	0.68	0.05	
15 410419501001080	0.01	0.01	0.00	
16 410419501001082	0.56	0.43	0.01	
17 410419501001285	0.00	0.00	0.00	
18 410419501001301	0.00	0.00	0.00	

**Figure 3-249: HAZUS Results Menu, General Building Stock Damage Submenu:
By Occupancy Dialog**

- Selection of By Occupancy option on the General Building Stock Damage submenu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the damage analysis by general or specific occupancy type. The dialog has the following features:
 - The dialog does not have tabs.
 - The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.

- c. The dialog has three combo boxes labeled Table Type, Occupancy, and Pre/Post Firm. The combo box options and defaults are discussed later.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid labeled Damage (thous. sq ft).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables ‘flFRGBSDmgGOccupB’, ‘clGenOccupancy’, ‘flFRGBSDmgSOccupB’, and ‘clSOccupancy’.
- c. Table views are as follows:

Table Type	Pre/Post Firm	View Name
General Occupancy	Pre-Firm	absv_FRGBSDmgSqFtGOccupPre
General Occupancy	Post-Firm	absv_FRGBSDmgSqFtGOccupPost
General Occupancy	Total	absv_FRGBSDmgSqFtGOccupAll
Specific Occupancy	Pre-Firm	absv_FRGBSDmgSqFtSOccupPre
Specific Occupancy	Post-Firm	absv_FRGBSDmgSqFtSOccupPost
Specific Occupancy	Total	absv_FRGBSDmgSqFtSOccupAll

- d. The combo box labeled Table Type allows the user to select between the General Occupancy and Specific Occupancy. The selection in this combo box changes what options are available in the combo box labeled Occupancy. The default value is General Occupancy.
- a. When General Occupancy is selected, the combo box labeled Occupancy has the options Residential, Commercial, Industrial, Agriculture, Religious/Non-Profit, Government, and Education.
 - b. When Specific Occupancy is selected, the combo box labeled Occupancy has the options RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7,

COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, REL1, AGR1, GOV1, GOV2, EDU1, and EDU2.

- e. The combo box labeled Occupancy allows the user to select the occupancy classification that the results are displayed for. Options are discussed above and are predicated on the selection of the Table Type option. The selection in this combo box acts as a filter for the views discussed above.
 - a. The default value when the Table Type combo box is set to General Occupancy is Residential.
 - b. The default value when the Table Type combo box is set to Specific Occupancy is RES1.
- f. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.
- g. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The column names are adjusted when looking at the General Occupancy or Specific Occupancy because the analysis is done at the specific occupancy level and rolled up to the general occupancy. The roll up does cause fidelity loss. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. When viewing the General Occupancy results the column names are:
CensusBlock, TotalSquareFootage, SqFtWithSubstantialDmg, UnDamagedSqFt, SqFtDmg1to10, SqFtDmg11to20, SqFtDmg21to30, SqFtDmg31to40, SqFtDmg41to50, SqFtDmg51to60, SqFtDmg61to70, SqFtDmg71to80, SqFtDmg81to90, and SqFtDmg91to100.
 - i. SqFtWithSubstantialDmg is a summation of square footage with damage 50% or greater.
 - b. When viewing the Specific Occupancy results, the column names are:
CensusBlock, ControllingHazard, TotalSquareFootage, SqFtWithSubstantialDmg, UnDamagedSqFt, SqFtDmg1to10, SqFtDmg11to20,

SqFtDmg21to30, SqFtDmg31to40, SqFtDmg41to50, SqFtDmg51to60,
SqFtDmg61to70, SqFtDmg71to80, SqFtDmg81to90, and SqFtDmg91to100.

- i. SqFtWithSubstantialDmg is a summation of square footage with damage 50% or greater.
- h. Selection of the Close command button closes the dialog and returns the user to the base map view.
- i. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- j. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- k. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.3.2. Results Menu, General Building Stock Damage Submenu: By Building Type Dialog

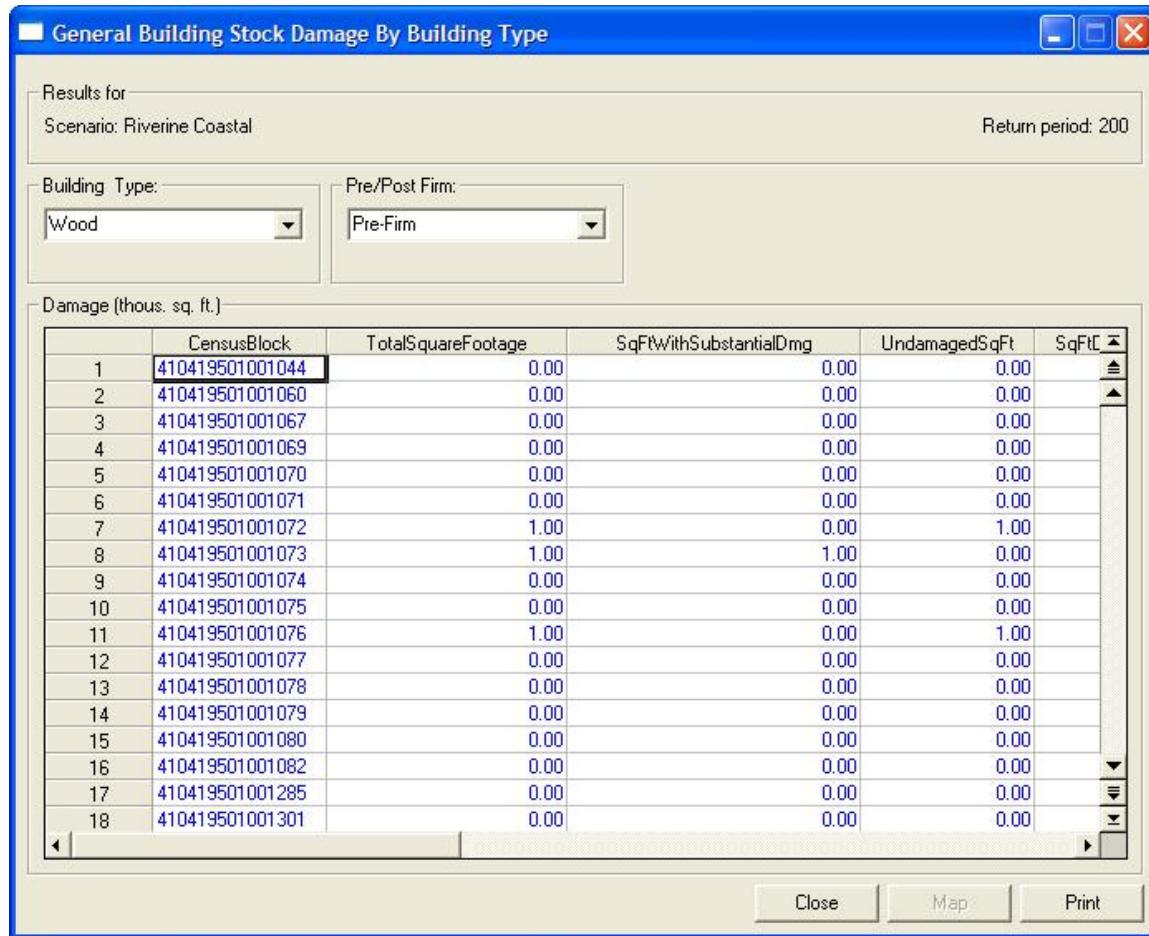


Figure 3-250: HAZUS Results Menu, General Building Stock Damage Submenu By Building Type Dialog

- Selection of By Building Type option on the General Building Stock Damage submenu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the damage analysis by building type. The dialog has the following features:
 - The dialog does not have tabs.
 - The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.

- c. The dialog has two combo boxes labeled Building Type and Pre/Post Firm. The combo box options and defaults are discussed later.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid labeled Damage (thous. sq ft).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables ‘f1FRGBSDmgGBldgType’ and ‘c1GBldgType’.
- c. Table views are as follows:

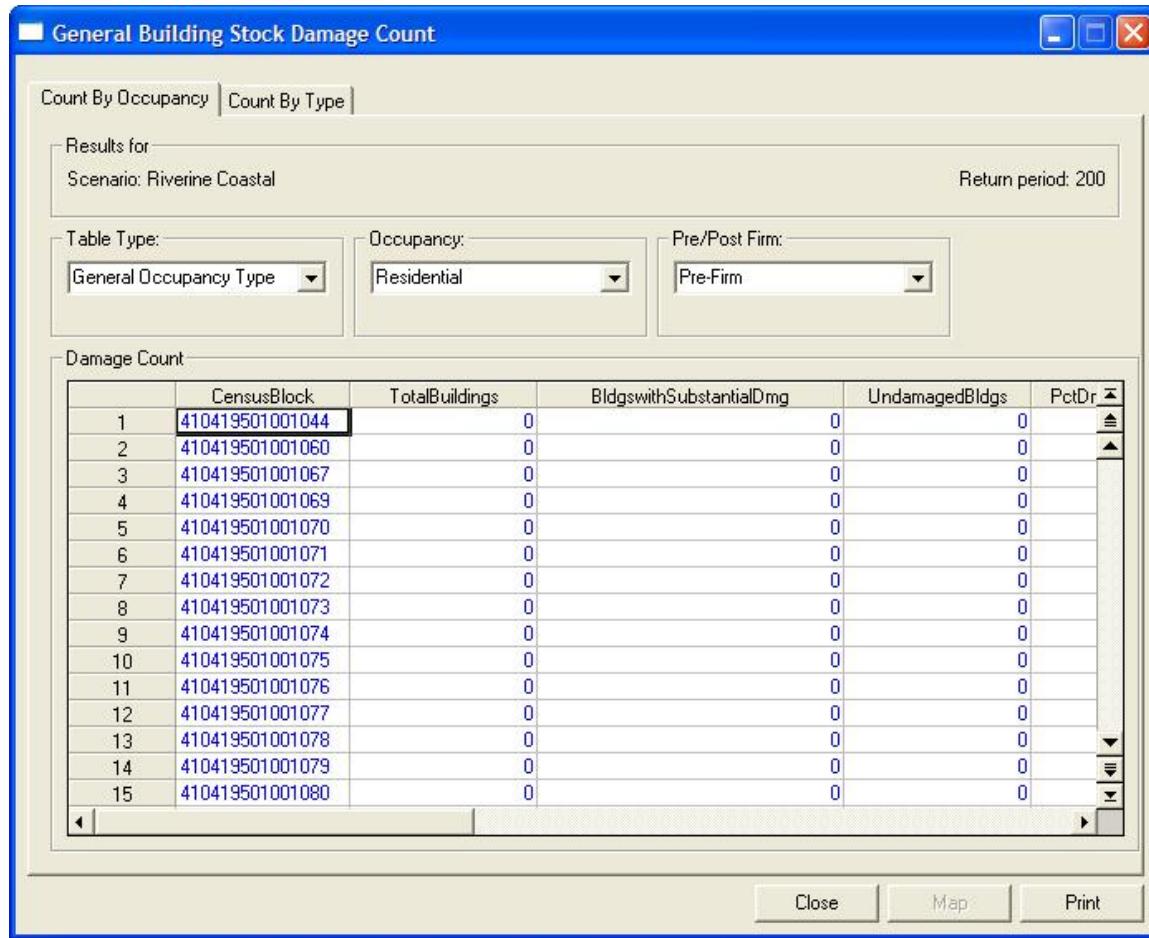
Pre/Post Firm	View Name
Pre-Firm	absv_FRGBSDmgSqFtGBldgTypePre
Post-Firm	absv_FRGBSDmgSqFtGBldgTypePost
Total	absv_FRGBSDmgSqFtGBldgTypeAll

- d. The combo box labeled Building Type allows the user to select the structure types available within the Flood Model. The HAZUS Flood model only assess damage at the General Building Type level as the damage functions are predicated on occupancy and not construction type. The selection in this combo box filters the results in the view. The default value is Wood.
 - a. The Building Type options include: Wood, Steel, Concrete, Masonry, and ManuHousing.
- e. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.

- f. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. The column names are: CensusBlock, TotalSquareFootage, SqFtWithSubstantialDmg, UnDamagedSqFt, SqFtDmg1to10, SqFtDmg11to20, SqFtDmg21to30, SqFtDmg31to40, SqFtDmg41to50, SqFtDmg51to60, SqFtDmg61to70, SqFtDmg71to80, SqFtDmg81to90, and SqFtDmg91to100.
 - i. SqFtWithSubstantialDmg is a summation of square footage with damage 50% or greater.
- g. Selection of the Close command button closes the dialog and returns the user to the base map view.
- h. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- i. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.3.3. Results Menu, General Building Stock Damage Submenu: By Count Dialog, Count by Occupancy Tab



**Figure 3-251: HAZUS Results Menu, General Building Stock Damage Submenu:
By Count Dialog, Count By Occupancy Tab**

- Selection of By Count option on the General Building Stock Damage submenu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the damage analysis by building count as opposed to square footage. The dialog has the following features:
 - The dialog has two tabs labeled Count By Occupancy and County By Type. Count By Occupancy is the default.
 - The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.

- c. The number of combo boxes varies depending on the tab selected. For the Count By Occupancy tab there are three combo boxes labeled Table Type, Occupancy, and Pre/Post Firm. For the Count by Type, there should be two combo boxes labeled Building Type and Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid labeled Damage Count.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables 'fIFRGBSDmgCountGOccupB', 'clGenOccupancy', 'fIFRGBSDmgCountSOccupB', and 'clSOccupancy'.
 - c. Table views are as follows:

Table Type	Pre/Post Firm	View Name
General Occupancy	Pre-Firm	absv_FRGBSDmgCountGOccupPre
General Occupancy	Post-Firm	absv_FRGBSDmgCountGOccupPost
General Occupancy	Total	absv_FRGBSDmgCountGOccupAll
Specific Occupancy	Pre-Firm	absv_FRGBSDmgCountSOccupPre
Specific Occupancy	Post-Firm	absv_FRGBSDmgCountSOccupPost
Specific Occupancy	Total	absv_FRGBSDmgCountSOccupAll

- d. The combo box labeled Table Type allows the user to select between the General Occupancy and Specific Occupancy. The selection in this combo box changes what options are available in the combo box labeled Occupancy. The default value is General Occupancy.
 - a. When General Occupancy is selected, the combo box labeled Occupancy has the options Residential, Commercial, Industrial, Agriculture, Religion, Government, and Education.

- b. When Specific Occupancy is selected, the combo box labeled Occupancy has the options RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, REL1, AGR1, GOV1, GOV2, EDU1, and EDU2.
- e. The combo box labeled Occupancy allows the user to select the occupancy classification that the results are displayed for. Options are discussed above and are predicated on the selection of the Table Type option. The selection in this combo box acts as a filter for the views discussed above.
 - a. The default value when the Table Type combo box is set to General Occupancy is Residential.
 - b. The default value when the Table Type combo box is set to Specific Occupancy is RES1.
- f. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.
- g. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The column names are adjusted when looking at the General Occupancy or Specific Occupancy because the analysis is done at the specific occupancy level and rolled up to the general occupancy. The roll up does cause fidelity loss. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. When viewing the General Occupancy results the column names are:
CensusBlock, TotalBuildings, BldgsWithSubstantialDmg, UnDamagedBldgs, PctDmg1to10, PctDmg11to20, PctDmg21to30, PctDmg31to40, PctDmg41to50, PctDmg51to60, PctDmg61to70, PctDmg71to80, PctDmg81to90, and PctDmg91to100.
 - i. BldgsWithSubstantialDmg is a summation of the count with damage 50% or greater.

- b. When viewing the Specific Occupancy results, the column names are:
CensusBlock, ControllingHazard, TotalBuildings, BldgsWithSubstantialDmg,
UnDamagedBldgs, PctDmg1to10, PctDmg11to20, PctDmg21to30,
PctDmg31to40, PctDmg41to50, PctDmg51to60, PctDmg61to70, PctDmg71to80,
PctDmg81to90, and PctDmg91to100.
 - i. BldgsWithSubstantialDmg is a summation of the count with damage 50% or greater.
- h. Selection of the Close command button closes the dialog and returns the user to the base map view.
- i. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- j. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- k. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.3.3.1. Results Menu, General Building Stock Damage Submenu: By Count Dialog, Count By Type Tab

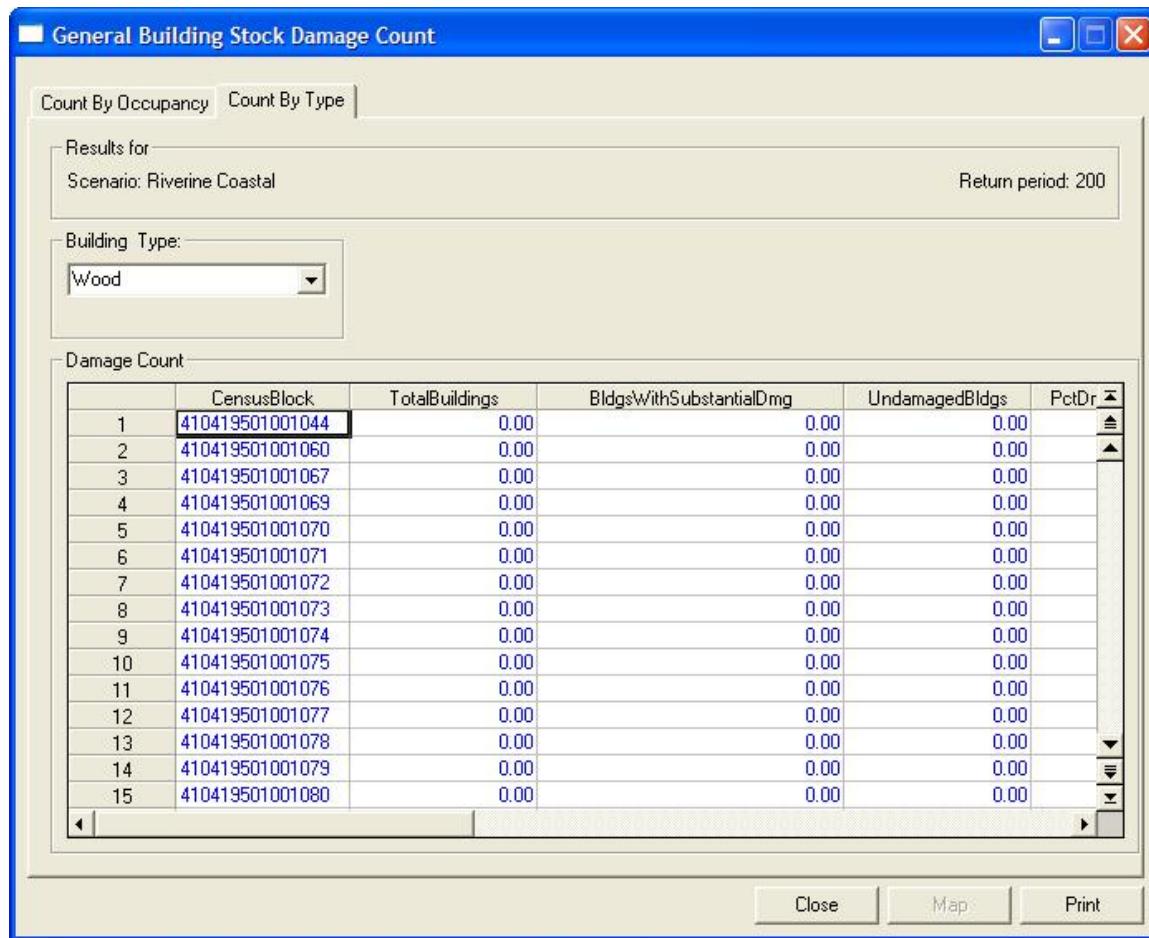


Figure 3-252: HAZUS Results Menu, General Building Stock Damage Submenu: By Count Dialog, Count By Type Tab

- Selection of By Count option on the General Building Stock Damage submenu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the damage analysis by building count as opposed to square footage. The dialog has the following features:
 - The dialog has two tabs labeled Count By Occupancy and Count By Type. Count By Occupancy is the default.
 - The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.

- c. The number of combo boxes varies depending on the tab selected. For the Count By Occupancy tab there are three combo boxes labeled Table Type, Occupancy, and Pre/Post Firm. For the Count by Type, there should be two combo boxes labeled Building Type and Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid labeled Damage Count.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables 'fIFRGBSDmgCountGOccupB' and 'clGenOccupancy'.
- c. Table views are as follows:

Pre/Post Firm	View Name
Pre-Firm	absv_FRGBSDmgCountGOccupPre
Post-Firm	absv_FRGBSDmgCountGOccupPost
Total	absv_FRGBSDmgCountGOccupAll

- d. The combo box labeled Building Type allows the user to select the construction type for results are displayed for. The selection in this combo box acts as a filter for the views discussed above.
 - a. The building type selections are Wood, Steel, Concrete, Masonry, and ManufHousing
- e. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.

- f. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. The column names are: CensusBlock, TotalBuildings, BldgsWithSubstantialDmg, UnDamagedBldgs, PctDmg1to10, PctDmg11to20, PctDmg21to30, PctDmg31to40, PctDmg41to50, PctDmg51to60, PctDmg61to70, PctDmg71to80, PctDmg81to90, and PctDmg91to100.
 - i. BldgsWithSubstantialDmg is a summation of the count with damage 50% or greater.
- g. Selection of the Close command button closes the dialog and returns the user to the base map view.
- h. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- i. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.4. Results Menu: General Building Stock Economic Loss Submenu

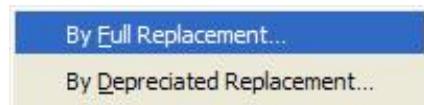


Figure 3-253: HAZUS Results Menu: General Building Stock Economic Loss Submenu

- a. The General Building Stock Economic Loss submenu allows the user to view the economic losses estimated for their current scenario. Losses are estimated in terms of dollars and are provided in a number of different views – either by occupancy or by building type. All losses are presented in thousands of dollars.
- b. The submenu shall have two items labeled By Full Replacement and by Depreciated Replacement. This represents the estimated losses for the entire built environment impacted by the flood as a function of the full replacement value or as reduced by the users depreciation functions.

3.2.8.3.4.1. Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses For Full Replacement Value Dialog

CensusBlock	TotalLoss	BuildingLoss	ContentsLoss	InventoryLoss	RelocationC
1	410419501001044	0	0	0	0
2	410419501001060	0	0	0	0
3	410419501001067	0	0	0	0
4	410419501001069	0	0	0	0
5	410419501001070	16	12	4	0
6	410419501001071	0	0	0	0
7	410419501001072	49	37	12	0
8	410419501001073	100	73	27	0
9	410419501001074	0	0	0	0
10	410419501001075	12	8	4	0
11	410419501001076	65	48	17	0
12	410419501001077	74	52	22	0
13	410419501001078	120	85	35	0
14	410419501001079	58	40	18	0
15	410419501001080	0	0	0	0

 At the bottom of the dialog are buttons for 'Close', 'Map', and 'Print'."/>

Figure 3-254: HAZUS Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses for Full Replacement Value Dialog, By General Occupancy Tab

- a. Selection of By Full Replacement option on the General Building Stock Economic Loss submenu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the economic losses (\$) analysis. The dialog has the following features:
 - a. The dialog has four tabs labeled By General Occupancy, By Specific Occupancy, By General Building Type, and Total. By General Occupancy is the default value.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. With the exception of the Total tab, all tabs have two combo boxes. The combo boxes are labeled as follows:
 - i. On the General and Specific Occupancy tabs combo boxes are labeled Occupancy and Pre/Post Firm.
 - ii. On the by General Building Type tab the combo box is labeled Building Type and Pre/Post Firm.
 - iii. On the Total tab the single combo box is labeled Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid Economic Loss (thous. Dollars).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables ‘fIFRGBSEcLossByGOccup’, ‘clGenOccupancy’, ‘fIFRGBSEcLossBySOccup’, ‘clSOccupancy’, ‘fIFRGBSEcLossByGBldgType’, ‘clGBldgType’, and ‘fIFRGBSEcLossByTotal’.
- c. Table views are as follows:

Tab	Pre/Post Firm	View Name
By General Occupancy	Pre-Firm	absv_FRGBSEcLossByGOccupPre
By General Occupancy	Post-Firm	absv_FRGBSEcLossByGOccupPost
By General Occupancy	Total	absv_FRGBSEcLossByGOccupAll
By Specific Occupancy	Pre-Firm	absv_FRGBSEcLossBySOccupPre
By Specific Occupancy	Post-Firm	absv_FRGBSEcLossBySOccupPost
By Specific Occupancy	Total	absv_FRGBSEcLossBySOccupAll
By General Building Type	Pre-Firm	absv_FRGBSEcLossByGBldgTypePre
By General Building Type	Post-Firm	absv_FRGBSEcLossByGBldgTypePost
By General Building Type	Total	absv_FRGBSEcLossByGBldgTypeAll
Total	Pre-Firm	absv_FRGBSEcLossByTotalPre
Total	Post-Firm	absv_FRGBSEcLossByTotalPost
Total	Total	absv_FRGBSEcLossByTotalAll

- d. The combo box labeled Occupancy allows the user to select the occupancy classification that the results are displayed for. The selection in this combo box acts as a filter for the views discussed above.
 - a. The combo box has the options Residential, Commercial, Industrial, Agriculture, Religion, Government, and Education. The default value when the Table Type combo box is set to General Occupancy is Residential
- e. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.
- f. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. The column names are: CensusBlock, TotalLoss, BuildingLoss, ContentLoss, InventoryLoss, RelocationCost, IncomeLoss, RentallIncomeLoss, WageLoss, DirectOutputLoss, EmploymentLossThousDays.
 - b. Total Loss is a summation of the other loss columns.

- g. Selection of the Close command button closes the dialog and returns the user to the base map view.
- h. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- i. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.4.1.1. Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses For Full Replacement Value Dialog By Specific Occupancy Tab

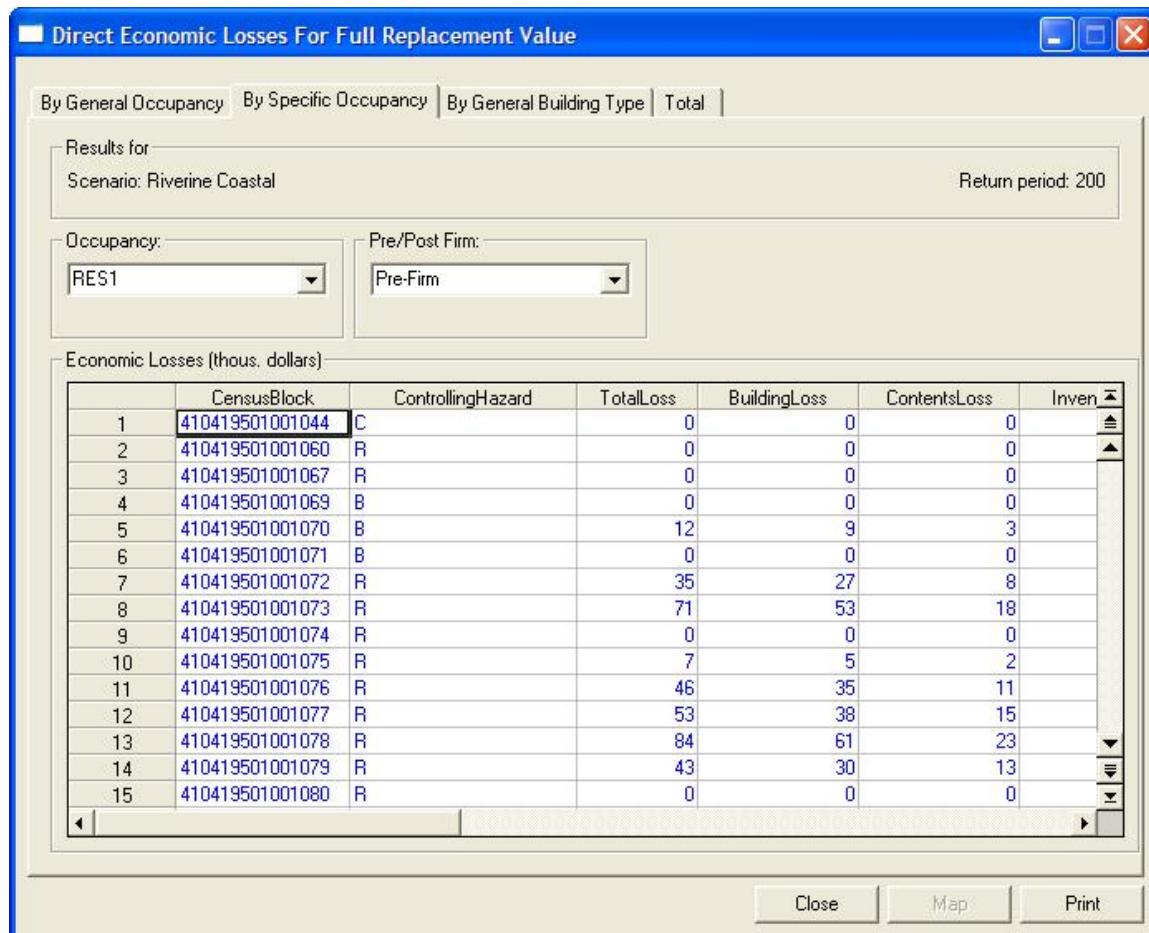


Figure 3-255: HAZUS Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses for Full Replacement By Specific Occupancy Tab

- a. Selection of the By Specific Occupancy tab on the Direct Economic Losses For Full Replacement Value dialog opens the view shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the economic losses (\$) analysis. The dialog has the following features:
 - a. The dialog has four tabs labeled By General Occupancy, By Specific Occupancy, By General Building Type, and Total. By General Occupancy is the default value.

- b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. With the exception of the Total tab, all tabs have two combo boxes. The combo boxes are labeled as follows:
 - i. On the General and Specific Occupancy tabs combo boxes are labeled Occupancy and Pre/Post Firm.
 - ii. On the by General Building Type tab the combo box is labeled Building Type and Pre/Post Firm.
 - iii. On the Total tab the single combo box is labeled Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid Economic Loss (thous. dollars).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables ‘fIIRGBSEcLossBySOccup’ and ‘clsOccupancy’.
- c. Table views are as follows:

Tab	Pre/Post Firm	View Name
By Specific Occupancy	Pre-Firm	absv_FRGBSEcLossBySOccupPre
By Specific Occupancy	Post-Firm	absv_FRGBSEcLossBySOccupPost
By Specific Occupancy	Total	absv_FRGBSEcLossBySOccupAll

- d. The combo box labeled Occupancy allows the user to select the occupancy classification that the results are displayed for. The selection in this combo box acts as a filter for the views discussed above.

- a. The combo box has the options RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, REL1, AGR1, GOV1, GOV2, EDU1, and EDU2. The default value is RES1.
- e. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.
- f. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. The column names are: CensusBlock, ControllingHazard, TotalLoss, BuildingLoss, ContentLoss, InventoryLoss, RelocationCost, IncomeLoss, RentalIncomeLoss, WageLoss, DirectOutputLoss, EmploymentLossThousDays.
 - b. Total Loss is a summation of the other loss columns.
- g. Selection of the Close command button closes the dialog and returns the user to the base map view.
- h. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- i. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.4.1.2. Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses For Full Replacement Value Dialog, By General Building Type Tab

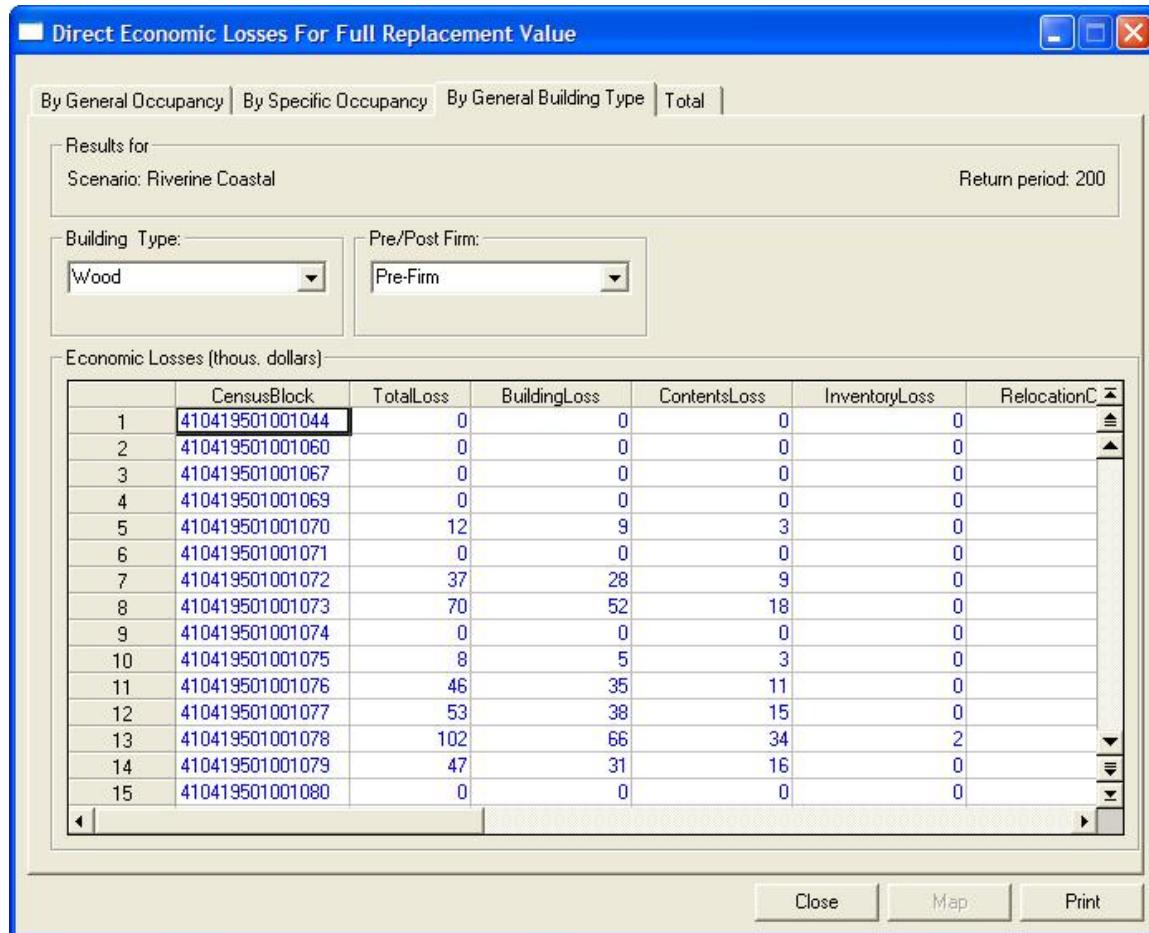


Figure 3-256: HAZUS Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses for Full Replacement Value By General Building Type Tab

- Selection of By General Building Type tab on the Direct Economic Losses For Full Replacement Value dialog opens the view shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the economic losses (\$) analysis. The dialog has the following features:
 - The dialog has four tabs labeled By General Occupancy, By Specific Occupancy, By General Building Type, and Total. By General Occupancy is the default value.

- b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. With the exception of the Total tab, all tabs have two combo boxes. The combo boxes are labeled as follows:
 - i. On the General and Specific Occupancy tabs combo boxes are labeled Occupancy and Pre/Post Firm.
 - ii. On the by General Building Type tab the combo box is labeled Building Type and Pre/Post Firm.
 - iii. On the Total tab the single combo box is labeled Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid Economic Loss (thous. dollars).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables ‘f1FRGBSEcLossByGBldgType’ and ‘clGBldgType’.
- c. Table views are as follows:

Tab	Pre/Post Firm	View Name
By General Building Type	Pre-Firm	absv_FRGBSEcLossByGBldgTypePre
By General Building Type	Post-Firm	absv_FRGBSEcLossByGBldgTypePost
By General Building Type	Total	absv_FRGBSEcLossByGBldgTypeAll

- d. The combo box labeled Building Type allows the user to select the construction classification that the results are displayed for. The selection in this combo box acts as a filter for the views discussed above.

- a. The combo box has the options Wood, Steel, Concrete, Masonry, and ManufHousing. The default value is Wood.
- e. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.
- f. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. The column names are: CensusBlock, TotalLoss, BuildingLoss, ContentLoss, InventoryLoss, RelocationCost, IncomeLoss, RentallIncomeLoss, WageLoss, DirectOutputLoss, EmploymentLossThousDays.
 - b. Total Loss is a summation of the other loss columns.
- g. Selection of the Close command button closes the dialog and returns the user to the base map view.
- h. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- i. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.4.1.3. Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses For Full Replacement Value Dialog Total Tab

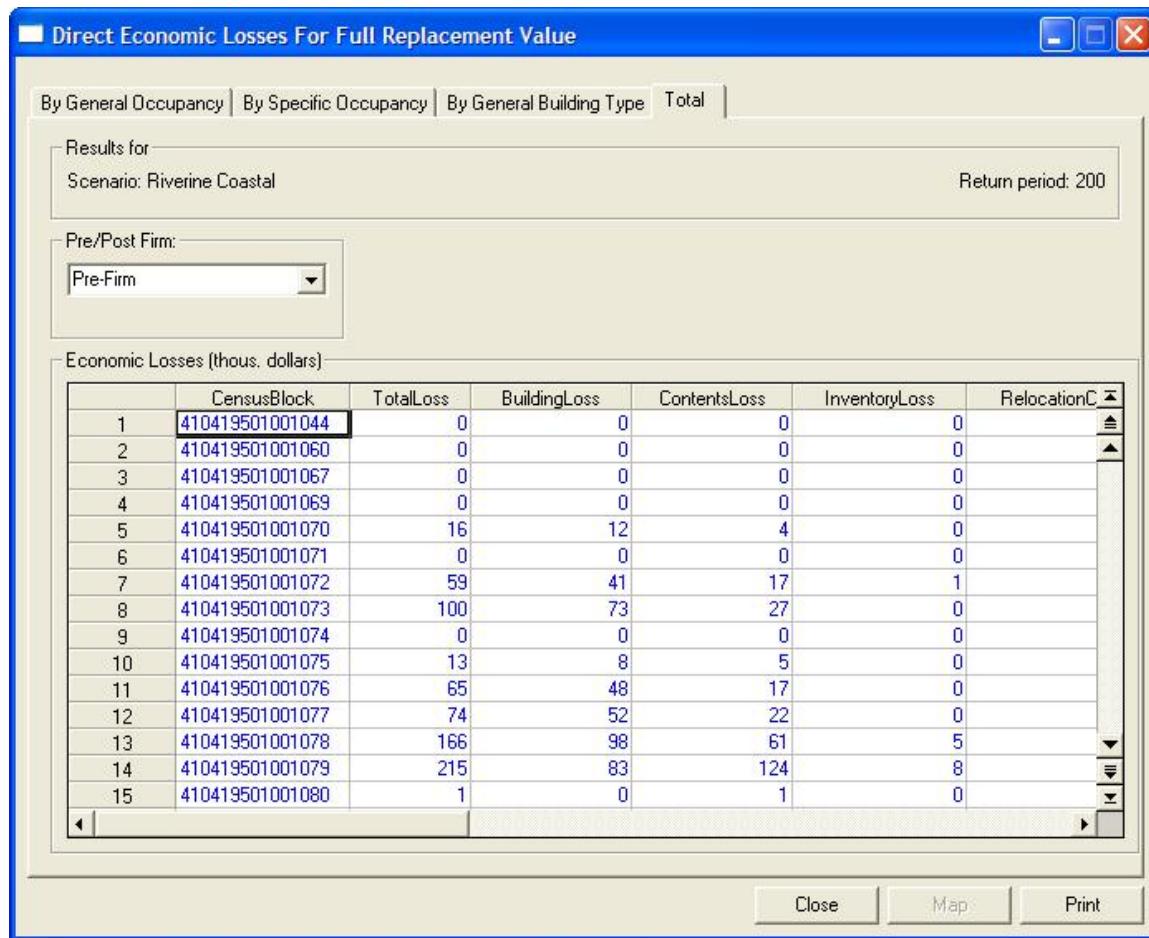


Figure 3-257: HAZUS Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses for Full Replacement Value Total Tab

- Selection of the Total tab on the Direct Economic Losses For Full Replacement Value dialog opens the view shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the economic losses (\$) analysis. The dialog has the following features:
 - The dialog has four tabs labeled By General Occupancy, By Specific Occupancy, By General Building Type, and Total. By General Occupancy is the default value.

- b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. With the exception of the Total tab, all tabs have two combo boxes. The combo boxes are labeled as follows:
 - i. On the General and Specific Occupancy tabs combo boxes are labeled Occupancy and Pre/Post Firm.
 - ii. On the by General Building Type tab the combo box is labeled Building Type and Pre/Post Firm.
 - iii. On the Total tab the single combo box is labeled Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid Economic Loss (thous. dollars).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results table f1FRGBSEcLossByTotal.
- c. Table views are as follows:

Tab	Pre/Post Firm	View Name
Total	Pre-Firm	absv_FRGBSEcLossByTotalPre
Total	Post-Firm	absv_FRGBSEcLossByTotalPost
Total	Total	absv_FRGBSEcLossByTotalAll

- d. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
- a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.

- e. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. The column names are: CensusBlock, TotalLoss, BuildingLoss, ContentLoss, InventoryLoss, RelocationCost, IncomeLoss, RentallIncomeLoss, WageLoss, DirectOutputLoss, EmploymentLossThousDays.
 - b. Total Loss is a summation of the other loss columns.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.4.2. Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses For Depreciation Replacement Value Dialog

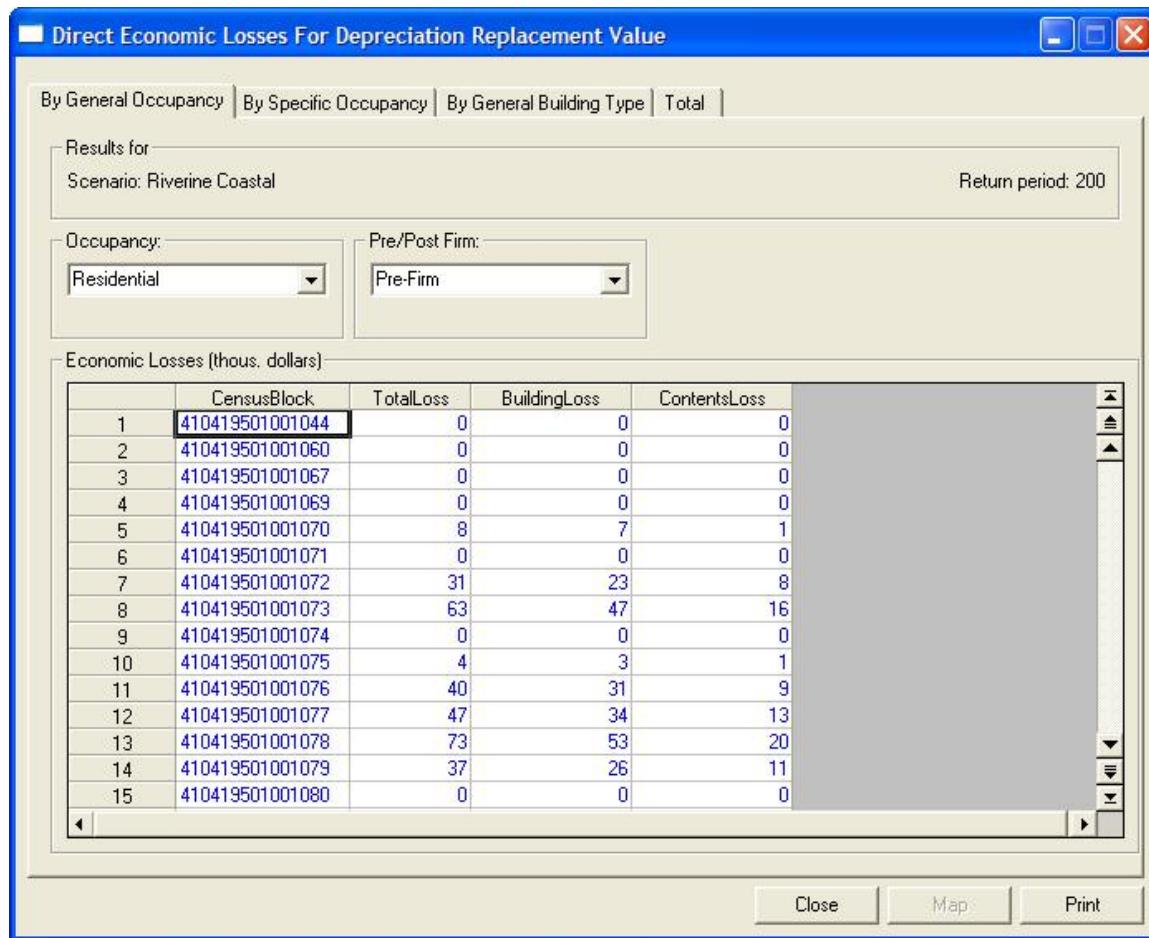


Figure 3-258: HAZUS Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses for Depreciation Replacement Value Dialog, By General Occupancy Tab

- Selection of By Depreciated Replacement option on the General Building Stock Economic Loss submenu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the economic losses (\$) analysis using depreciated building values. The dialog has the following features:
 - The dialog has four tabs labeled By General Occupancy, By Specific Occupancy, By General Building Type, and Total. By General Occupancy is the default value.

- b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. With the exception of the Total tab, all tabs have two combo boxes. The combo boxes are labeled as follows:
 - i. On the General and Specific Occupancy tabs combo boxes are labeled Occupancy and Pre/Post Firm
 - ii. On the by General Building Type tab the combo box is labeled Building Type and Pre/Post Firm
 - iii. On the Total tab the single combo box is labeled Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid Economic Loss (thous. dollars).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables f1FRGBSDepEcLossByGOccup, c1GenOccupancy, f1FRGBSDepEcLossBySOccup, c1SOccupancy, f1FRGBSDepEcLossByBldgType, c1GBldgType, and f1FRGBSDepEcLossByTotal.
- c. Table views are as follows:

Tab	Pre/Post Firm	View Name
By General Occupancy	Pre-Firm	absv_FRGBSDepEcLossByGOccupPre
By General Occupancy	Post-Firm	absv_FRGBSDepEcLossByGOccupPost
By General Occupancy	Total	absv_FRGBSDepEcLossByGOccupAll
By Specific Occupancy	Pre-Firm	absv_FRGBSDepEcLossBySOccupPre
By Specific Occupancy	Post-Firm	absv_FRGBSDepEcLossBySOccupPost
By Specific Occupancy	Total	absv_FRGBSDepEcLossBySOccupAll
By General Building Type	Pre-Firm	absv_FRGBSDepEcLossByBldgTypePre

Tab	Pre/Post Firm	View Name
By General Building Type	Post-Firm	absv_FRGBSDepEcLossByBldgTypePost
By General Building Type	Total	absv_FRGBSDepEcLossByBldgTypeAll
Total	Pre-Firm	absv_FRGBSDepEcLossByTotalPre
Total	Post-Firm	absv_FRGBSDepEcLossByTotalPost
Total	Total	absv_FRGBSDepEcLossByTotalAll

- d. The combo box labeled Occupancy allows the user to select the occupancy classification that the results are displayed for. The selection in this combo box acts as a filter for the views discussed above.
 - a. The combo box has the options Residential, Commercial, Industrial, Agriculture, Religious/Non-Profit, Government, and Education. The default value when the Table Type combo box is set to General Occupancy is Residential.
- e. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.
- f. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. The column names are: CensusBlock, TotalLoss, BuildingLoss, and ContentLoss.
 - b. Total Loss is a summation of the other loss columns.
- g. Selection of the Close command button closes the dialog and returns the user to the base map view.
- h. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- i. Selection of Print opens a standard print dialog and allows the user to print the entire table.

- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.4.2.1. Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses For Depreciation Replacement Value Dialog By Specific Occupancy Tab

CensusBlock	ControllingHazard	TotalLoss	BuildingLoss	ContentsLoss
1	410419501001044	0	0	0
2	R	0	0	0
3	R	0	0	0
4	B	0	0	0
5	B	7	6	1
6	B	0	0	0
7	R	25	19	6
8	R	50	38	12
9	R	0	0	0
10	R	4	3	1
11	R	32	25	7
12	R	37	27	10
13	R	59	43	16
14	R	30	21	9
15	R	0	0	0

Figure 3-259: HAZUS Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses for Depreciation Replacement By Specific Occupancy Tab

- a. Selection of the By Specific Occupancy tab on the Direct Economic Losses For Depreciation Replacement Value dialog opens the view shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the economic losses (\$) analysis. The dialog has the following features:
 - a. The dialog has four tabs labeled By General Occupancy, By Specific Occupancy, By General Building Type, and Total. By General Occupancy is the default value.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. With the exception of the Total tab, all tabs have two combo boxes. The combo boxes are labeled as follows:
 - i. On the General and Specific Occupancy tabs combo boxes are labeled Occupancy and Pre/Post Firm.
 - ii. On the by General Building Type tab the combo box is labeled Building Type and Pre/Post Firm.
 - iii. On the Total tab the single combo box is labeled Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid Economic Loss (thous. dollars).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables flFRGBSDepEcLossBySOccup and clSOccupancy.

- c. Table views are as follows:

Tab	Pre/Post Firm	View Name
By Specific Occupancy	Pre-Firm	absv_FRGBSDepEcLossBySOccupPre
By Specific Occupancy	Post-Firm	absv_FRGBSDepEcLossBySOccupPost
By Specific Occupancy	Total	absv_FRGBSDepEcLossBySOccupAll

- d. The combo box labeled Occupancy allows the user to select the occupancy classification that the results are displayed for. The selection in this combo box acts as a filter for the views discussed above.
 - a. The combo box has the options RES1, RES2, RES3A, RES3B, RES3C, RES3D, RES3E, RES3F, RES4, RES5, RES6, COM1, COM2, COM3, COM4, COM5, COM6, COM7, COM8, COM9, COM10, IND1, IND2, IND3, IND4, IND5, IND6, REL1, AGR1, GOV1, GOV2, EDU1, and EDU2. The default value is RES1.
- e. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.
- f. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. The column names are: CensusBlock, ControllingHazard, TotalLoss, BuildingLoss, and ContentLoss.
 - b. Total Loss is a summation of the other loss columns.
- g. Selection of the Close command button closes the dialog and returns the user to the base map view.
- h. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- i. Selection of Print opens a standard print dialog and allows the user to print the entire table.

- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.4.2.2. Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses For Depreciation Replacement Value Dialog, By General Building Type Tab

CensusBlock	TotalLoss	BuildingLoss	ContentsLoss
1 410419501001044	0	0	0
2 410419501001060	0	0	0
3 410419501001067	0	0	0
4 410419501001069	0	0	0
5 410419501001070	7	6	1
6 410419501001071	0	0	0
7 410419501001072	26	19	7
8 410419501001073	50	38	12
9 410419501001074	0	0	0
10 410419501001075	4	3	1
11 410419501001076	32	25	7
12 410419501001077	37	27	10
13 410419501001078	69	46	23
14 410419501001079	33	22	11
15 410419501001080	0	0	0

Figure 3-260: HAZUS Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses for Depreciation Replacement Value By General Building Type Tab

- a. Selection of By General Building Type tab on the Direct Economic Losses For Depreciation Replacement Value dialog opens the view shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the economic losses (\$) analysis. The dialog has the following features:
 - a. The dialog has four tabs labeled By General Occupancy, By Specific Occupancy, By General Building Type, and Total. By General Occupancy is the default value.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. With the exception of the Total tab, all tabs have two combo boxes. The combo boxes are labeled as follows:
 - i. On the General and Specific Occupancy tabs combo boxes are labeled Occupancy and Pre/Post Firm.
 - ii. On the by General Building Type tab the combo box is labeled Building Type and Pre/Post Firm.
 - iii. On the Total tab the single combo box is labeled Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid Economic Loss (thous. dollars).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables flFRGBSDepEcLossByGBldgType and clGBldgType.

- c. Table views are as follows:

Tab	Pre/Post Firm	View Name
By General Building Type	Pre-Firm	absv_FRGBSDepEcLossByBldgTypePre
By General Building Type	Post-Firm	absv_FRGBSDepEcLossByBldgTypePost
By General Building Type	Total	absv_FRGBSDepEcLossByBldgTypeAll

- d. The combo box labeled Building Type allows the user to select the construction classification that the results are displayed for. The selection in this combo box acts as a filter for the views discussed above.
 - a. The combo box has the options Wood, Steel, Concrete, Masonry, and ManufHousing. The default value is Wood.
- e. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
 - a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.
- f. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
 - a. The column names are: CensusBlock, TotalLoss, BuildingLoss, and ContentLoss.
 - b. Total Loss is a summation of the other loss columns.
- g. Selection of the Close command button closes the dialog and returns the user to the base map view.
- h. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- i. Selection of Print opens a standard print dialog and allows the user to print the entire table.

- j. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.4.2.3. Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses For Depreciation Replacement Value Dialog Total Tab

CensusBlock	TotalLoss	BuildingLoss	ContentsLoss
1 410419501001044	0	0	0
2 410419501001060	0	0	0
3 410419501001067	0	0	0
4 410419501001069	0	0	0
5 410419501001070	8	7	1
6 410419501001071	0	0	0
7 410419501001072	36	25	11
8 410419501001073	63	47	16
9 410419501001074	0	0	0
10 410419501001075	4	3	1
11 410419501001076	40	31	9
12 410419501001077	47	34	13
13 410419501001078	99	62	37
14 410419501001079	138	55	83
15 410419501001080	0	0	0

Figure 3-261: HAZUS Results Menu, General Building Stock Economic Loss Submenu: Direct Economic Losses for Depreciation Replacement Value Total Tab

- a. Selection of the Total tab on the Direct Economic Losses For Depreciation Replacement Value dialog opens the view shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the economic losses (\$) analysis. The dialog has the following features:
 - a. The dialog has four tabs labeled By General Occupancy, By Specific Occupancy, By General Building Type, and Total. By General Occupancy is the default value.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. With the exception of the Total tab, all tabs have two combo boxes. The combo boxes are labeled as follows:
 - i. On the General and Specific Occupancy tabs combo boxes are labeled Occupancy and Pre/Post Firm.
 - ii. On the by General Building Type tab the combo box is labeled Building Type and Pre/Post Firm.
 - iii. On the Total tab the single combo box is labeled Pre/Post Firm.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid Economic Loss (thous. dollars).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results table f1FRGBSDepEcLossByTotal.

- c. Table views are as follows:

Tab	Pre/Post Firm	View Name
Total	Pre-Firm	absv_FRGBSDepEcLossByTotalPre
Total	Post-Firm	absv_FRGBSDepEcLossByTotalPost
Total	Total	absv_FRGBSDepEcLossByTotalAll

- d. The combo box labeled Pre/Post FIRM allows the user to view the results by the design level of the structures. The default option is Pre-Firm.
- a. The Pre/Post Firm combo box options include Pre-Firm, Post-Firm and Total.
- e. The data grid displays the results views as filtered and managed through the combo box selections outlined above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
- a. The column names are: CensusBlock, TotalLoss, BuildingLoss, and ContentLoss.
 - b. Total Loss is a summation of the other loss columns.
- f. Selection of the Close button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.5. Results Menu: Essential Facilities

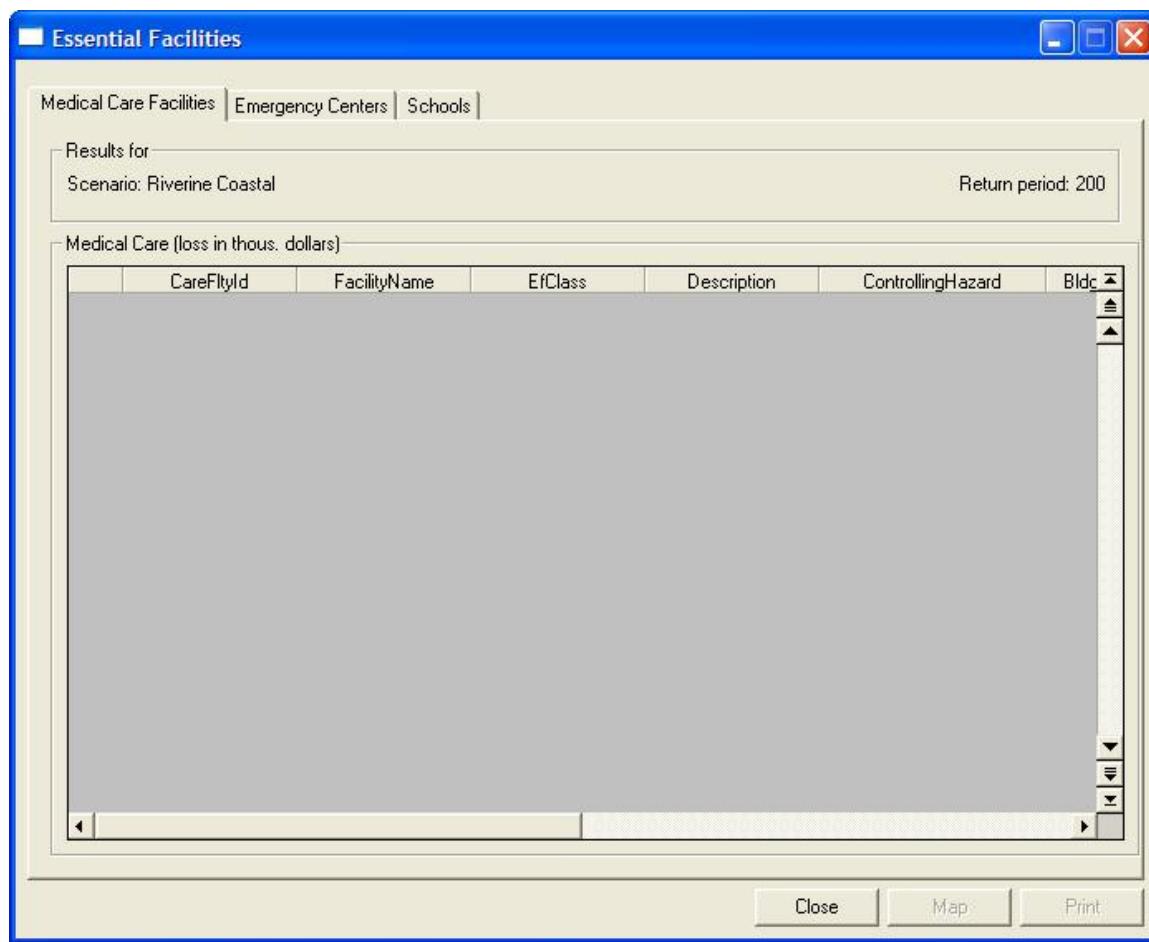


Figure 3-262: HAZUS Results Menu: Essential Facilities Dialog, Medical Care Tab

- a. Selection of the Essential Facilities on the Results Menu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Essential Facilities within the study region. Because the analysis is performed site by site, it is not uncommon for the results to be empty if there are no facilities within the depth grid. The dialog has the following features:
 - a. The dialog has three tabs labeled Medical Care Facilities, Emergency Centers, and Schools. The default value for the dialog is the Medical Care Facilities Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.

- c. The Emergency Centers tab is the only tab with a combo box. The combo box is labeled Facility Type and Emergency Centers is the default value. Neither of the other two tabs have a combo box.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables cIEF, hzCareFlty, fIFRCareFlty, hzEmergencyCtr, fIFREmergencyCtr, hzFireStation, fIFRFireStation, hzPoliceStation, fIFRPoliceStation, hzSchool, and fIFRSchool.
- c. Table views are as follows:

Tab	Combo Selection	View Name
Medical Care Facility	N/A	absv_FRCareFlty
Emergency Centers	Emergency Centers	absv_FREmergencyCtr
Emergency Centers	Fire Stations	absv_FRFireStation
Emergency Centers	Police Stations	absv_FRPOLiceStation
Schools	N/A	absv_FRSchool

- d. The data grid, labeled Medical Care (loss in thous. dollars), displays the results for the Medical Care Facilities. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
- a. The column names are: CareFltyId, FacilityName, EfClass, Description, ControllingHazard, BldgDmgPct, ContDmgPct, BldgLossUSD, ContLossUSD, Functionality, and DaysTo100Functionality.
- e. Selection of the Close command button closes the dialog and returns the user to the base map view.

- f. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.5.1. Results Menu, Essential Facilities: Emergency Centers Tab

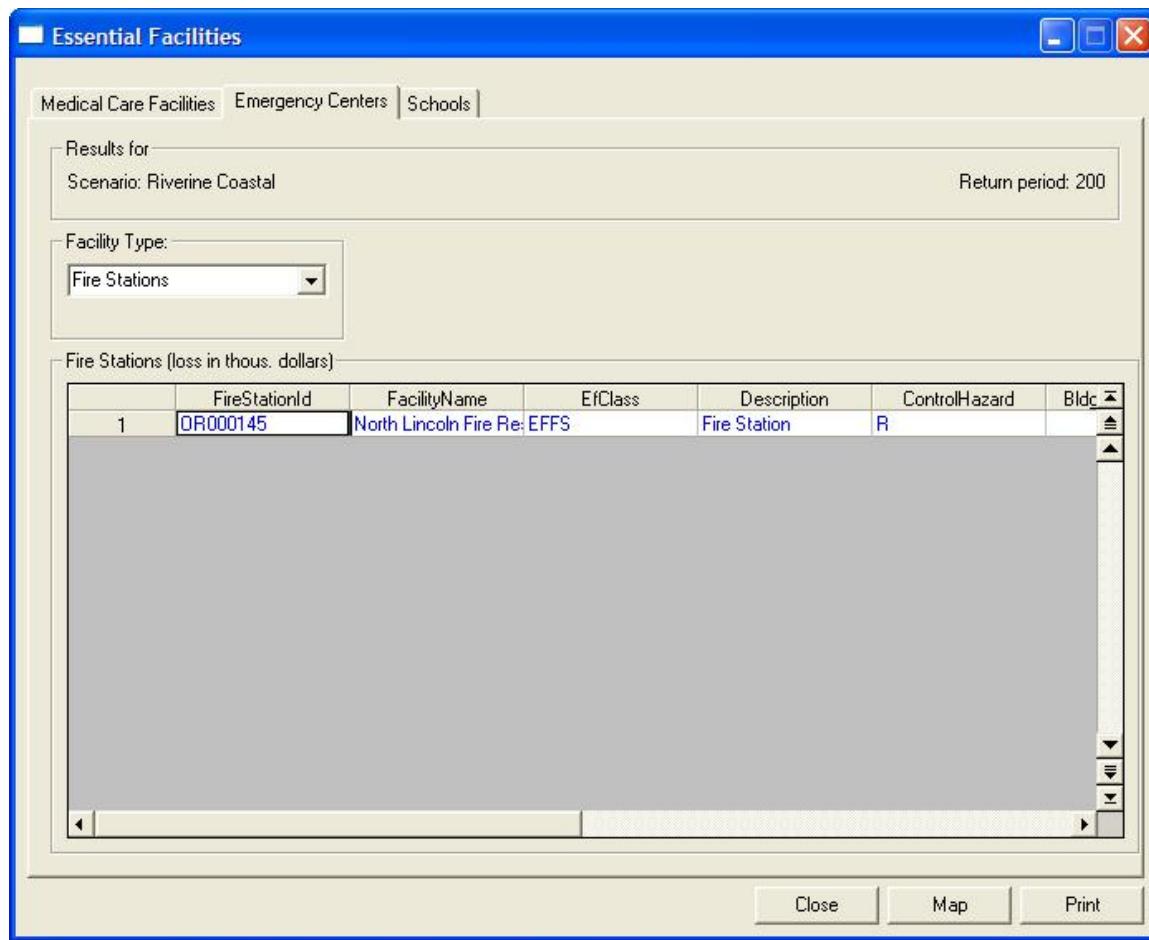


Figure 3-263: HAZUS Results Menu, Essential Facilities, Emergency Centers Tab

- a. Selection of the Emergency Centers tab on the Essential Facilities Dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Essential Facilities within the study region. The dialog has the following features:
 - a. The dialog has three tabs labeled Medical Care Facilities, Emergency Centers, and Schools. The default value for the dialog is the Medical Care Facilities Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The Emergency Centers tab is the only tab with a combo box. The combo box is labeled Facility Type and Emergency Centers is the default value.

- d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables cIEF, hzEmergencyCtr, fFREmergencyCtr, hzFireStation, fFRFireStation, hzPoliceStation, and fFRPoliceStation.
- c. Table views are as follows:

Tab	Combo Selection	View Name
Emergency Centers	Emergency Centers	absv_FREmergencyCtr
Emergency Centers	Fire Stations	absv_FRFireStation
Emergency Centers	Police Stations	absv_FRPoliceStation

- d. A combo box labeled Facility Type allows the user to select between Emergency Centers, Fire Stations, and Police Stations.
- e. The data grid displays the results for the Facilities Type selected in the combo box discussed above. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
- a. When the selected Facility Type is Emergency Centers, the data grid is labeled Emergency Centers (loss in thous. dollars). The column names are: EoID, FacilityName, EfClass, Description, ControllingHazard, BldgDmgPct, ContDmgPct, Functionality, BldgLossUSD, ContLosUSD, and DaysTo100Functionality.
 - b. When the selected Facility Type is Fire Stations, the data grid is labeled Fire Stations (loss in thous. dollars). The column names are FireStationId, FacilityName, EfClass, Description, ControlHazard, BldgDmgPct, ContDmgPct, Functionality (checkbox), BldgLossUSD, ContLosUSD, and DaysTo100Functionality.

- c. When the selected Facility Type is Police Stations, data grid is labeled Police Stations (loss in thous. dollars). The column names are: PoliceStationId, Name, ControlHazard, BldgDmgPct, ContDmgPct, Functionality (checkbox), BldgLossUSD, ContLosUSD, and DaysTo100Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.5.2. Results Menu, Essential Facilities Dialog: Schools Tab

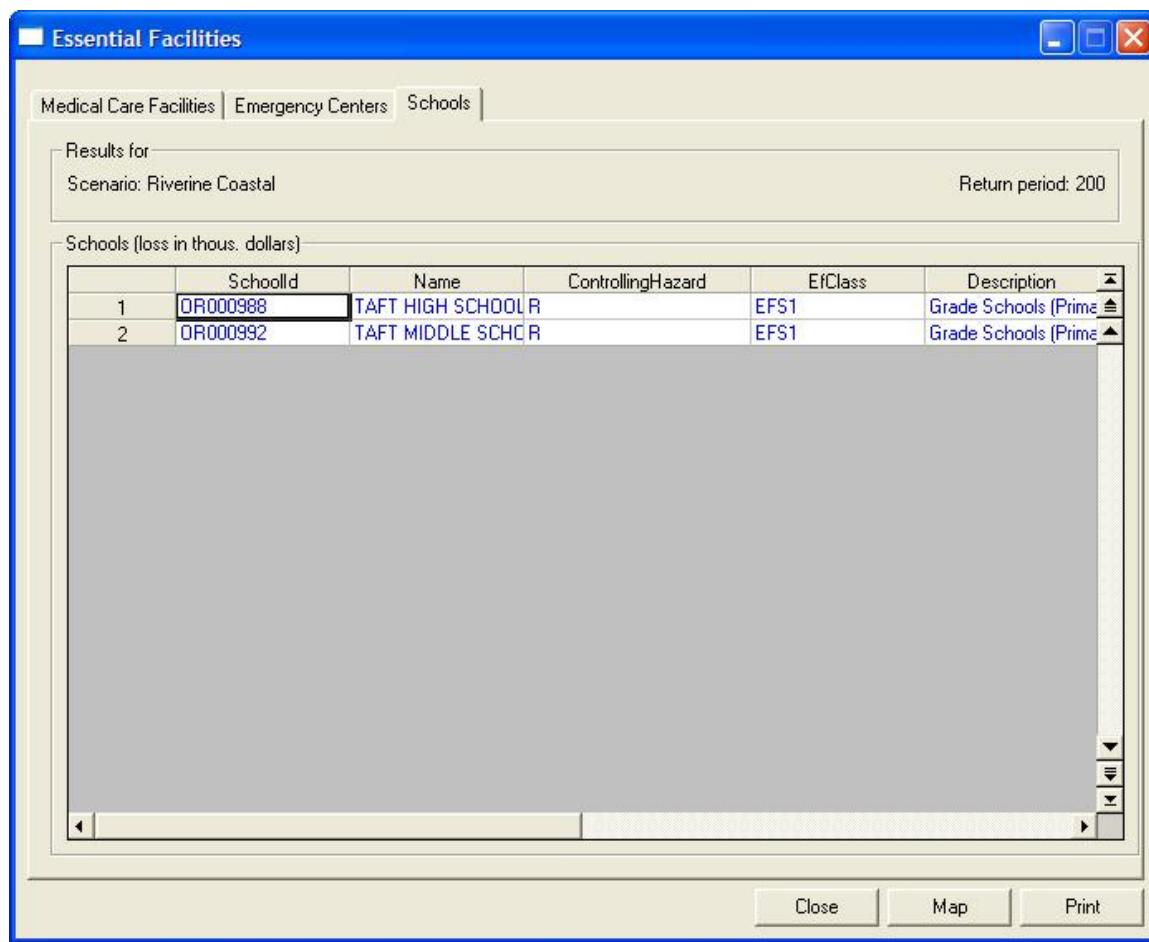


Figure 3-264: HAZUS Results Menu, Essential Facilities, Schools Tab

- a. Selection of the Schools tab on the Essential Facilities Dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Essential Facilities within the study region. The dialog has the following features:
 - a. The dialog has three tabs labeled Medical Care Facilities, Emergency Centers, and Schools. The default value for the dialog is the Medical Care Facilities Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The Emergency Centers tab is the only tab with a combo box. The combo box is labeled Facility Type and Emergency Centers is the default value.

- d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables: cIEF, hzSchool, and fIFRSchool.
- c. Table view is absv_FRSchools
- d. The data grid, labeled Schools (loss in thous. dollars) displays the results for the schools in the study region. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
- a. The column names are: SchoollId, Name, ControllingHazard, EfClass, Description, BldgDmgPct, ContDmgPct, BldgLossUSD, ContLosUSD, Functionality (checkbox), and DaysTo100Functionality.
- e. Selection of the Close command button closes the dialog and returns the user to the base map view.
- f. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.6. Results Menu: User Defined Facilities Dialog

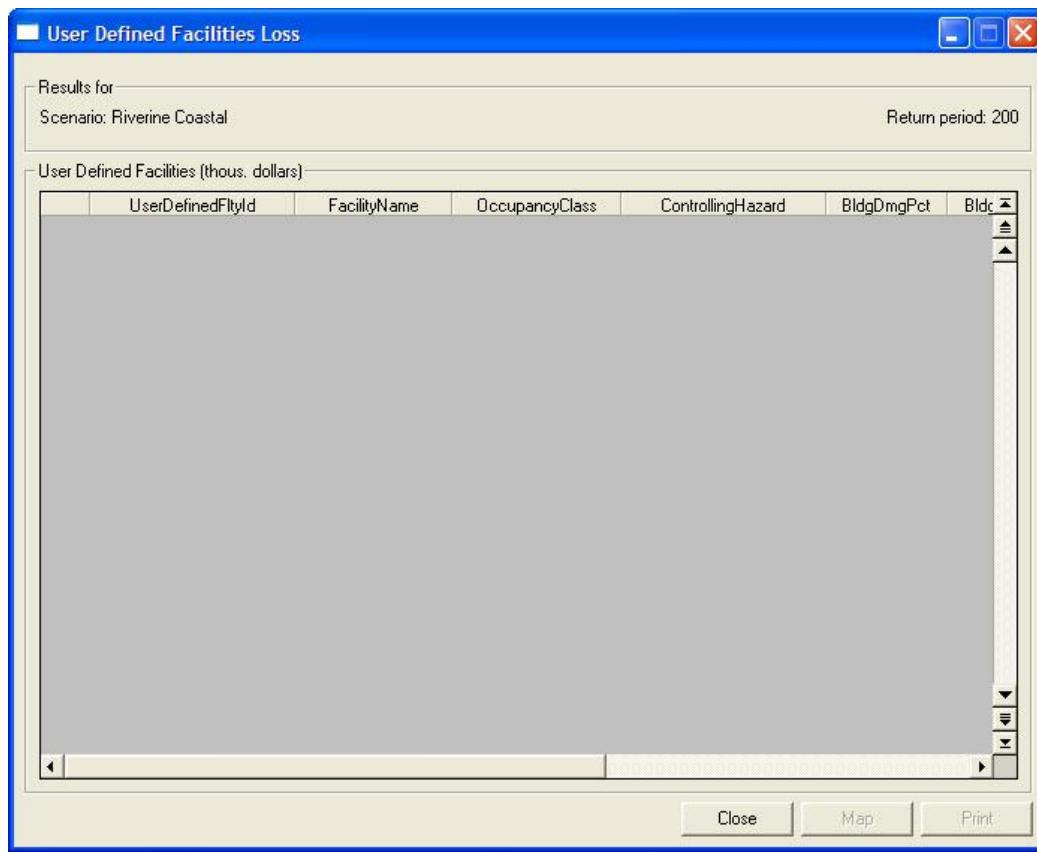


Figure 3-265: HAZUS Results Menu, User Defined Facilities Dialog

- a. Selection of the User Defined Facilities on the Results Menu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the facilities they defined on the Inventory Menu. The dialog has the following features:
 - a. The dialog does not have any tabs.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The dialog does not have a combo box.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.

- f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables hzUserDefinedFlty and flFRUserDefinedFlty.
- c. Table view is absv_FRUserDefinedFlty
- d. The data grid, labeled User Defined Facilities (thous. dollars) displays the results for the facilities the user has imported or added to the User Defined Facilities inventory data. The data grid is not editable regardless of the combo box selections. All text is displayed in blue.
- a. The column names are: UserDefinedFltyId, FacilityName, OccupancyClass, ControllingHazard, BldgDmgPct, BldgLossUSD, ContDmgPct, ContLosUSD, and InventoryLossUSD.
- e. Selection of the Close command button closes the dialog and returns the user to the base map view.
- f. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.7. Results Menu: Advanced Engineering Analysis Dialog

- a. This menu item is included on the Results Menu to remain consistent with the Earthquake model. Currently the flood model does not have a similar detailed engineering analysis requirement from their user base. The menu items are disabled.

3.2.8.3.8. Results Menu: Transportation Systems Damage/Economic Loss Dialog

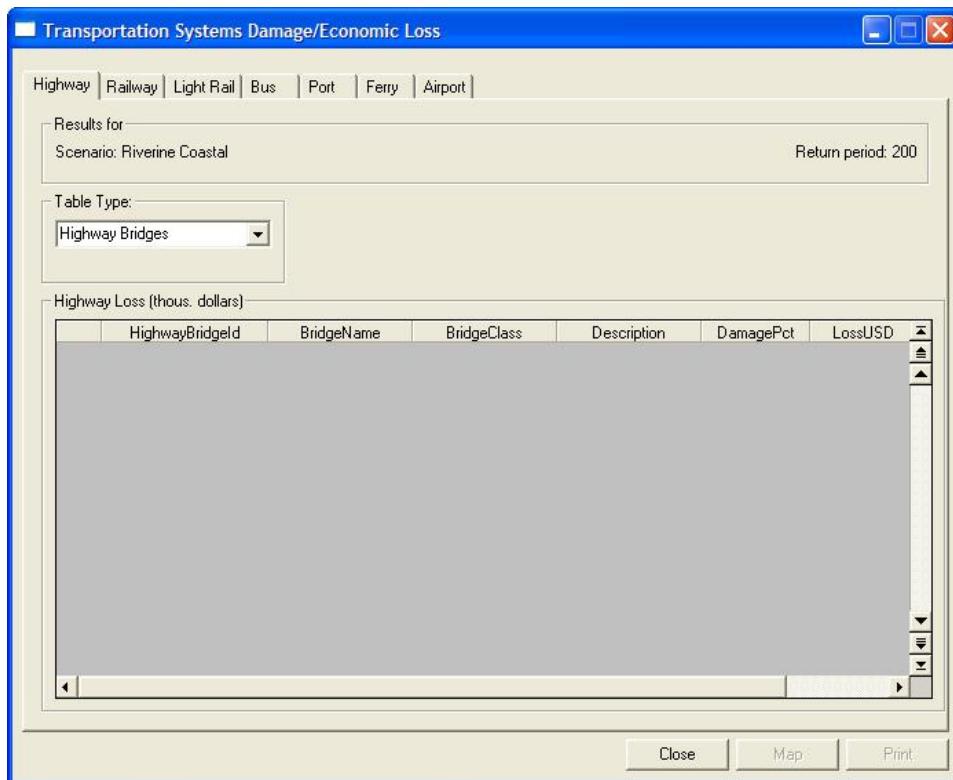


Figure 3-266: HAZUS Results Menu, Transportation Systems Damage / Economic Loss Dialog, Highway Tab

- a. Selection of the Transportation Systems Damage / Economic Loss on the Results Menu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Transportation System features that the HAZUS flood model analyzes. The dialog has the following features:
 - a. The dialog has seven tabs labeled Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport. The default value for the dialog is the Highway Tab.

- b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. Depending on the tab selected, a combo box may be available to the user.
 - i. The Highway, Railway, Light Rail, and Airport tabs have a combo box labeled Table Type.
 - ii. Tabs Bus, Port and Ferry do not have a combo box.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clBridges, hzHighwayBridge, flFRRoadwayBridge, clTunnels, hzHighwayTunnel, flFRRoadwayTunnel, clSegments, hzHighwaySegment, flFRRoadwaySegments, clBridges, hzRailwayBridge, flFRRailwayBridge, clTranspFacilities, hzRailFlty, flFRRailwayFlty, hzRailwayTunnel, flFRRailwayTunnel, hzRailwaySegment, flFRRailwaySegments, hzLightRailBridge, flFRLightRailBridge, hzLightRailFlty, flFRLightRailFlty, hzLightRailTunnel, flFRLightRailTunnel, hzLightRailSegment, flFRLightRailSegments, hzBusFlty, flFRBusFlty, hzPortFlty, flFRPortFlty, hzFerryFlty, flFRFerryFlty, hzRunway, flFRAirportRunway, hzAirportFlty, and flFRAirportFlty.
- c. Table views are:

Tab	Combo Selection	View
Highway	Highway Bridges	absv_FRRoadwayBridge
Highway	Highway Tunnels	absv_FRRoadwayTunnel
Highway	Highway Segments	absv_FRRoadwaySegments
Railway	Railway Bridges	absv_FRRailwayBridge
Railway	Railway Facilities	absv_FRRailFlty
Railway	Railway Tunnels	absv_FRRailwayTunnel
Railway	Railway Segments	absv_FRRailwaySegment
Light Rail	Light Rail Bridges	absv_FRLightRailBridge

Tab	Combo Selection	View
Light Rail	Light Rail Facilities	absv_FRLightRailFlty
Light Rail	Light Rail Tunnels	absv_FRLightRailTunnel
Light Rail	Light Rail Segments	absv_FRLightRailSegments
Bus	N/A	absv_FRBusFlty
Port	N/A	absv_FRPoRtFlty
Ferry	N/A	absv_FRFerryFlty
Airport	Airport Runways	absv_FRAirportRunway
Airport	Airport Facilities	absv_FRAirportFlty

- d. The Highway tab has a single combo box labeled Table Type. Options include Highway Bridges, Highway Tunnels, and Highway Segments. Highway Bridges is the default value.
- e. The data grid is labeled Highway Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
 - a. For Highway Bridges, the column names are: HighwayBridgeld, BridgeName, BridgeClass, Description, DamagePct, LossUSD, and Functionality.
 - b. For Highway Tunnels, the column names are: HighwayTunnelld, TunnelClass, Name, Description, Damage%, Loss (\$), and Functionality.
 - c. For Highway Segments, the column names are: HighwaySegId, SegmentClass, Name, Description, DamagePct, LossUSD, and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.8.1. Results Menu, Transportation Systems Damage / Economic Loss: Railway Tab

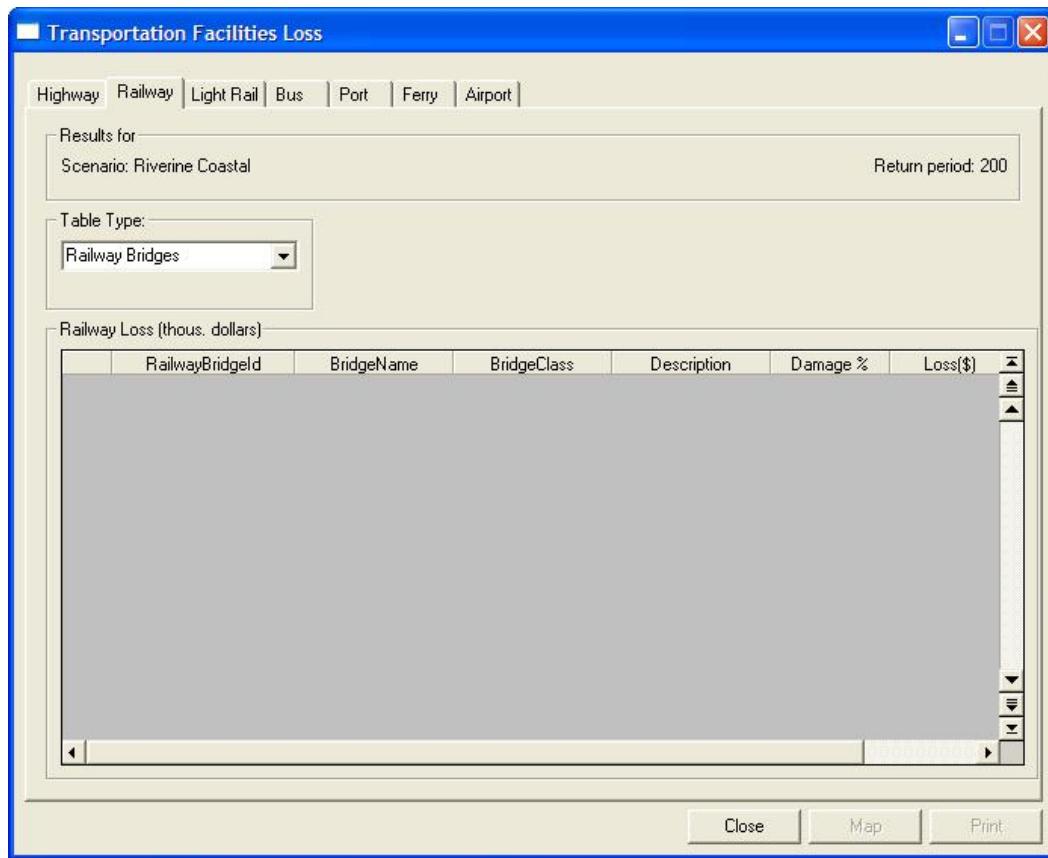


Figure 3-267: HAZUS Results Menu, Transportation Systems Damage / Economic Loss: Railway Tab

- a. Selection of the Railway Tab on the Transportation Facilities Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Rail features that the HAZUS flood model analyzes. The dialog has the following features:

- a. The dialog has seven tabs labeled Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport. The default value for the dialog is the Highway Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. Depending on the tab selected, a combo box may be available to the user.
 - i. The Highway, Railway, Light Rail, and Airport tabs have a combo box labeled Table Type.
 - ii. Tabs Bus, Port and Ferry do not have a combo box.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clBridges, hzRailwayBridge, flFRRailwayBridge, clTranspFacilities, hzRailFlty, flFRRailwayFlty, clTunnels, hzRailwayTunnel, flFRRailwayTunnel, clSegments, hzRailwaySegment, and flFRRailwaySegments.
- c. Table views are:

Tab	Combo Selection	View
Railway	Railway Bridges	absv_FRRailwayBridge
Railway	Railway Facilities	absv_FRRailFlty
Railway	Railway Tunnels	absv_FRRailwayTunnel
Railway	Railway Segments	absv_FRRailwaySegment

- d. The Railway tab has a single combo box labeled Table Type. Options include Railway Bridges, Railway Facilities, Railway Tunnels, and Railway Segments. Railway Bridges is the default value.

- e. The data grid is labeled Railway Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
 - a. For Railway Bridges, the column names are: RailwayBridgeld, BridgeName, BridgeClass, Description, Damage%, Loss(\$), and Functionality.
 - b. For Railway Facilities, the column names are: RailFltyld, Name, TranspFclyClass, Description, Damage %, Loss (\$), and Functionality.
 - c. For Railway Tunnels, the column names are: RailwayTunnelld, Name, TunnelClass, Description, Damage%, Loss (\$), and Functionality.
 - d. For Railway Segments, the column names are: RailwaySegld, SegmentClass, Name, Description, Damage%, Loss(\$), and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.8.2. Results Menu, Transportation Systems Damage / Economic Loss: Light Rail Tab

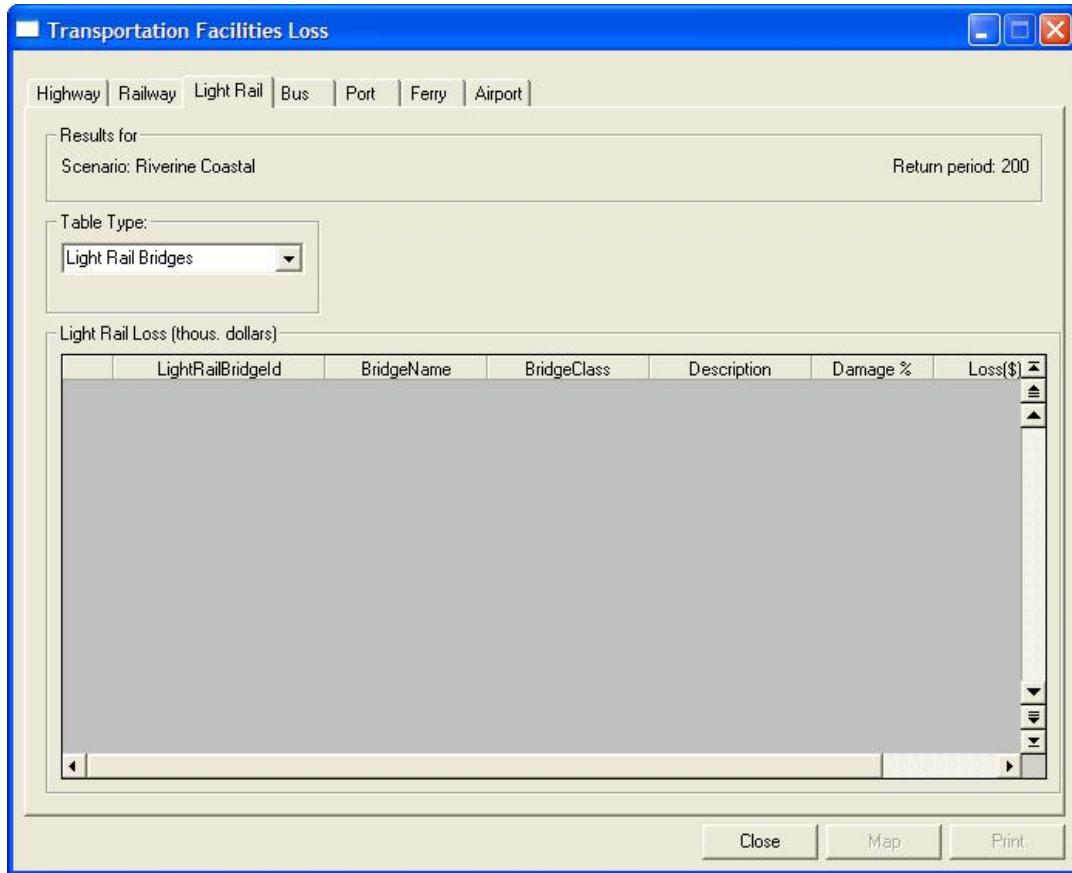


Figure 3-268: HAZUS Results Menu, Transportation Systems Damage / Economic Loss: Light Rail Tab

- a. Selection of the Light Rail Tab on the Transportation Facilities Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Light Rail features that the HAZUS flood model analyzes. The dialog has the following features:
 - a. The dialog has seven tabs labeled Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport. The default value for the dialog is the Highway Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. Depending on the tab selected, a combo box may be available to the user.

- i. The Highway, Railway, Light Rail, and Airport tabs have a combo box labeled Table Type.
- ii. Tabs Bus, Port and Ferry do not have a combo box.
- d. The dialog does not have radio buttons.
- e. The dialog does not have a check box.
- f. The dialog has a single data grid.
- g. The dialog does not have text boxes.
- h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clBridges, hzLightRailBridge, flFRLightRailBridge, clTranspFacilities, hzLightRailFlty, flFRLightRailFlty, clTunnels, hzLightRailTunnel, flFRLightRailTunnel, clSegments, hzLightRailSegment, and flFRLightRailSegments.
- c. Table views are:

Tab	Combo Selection	View
Light Rail	Light Rail Bridges	absv_FRLightRailBridge
Light Rail	Light Rail Facilities	absv_FRLightRailFlty
Light Rail	Light Rail Tunnels	absv_FRLightRailTunnel
Light Rail	Light Rail Segments	absv_FRLightRailSegments

- d. The Light Rail tab has a single combo box labeled Table Type. Options include Light Rail Bridges, Light Rail Facilities, Light Rail Tunnels, and Light Rail Segments. Light Rail Bridges is the default value.
- e. The data grid is labeled Light Rail Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
 - a. For Light Rail Bridges, the column names are: LightRailBridgeld, BridgeName, BridgeClass, Description, Damage%, Loss(\$), and Functionality.

- b. For Light Rail Facilities, the column names are: LightRailFltyId, TranspFcCityClass, Name, Description, Damage %, Loss (\$), and Functionality.
- c. For Light Rail Tunnels, the column names are: LightRailTunnelId, TunnelName, TunnelClass, Description, Damage%, Loss (\$), and Functionality.
- d. For Light Rail Segments, the column names are: LightRailSegId, SegmentName, SegmentClass, Description, Damage%, Loss(\$), and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.8.3. Results Menu, Transportation Systems Damage / Economic Loss: Bus Tab

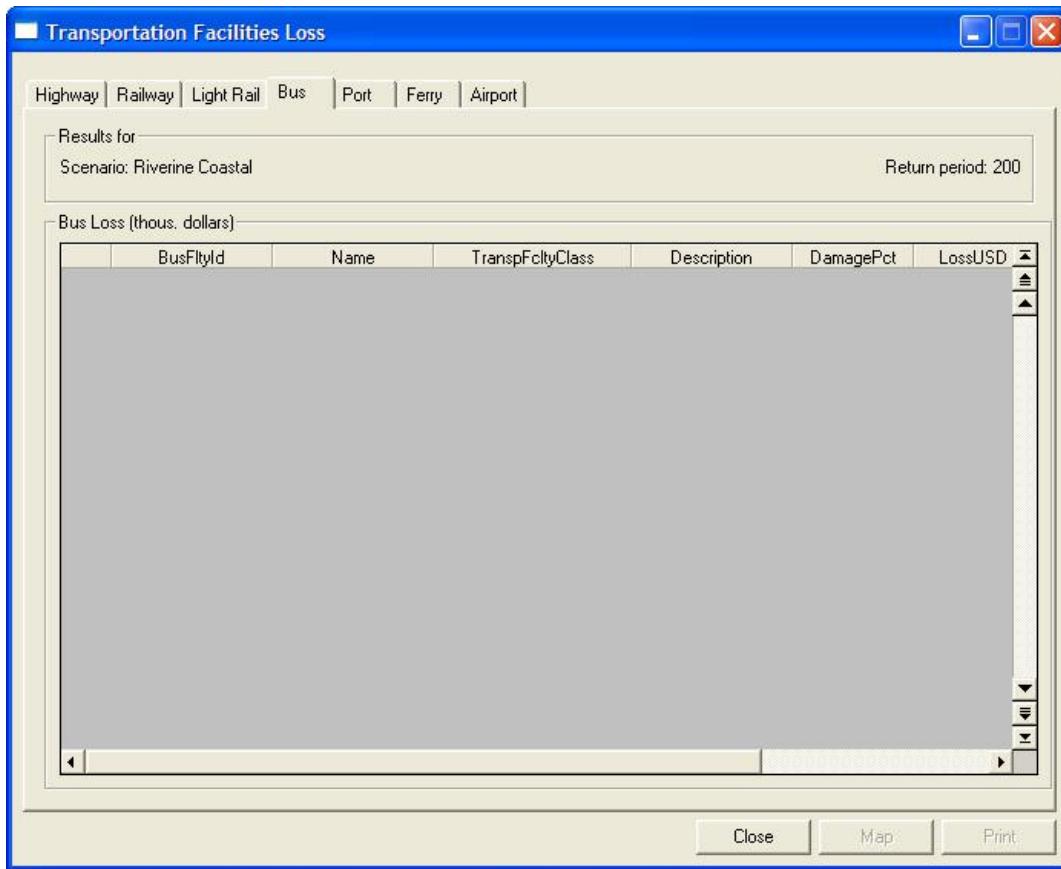


Figure 3-269: HAZUS Results Menu, Transportation Systems Damage / Economic Loss: Bus Tab

- a. Selection of the Bus Tab on the Transportation Facilities Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Bus features that the HAZUS flood model analyzes. The dialog has the following features:
 - a. The dialog has seven tabs labeled Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport. The default value for the dialog is the Highway Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. Depending on the tab selected, a combo box may be available to the user.

- i. The Highway, Railway, Light Rail, and Airport tabs have a combo box labeled Table Type.
 - ii. Tabs Bus, Port and Ferry do not have a combo box.
- d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clTranspFacilities, hzBusFlty, flFRBusFlty.
 - c. Table view is absv_FRBusFlty.
- d. The data grid is labeled Bus Loss (thous. dollars) and the column names are: BusFltyId, Name, TranspFcLtyClass, Description, DamagePct, LossUSD, and Functionality. The data grid is not editable and all values are displayed in blue text.
 - e. Selection of the Close command button closes the dialog and returns the user to the base map view.
 - f. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
 - g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
 - h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.8.4. Results Menu, Transportation Systems Damage / Economic Loss: Port Tab

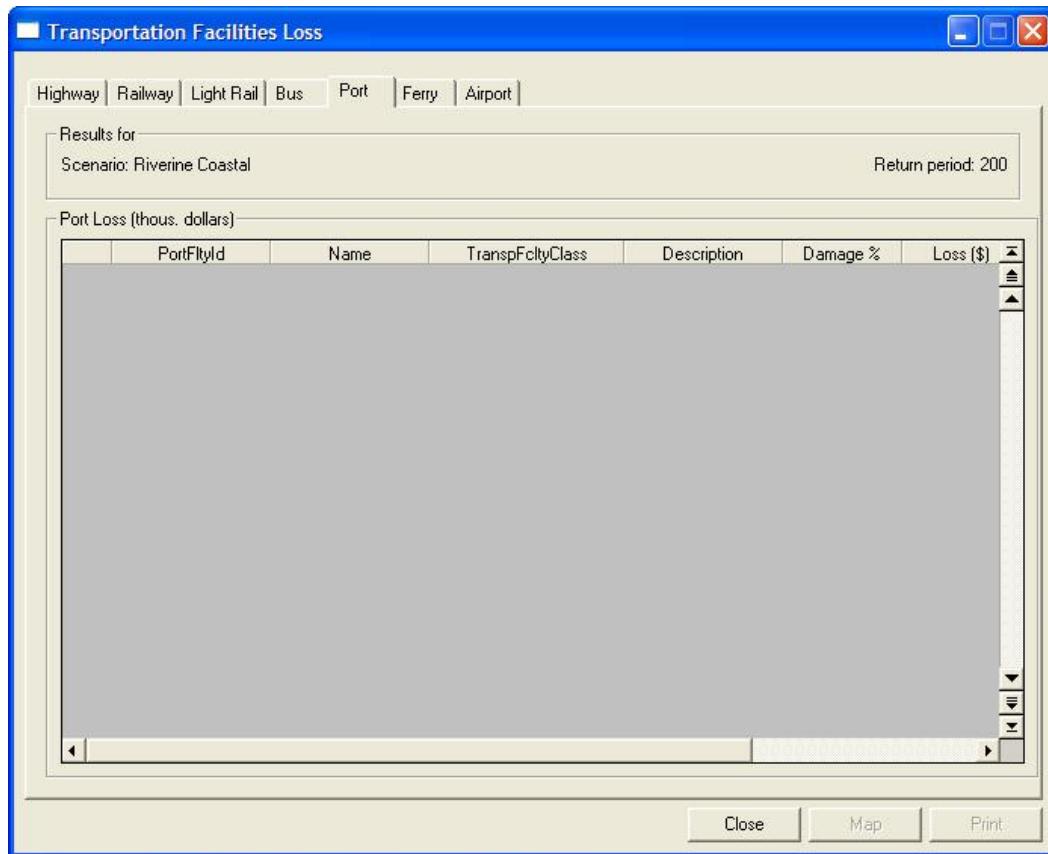


Figure 3-270: HAZUS Results Menu, Transportation Systems Damage / Economic Loss: Port Tab

- a. Selection of the Port Tab on the Transportation Facilities Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Port features that the HAZUS flood model analyzes. The dialog has the following features:
 - a. The dialog has seven tabs labeled Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport. The default value for the dialog is the Highway Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. Depending on the tab selected, a combo box may be available to the user.

- i. The Highway, Railway, Light Rail, and Airport tabs have a combo box labeled Table Type.
 - ii. Tabs Bus, Port and Ferry do not have a combo box.
- d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clTranspFacilities, hzPortFlty, and flFRPortFlty.
 - c. Table view is absv_FRPortFlty.
- d. The data grid is labeled Port Loss (thous. dollars) and the column names are: PortFltyId, Name, TranspFcntyClass, Description, Damage%, Loss(\$), and Functionality. The data grid is not editable and all values are displayed in blue text.
 - e. Selection of the Close command button closes the dialog and returns the user to the base map view.
 - f. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
 - g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
 - h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

**3.2.8.3.8.5. Results Menu, Transportation Systems Damage / Economic Loss:
Ferry Tab**

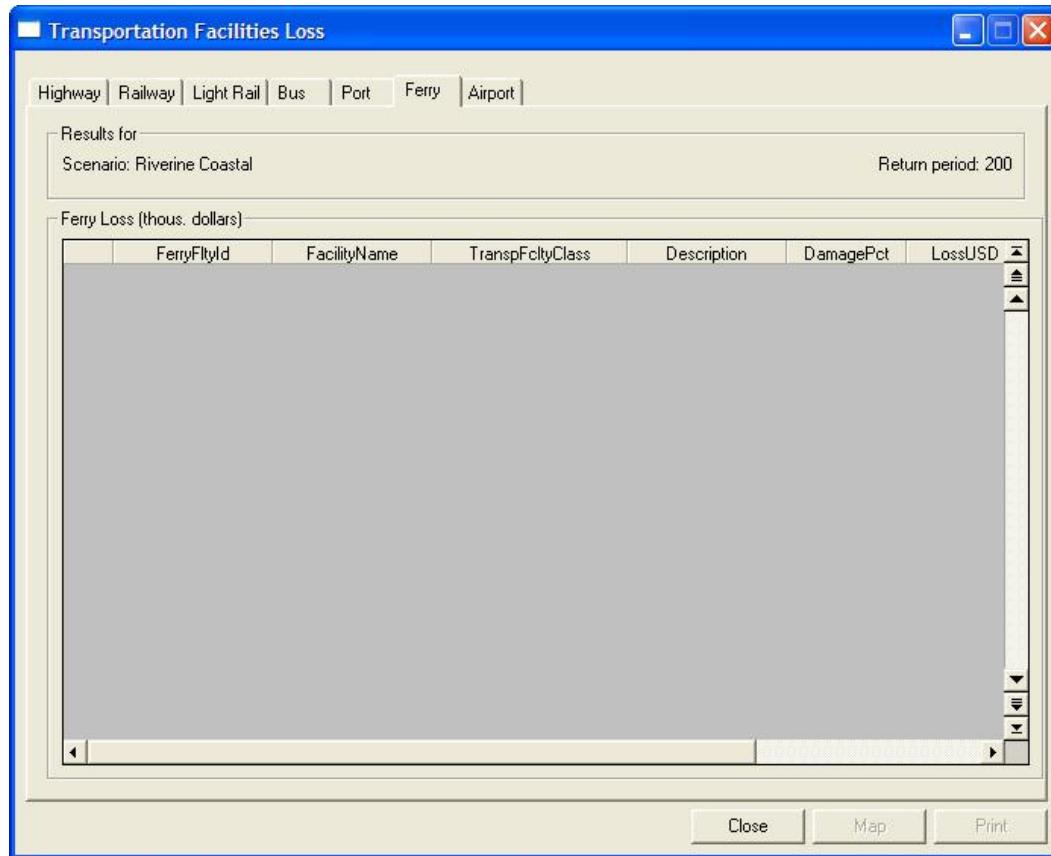


Figure 3-271: HAZUS Results Menu, Transportation Systems Damage / Economic Loss: Ferry Tab

- Selection of the Ferry Tab on the Transportation Facilities Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Ferry features that the HAZUS flood model analyzes. The dialog has the following features:
 - The dialog has seven tabs labeled Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport. The default value for the dialog is the Highway Tab.
 - The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - Depending on the tab selected, a combo box may be available to the user.

- i. The Highway, Railway, Light Rail, and Airport tabs have a combo box labeled Table Type.
 - ii. Tabs Bus, Port and Ferry do not have a combo box.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clTranspFacilities, hzFerryFlty, and flFRFerryFlty.
 - c. Table view is absv_FRFerryFlty.
 - d. The data grid is labeled Ferry Loss (thous. dollars) and the column names are: FerryFltyId, FacilityName, TranspFcntyClass, Description, DamagePct, LossUSD, and Functionality. The data grid is not editable and all values are displayed in blue text.
 - e. Selection of the Close command button closes the dialog and returns the user to the base map view.
 - f. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
 - g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
 - h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

**3.2.8.3.8.6. Results Menu, Transportation Systems Damage / Economic Loss:
Airport Tab**

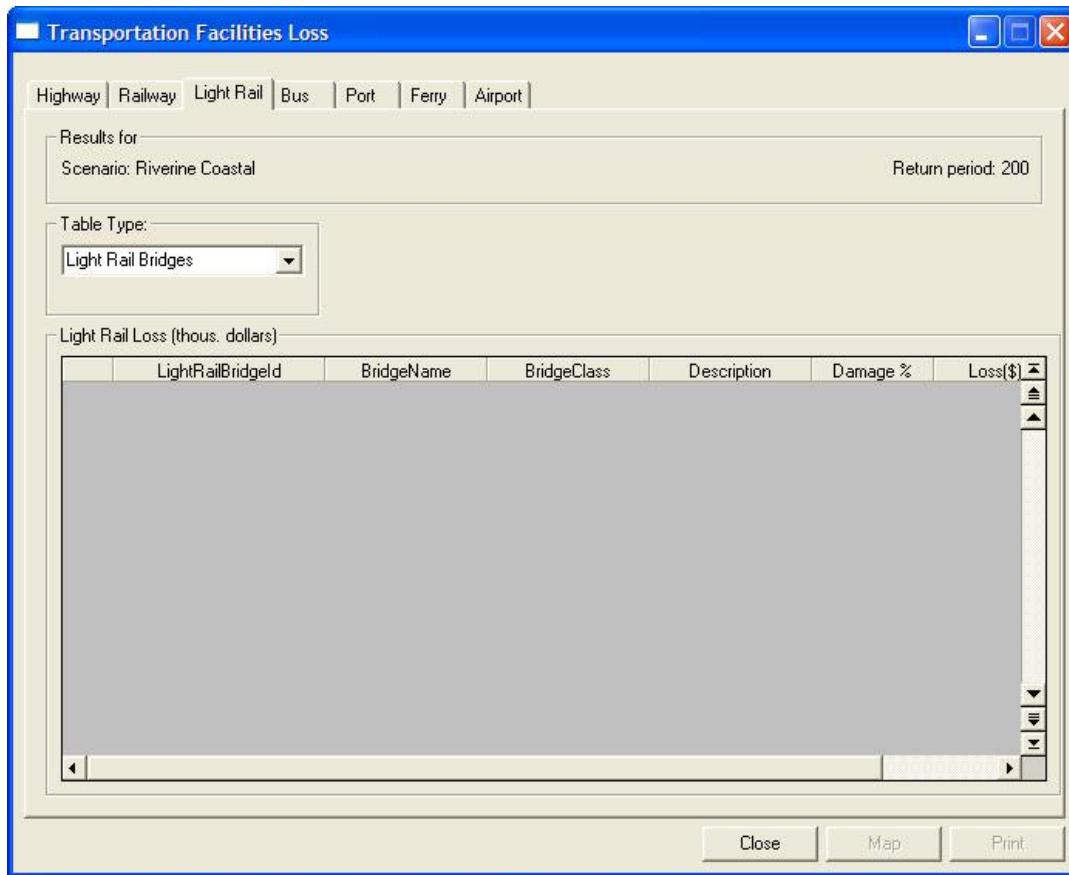


Figure 3-272: HAZUS Results Menu, Transportation Systems Damage / Economic Loss: Airport Tab

- Selection of the Airport Tab on the Transportation Facilities Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Airport features that the HAZUS flood model analyzes. The dialog has the following features:
 - The dialog has seven tabs labeled Highway, Railway, Light Rail, Bus, Port, Ferry, and Airport. The default value for the dialog is the Highway Tab.
 - The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - Depending on the tab selected, a combo box may be available to the user.

- i. The Highway, Railway, Light Rail, and Airport tabs have a combo box labeled Table Type.
 - ii. Tabs Bus, Port and Ferry do not have a combo box.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clTranspFacilities, hzRunway, flFRAirportRunway, hzAirportFlty, and flFRAirportFlty.
 - c. Table views are:

Tab	Combo Selection	View
Airport	Airport Runways	absv_FRAirportRunway
Airport	Airport Facilities	absv_FRAirportFlty

- d. The Airport tab has a single combo box labeled Table Type. Options include Airport Runways and Airport Facilities. Airport Runways is the default value.
- e. The data grid is labeled Airport Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
 - a. For Airport Runways, the column names are: RunwayId, AirportId, Name, TranspFclyClass, Description, DamagePct, LossUSD, and Functionality.
 - b. For Airport Facilities, the column names are: AirportFltyId, Name, TranspFclyClass, Description, DamagePct, LossUSD, and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.

- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.9. Results Menu: Utility Systems Damage/Economic Loss Dialog

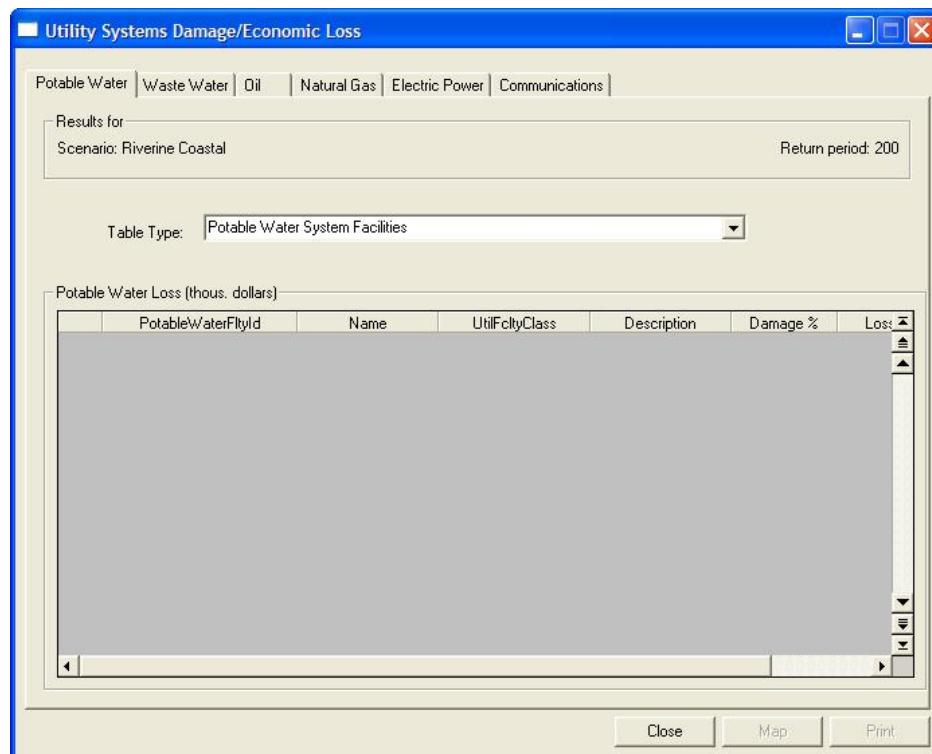


Figure 3-273: HAZUS Results Menu, Utility Systems Damage / Economic Loss Potable Water Tab

- a. Selection of the Utility Systems Damage / Economic Loss on the Results Menu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Utility System features that the HAZUS flood model analyzes. The dialog has the following features:
 - a. The dialog has six tabs labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. The default value for the dialog is the Potable Water Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. All of the tabs on the dialog have a single combo box labeled Table Type.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clUtilFacilities, hzPotableWaterFlty, flFRRPotableWaterFlty, clPipelines, hzPotableWaterPI, flFRRPotableWaterPI, hzWasteWaterFlty, flFRRWasteWaterFlty, hzWasteWaterPI, flFRRWasteWaterPI, hzOilFlty, flFROilFlty, hzOilPI, flFROilPI, hzNaturalGasFlty, flFRRNaturalGasFlty, hzNaturalGasPI, flFRRNaturalGasPI, hzElectricPowerFlty, flFRElectricPowerFlty, hzCommunicationFlty, and flFRCCommunicationFlty.
- c. Table views are:

Tab	Combo Selection	View
Potable Water	Potable Water System Facilities	absv_FRPotableWaterFlty
Potable Water	Potable Water Network System Pumps	absv_FRPotableWaterPumps
Potable Water	Control Vaults & Control Stations	absv_FRPotableWaterControlVaults
Potable Water	Potable Water Network System Tanks	absv_FRPotableWaterTanks
Potable Water	Potable Water Network System Wells	absv_FRPotableWaterWells
Potable Water	Potable Water Pipelines Segments	absv_FRPotableWaterPI
Waste Water	Waste Water Treatment Plants	absv_FRWasteWaterTreatmentPlants
Waste Water	Waste Water Lift Stations	absv_FRWasteWaterLiftStations
Waste Water	Control Vaults & Control Stations	absv_FRWasteWaterCtrlVltsandCtrlStns
Waste Water	Waste Water Pipelines	absv_FRWasteWaterPI
Oil	Oil Refineries	absv_FROilRefinery
Oil	Oil Pumping Plants	absv_FROilPumpingPlants
Oil	Oil Tank Farm	absv_FROilTankFarm
Oil	Oil Control Vaults & Control Stations	absv_FROilCtrlVaultsCtrlStns
Oil	Oil Pipelines	absv_FROilPI
Natural Gas	Compressor Plants	absv_FRNaturalGasCompressorPlants
Natural Gas	Control Vaults and Control Stations	absv_FRNaturalGasCtrlVltsandCtrlStns
Natural Gas	Natural Gas Pipelines	absv_FRNaturalGasPI
Electric Power	Power Plants	absv_FRElectricPowerPlants
Electric Power	Power Substations	absv_FRElectricPowerSubstations
Communications	Central Offices and Switching Stations	absv_FRCCommCentralOfficesSwitchingStns
Communications	Control Vaults and Control Stations	absv_FRCCommControlVaultsAndControlStation s
Communications	Broadcast Facility	absv_FRCCommBroadcastFlty

- d. The Potable Water tab has a single combo box labeled Table Type. Options include Potable Water System Facilities, Potable Water Network System Pumps, Control Vaults & Control Stations, Potable Water Network System Tanks, Potable Water Network System Wells, and Potable Water Pipelines Segments. Potable Water System Facilities is the default value.
- e. The data grid is labeled Potable Water Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
 - a. For Potable Water System Facilities, the column names are: PotableWaterFltyId, Name, UtilFclyClass, Description, Damage%, Loss(\$), and Functionality.
 - b. For Potable Water Network System Pumps, the column names are: PotableWaterFltyId, Name, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.
 - c. For Control Vaults & Control Stations, the column names are: PotableWaterFltyId, Name, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.
 - d. For Potable Water Network System Tanks, the column names are: PotableWaterFltyId, Name, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.
 - e. For Potable Water Network System Wells, the column names are: PotableWaterFltyId, Name, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.
 - f. For Potable Water Pipelines Segments, the column names are: PotableWaterFltyId, Name, PipelineClass, Description, Damage%, Loss (\$), and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.

- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.9.1. Results Menu, Utility Systems Damage / Economic Loss: Wastewater Tab

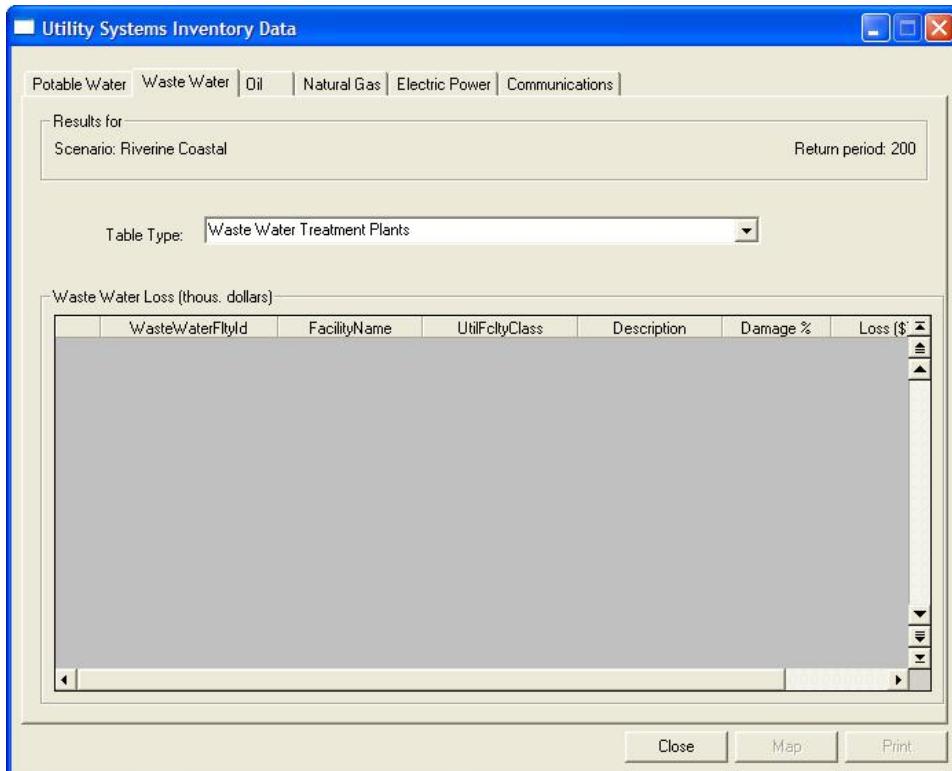


Figure 3-274: HAZUS Results Menu, Utility Systems Damage / Economic Loss Waste Water Tab

- a. Selection of the Waste Water tab on the Utility Systems Damage/Economic Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Utility System features that the HAZUS flood model analyzes. The dialog has the following features:
 - a. The dialog has six tabs labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. The default value for the dialog is the Potable Water Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. All of the tabs on the dialog have a single combo box labeled Table Type.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clUtilFacilities, hzWasteWaterFlty, flFRWasteWaterFlty, clPipelines, hzWasteWaterPl, and flFRWasteWaterPl.
- c. Table views are:

Tab	Combo Selection	View
Waste Water	Waste Water Treatment Plants	absv_FRWasteWaterTreatmentPlants
Waste Water	Waste Water Lift Stations	absv_FRWasteWaterLiftStations
Waste Water	Control Vaults & Control Stations	absv_FRWasteWaterCtrlVtsandCtrlStns
Waste Water	Waste Water Pipelines	absv_FRWasteWaterPl

- d. The Waste Water tab has a single combo box labeled Table Type. Options include Waste Water Treatment Plants, Waste Water Lift Stations, Control Vaults & Control Stations, and Waste Water Pipelines. Waste Water Treatment Plants is the default value.
- e. The data grid is labeled Waste Water Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
 - a. For Waste Water Treatment Plants, the column names are: WasteWaterFltyId, FacilityName, UtilFclyClass, Description, Damage%, Loss(\$), and Functionality.
 - b. For Waste Water Lift Stations, the column names are: WasteWaterFltyId, FacilityName, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.
 - c. For Control Vaults & Control Stations, the column names are: WasteWaterFltyId, FacilityName, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.
 - d. For Waste Water Pipelines, the column names are: WasteWaterPlId, FacilityName, PipelineClass, Description, Damage%, Loss (\$), and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.9.2. Results Menu, Utility Systems Damage / Economic Loss: Oil Tab

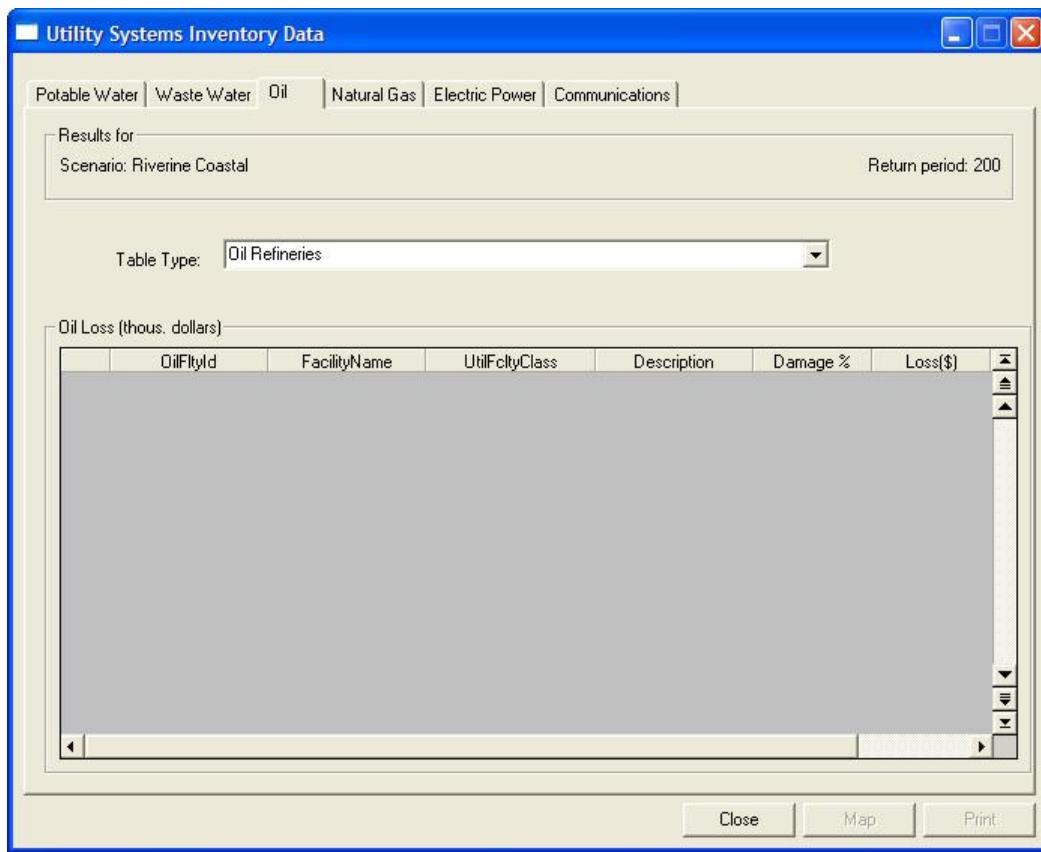


Figure 3-275: HAZUS Results Menu, Utility Systems Damage / Economic Loss, Oil Tab

- Selection of the Oil tab on the Utility Systems Damage / Economic Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Utility System features that the HAZUS flood model analyzes. The dialog has the following features:
 - The dialog has six tabs labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. The default value for the dialog is the Potable Water Tab.
 - The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - All of the tabs on the dialog have a single combo box labeled Table Type.

- d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clUtilFacilities, hzOilFlty, flFROilFlty, clPipelines, hzOilPl, and flFROilPl.
- c. Table views are:

Tab	Combo Selection	View
Oil	Oil Refineries	absv_FROilRefinery
Oil	Oil Pumping Plants	absv_FROilPumpingPlants
Oil	Oil Tank Farm	absv_FROilTankFarm
Oil	Oil Control Vaults & Control Stations	absv_FROilCtrlVaultsCtrlStns
Oil	Oil Pipelines	absv_FROilPl

- d. The Oil tab has a single combo box labeled Table Type. Options include Oil Refineries, Oil Pumping Plants, Oil Tank Farm, Oil Control Vaults & Control Stations, and Oil Pipelines. Oil Refineries is the default value.
- e. The data grid is labeled Oil Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
 - a. For Oil Refineries, the column names are: OilFltyId, FacilityName, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.
 - b. For Oil Pumping Plants, the column names are: OilFltyId, FacilityName, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.
 - c. For Oil Tank Farm, the column names are: OilFltyId, FacilityName, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.

- d. For Oil Control Vaults & Control Stations, the column names are: OilFltyId, FacilityName, UtilFclyClass, Description, Damage%, Loss (\$), and Functionality.
- e. For Oil Pipelines, the column names are: OilPlId, PipelineClass, Name, Description, Damage%, Loss (\$), and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.9.3. Results Menu, Utility Systems Damage / Economic Loss: Natural Gas Tab

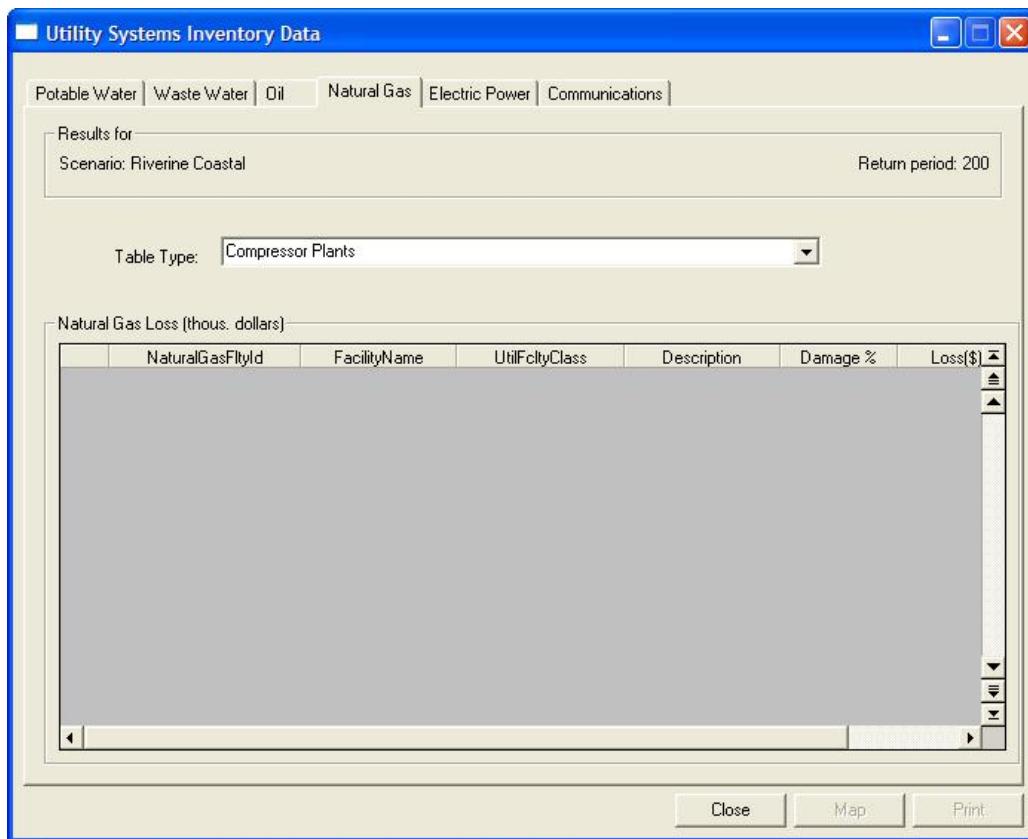


Figure 3-276: HAZUS Results Menu, Utility Systems Damage / Economic Loss Natural Gas Tab

- a. Selection of the Natural Gas tab on the Utility Systems Damage / Economic Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Utility System features that the HAZUS flood model analyzes. The dialog has the following features:
 - a. The dialog has six tabs labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. The default value for the dialog is the Potable Water Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.

- c. All of the tabs on the dialog have a single combo box labeled Table Type.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clUtilFacilities, hzNaturalGasFlty, flFRNaturalGasFlty, clPipelines, hzNaturalGasPl, and flFRNaturalGasPl.
- c. Table views are:

Tab	Combo Selection	View
Natural Gas	Compressor Plants	absv_FRNaturalGasCompressorPlants
Natural Gas	Control Vaults and Control Stations	absv_FRNaturalGasCtrlVltsandCtrlStns
Natural Gas	Natural Gas Pipelines	absv_FRNaturalGasPl

- d. The Natural Gas tab has a single combo box labeled Table Type. Options include Compressor Plants, Control Vaults and Control Stations, and Natural Gas Pipelines. Oil Refineries is the default value.
- e. The data grid is labeled Natural Gas Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
 - a. For Compressor Plants, the column names are: NaturalGasFltyId, FacilityName, UtilFltyClass, Description, Damage%, Loss(\$), and Functionality.
 - b. For Control Vaults & Control Stations, the column names are: NaturalGasFltyId, FacilityName, UtilFltyClass, Description, Damage%, Loss (\$), and Functionality.

- c. For Natural Gas Pipelines, the column names are: NaturalGasPId, PipelineName, PipelineClass, Description, Damage%, Loss (\$), and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.9.4. Results Menu, Utility System Damage / Economic Loss: Electric Power Tab

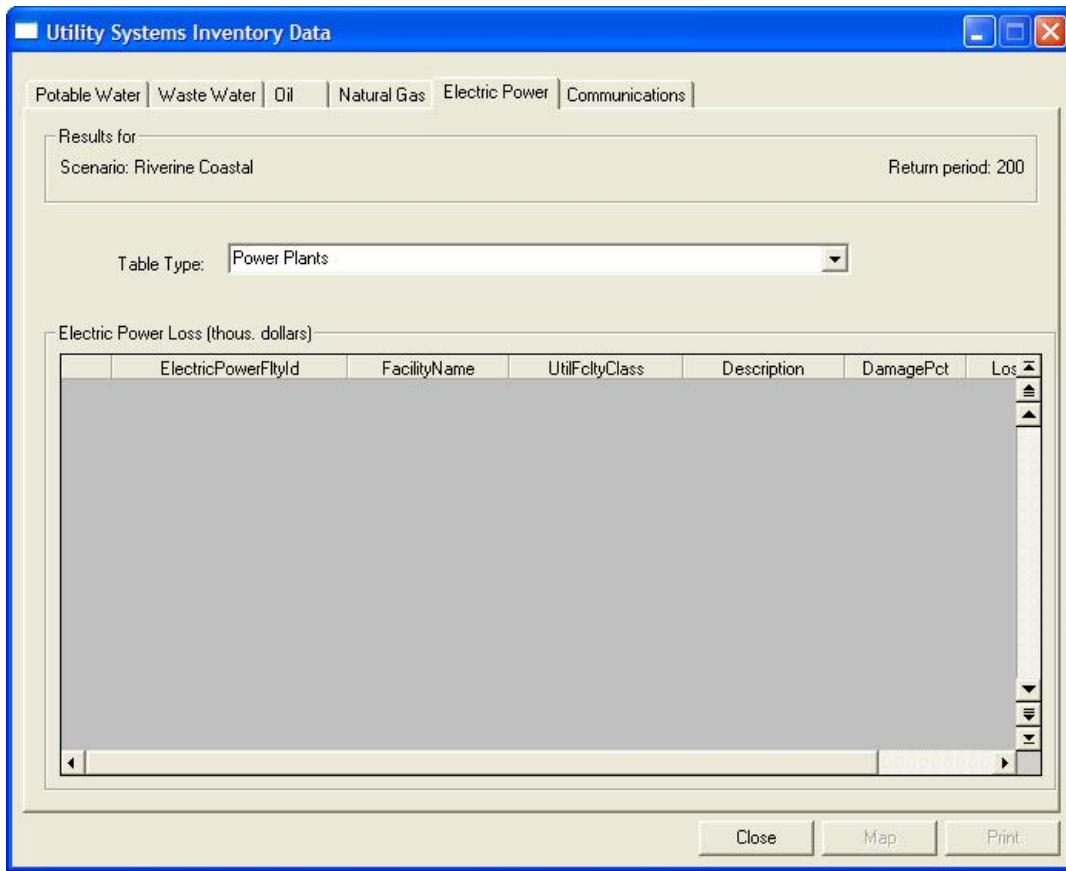


Figure 3-277: HAZUS Results Menu, Utility Systems Damage / Economic Loss Electric Power Tab

- a. Selection of the Electric Power tab on the Utility Systems Damage / Economic Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Utility System features that the HAZUS flood model analyzes. The dialog has the following features:
 - a. The dialog has six tabs labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. The default value for the dialog is the Potable Water Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.

- c. All of the tabs on the dialog have a single combo box labeled Table Type.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clUtilFacilities, hzElectricPowerFlty, and flFRElectricPowerFlty.
- c. Table views are:
- | Tab | Combo Selection | View |
|----------------|-------------------|---------------------------------|
| Electric Power | Power Plants | absv_FRElectricPowerPlants |
| Electric Power | Power Substations | absv_FRElectricPowerSubstations |
- d. The Electric Power tab has a single combo box labeled Table Type. Options include Power Plants and Power Substations. Power Plants is the default value.
- e. The data grid is labeled Electric Power Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
- a. For Power Plants, the column names are: ElectricPowerFltyId, FacilityName, UtilFclyClass, Description, DamagePct, LossUSD, and Functionality.
 - b. For Power Substations, the column names are: ElectricPowerFltyId, FacilityName, UtilFclyClass, Description, DamagePct, LossUSD, and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.

- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.9.5. Results Menu, Utility Systems Damage / Economic Loss: Communications Tab

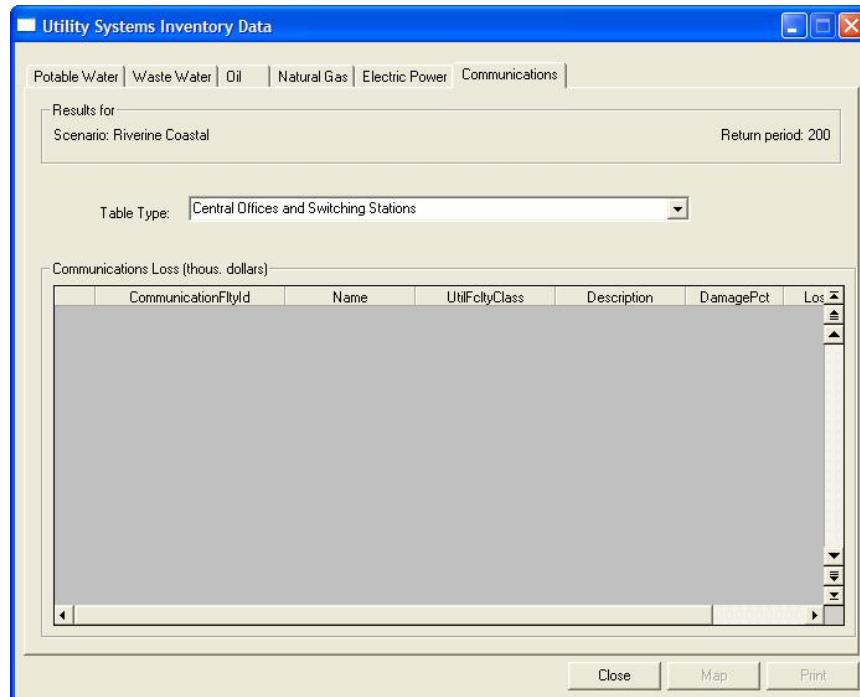


Figure 3-278: HAZUS Results Menu, Utility Systems Damage / Economic Loss Communications Tab

- a. Selection of the Communications tab on the Utility Systems Damage/Economic Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the site specific analysis performed on the Utility System features that the HAZUS flood model analyzes. The dialog has the following features:
 - a. The dialog has six tabs labeled Potable Water, Waste Water, Oil, Natural Gas, Electric Power, and Communications. The default value for the dialog is the Potable Water Tab.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. All of the tabs on the dialog have a single combo box labeled Table Type.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map, and Print.
- b. Results tables clUtilFacilities, hzCommunicationFlty, and flFRCommunicationFlty.
- c. Table views are:

Tab	Combo Selection	View
Communications	Central Offices and Switching Stations	absv_FRCCommCentralOfficesSwitchingStns
Communications	Control Vaults and Control Stations	absv_FRCCommControlVaultsAndControlStations
Communications	Broadcast Facility	absv_FRCCommBroadcastFlty

- d. The Communications tab has a single combo box labeled Table Type. Options include Central Offices and Switching Stations, Control Vaults and Control Stations, and Broadcast Facility. Central Offices and Switching Stations is the default value.
- e. The data grid is labeled Communications Loss (thous. dollars) and the column names adjust depending on the combo box item selected. The data grid is not editable and all values are displayed in blue text.
 - a. For Central Offices and Switching Stations, the column names are: CommunicationFltyId, Name, UtilFclyClass, Description, DamagePct, LossUSD, and Functionality.
 - b. For Control Vaults and Control Stations, the column names are: CommunicationFltyId, Name, UtilFclyClass, Description, DamagePct, LossUSD, and Functionality.
 - c. For Broadcast Facility, the column names are: CommunicationFltyId, Name, UtilFclyClass, Description, DamagePct, LossUSD, and Functionality.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.10. Results Menu: Agriculture Loss

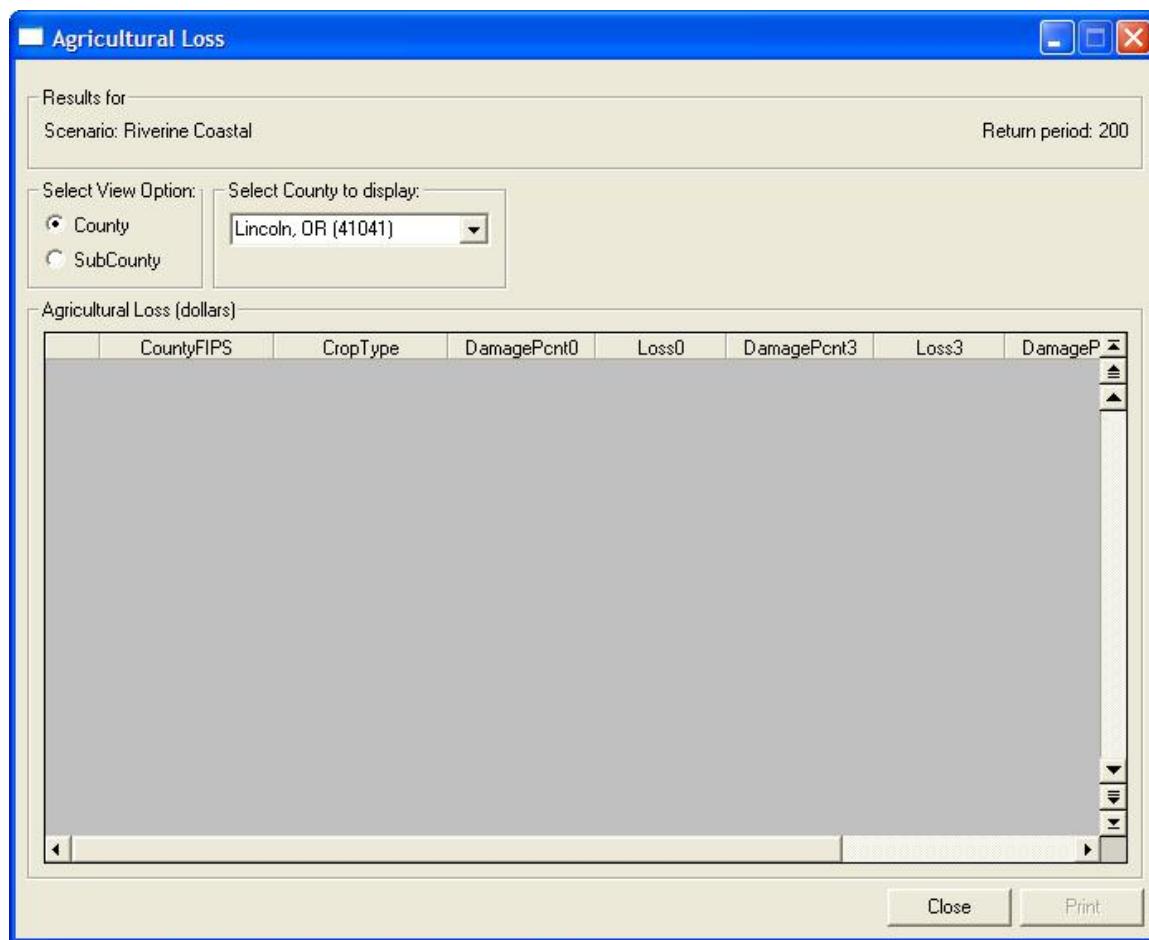


Figure 3-279: HAZUS Results Menu, Agriculture Loss County Level

- a. Selection of the Agricultural Loss menu item on the Results menu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the agricultural products analysis the user may have performed. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The dialog has either one or two combo boxes depending on whether the user is viewing the county or subcounty level.

- d. The dialog has two radio buttons that allows the user to switch from the County level view to the subcounty polygon view.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid labeled Agricultural Loss (dollars).
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled: Close and Print.
- b. Results tables are `hzCounty`, `fIFRAgricultureLossCounty`, and `fIFRAgricultureLossSubCounty`.
 - c. Table views are:

Radio Button	View
County	<code>absv_AgricultureLossCounty</code>
SubCounty	<code>absv_AgricultureLossSubCounty</code>

- d. The Agricultural Loss has two radio buttons labeled Select View Option. When viewing the County level option, the dialog has a single combo box labeled Select County to Display. If there are multiple counties, the user can select between counties. Counties are displayed by County Name, State, and County FIPS (e.g., Lincoln, OR (41041)).
 - a. The data grid displays the losses for the county by crop type. Column names are: `CountyFIPS`, `CropType`, `DamageOcnt0`, `Loss0`, `DamagePcnt3`, `Loss3`, `DamagePcnt7`, `Loss7`, `DamagePcnt14`, and `Loss14`. Note that the numbers 0, 3, 7, and 14 represent the flood duration in days that are automatically calculated by HAZUS.
- e. When viewing the SubCounty level, a second combo box is displayed that is labeled Select A SubCountyRegion. This allows the user to filter the results by selected subcounty regions for viewing.

- a. The data grid column names are: AgriRegionId, CropType, DamageOcnt0, Loss0, DamagePcnt3, Loss3, DamagePcnt7, Loss7, DamagePcnt14, and Loss14.

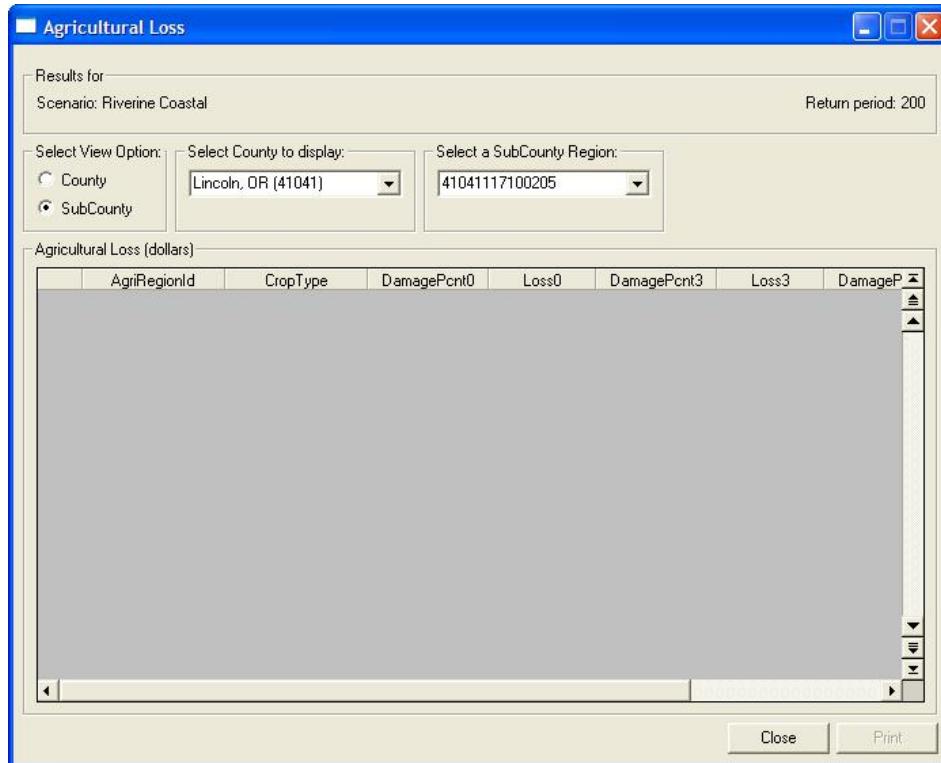


Figure 3-280: HAZUS Results Menu, Agriculture Loss SubCounty Level

- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.11. Results Menu: Vehicle Damage / Economic Loss

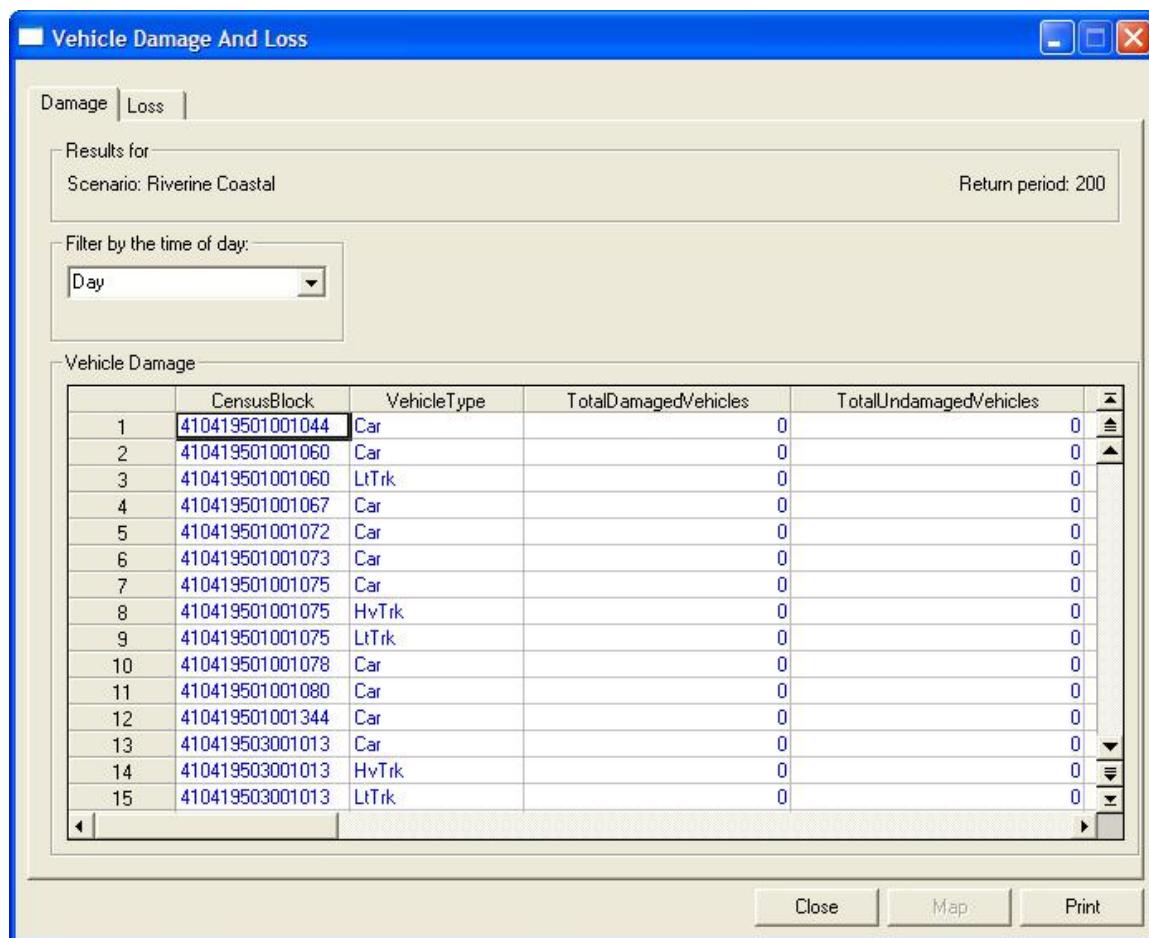


Figure 3-281: HAZUS Results Menu, Vehicle Damage / Economic Loss Dialog, Damage Tab

- Selection of the Vehicle Damage / Economic Loss menu item on the Results menu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the vehicle analysis the user may have performed. The dialog has the following features:
 - The dialog has two tabs labeled Damage and Loss. The Damage tab is the default.
 - The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.

- c. The dialog has a combo box on both tabs labeled Filter by time of day. Day is the default value.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map and Print.
- b. Results tables are fIFRVehicleDamage and fIFRVehicleLoss.
- c. Table views are:

Tab	View
Damage	absv_FRVehDamage
Loss	absv_FRVehLoss

- d. When viewing the Damage tab, the Vehicle Damage and Loss dialog has a single combo box labeled Filter by time of day. The options are Day and Night. Selection allows the user to view the results for vehicles during the daytime (this assumes typical commute and work travel) and night time when more vehicles are in residential areas.
- e. The dialog has a single data grid that displays the results for either daytime or nighttime vehicle damage depending on the combo box selection. The data is not editable and is displayed in blue text.
 - a. The data grid column names are: CensusBlock, VehicleType, TotalDamagedVehicles, TotalUnDamagedVehicles, Vehicles1To10PcntDamaged, Vehicles11To20PcntDamaged, Vehicles21To30PcntDamaged, Vehicles31To40PcntDamaged, Vehicles41To50PcntDamaged, Vehicles51To60PcntDamaged, Vehicles61To70PcntDamaged, Vehicles71To80PcntDamaged, Vehicles81To90PcntDamaged, and Vehicles91To100PcntDamaged.

- b. Columns TotalDamagedVehicles is a roll up of all the column values from 1 to 100 percent damaged. The TotalUndamagedVehicles column is mathematically derived from the total vehicles of type in the census block minus the damaged total.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.11.1. Results Menu: Vehicle Damage/Economic Loss, Loss Tab

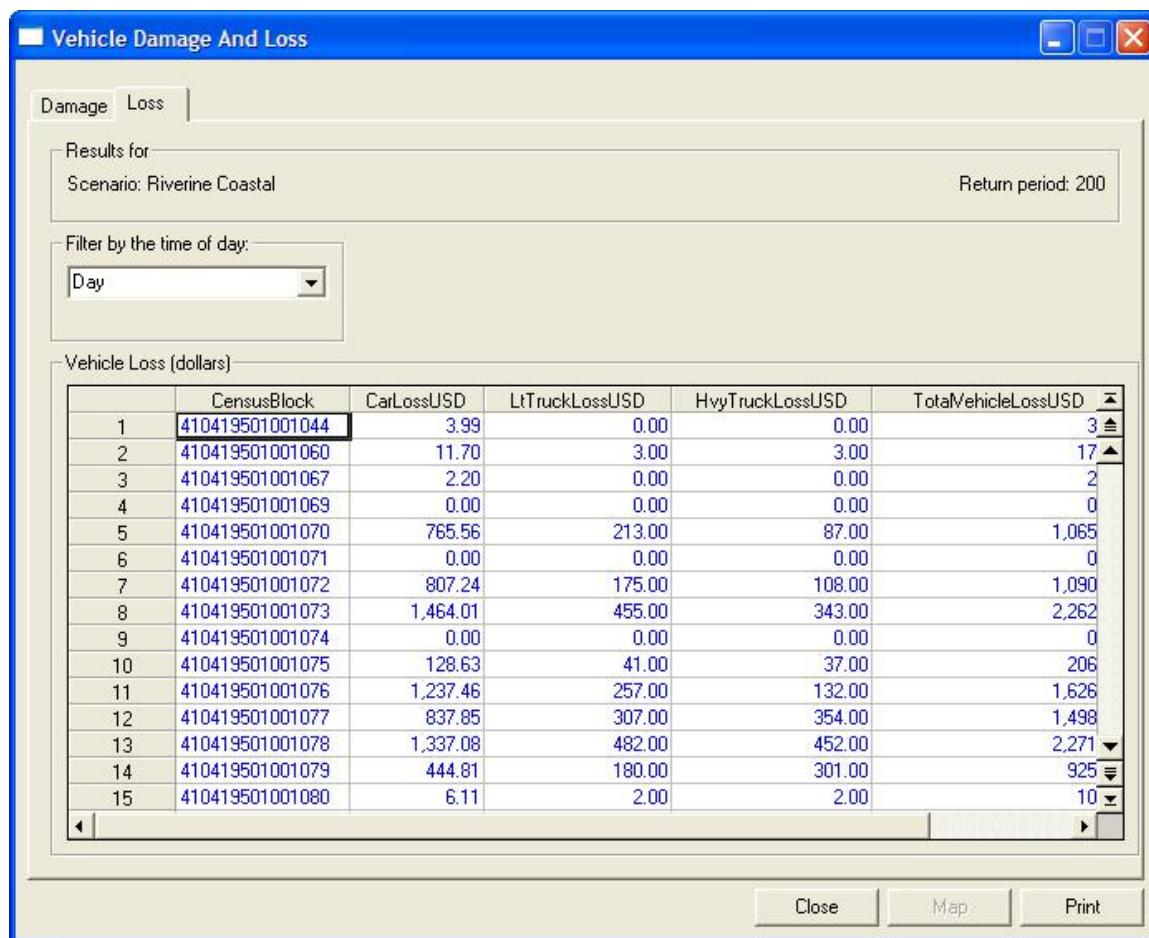


Figure 3-282: HAZUS Results Menu, Vehicle Damage / Economic Loss Dialog, Loss Tab

- Selection of the Loss tab on the Vehicle Damage and Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the vehicle analysis the user may have performed. The dialog has the following features:
 - The dialog has two tabs labeled Damage and Loss. The Damage tab is the default.
 - The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - The dialog has a combo box on both tabs labeled Filter by time of day. Day is the default value.

- d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map and Print.
- b. Results table is f1FVehicleLoss.
- c. The table view is absv_FrVehLoss.
- d. When viewing the Loss tab, the Vehicle Damage and Loss dialog has a single combo box labeled Filter by time of day. The options are Day and Night. Selection allows the user to view the results for vehicles during the daytime (this assumes typical commute and work travel) and night time when more vehicles are in residential areas.
- e. The dialog has a single data grid that displays the results for either daytime or nighttime vehicle damage depending on the combo box selection. The data is not editable and is displayed in blue text.
 - a. The data grid column names are: CensusBlock, CarLossUSD, LtTruckLossUSD, HvyTruckLossUSD, and TotalVehicleLossUSD.
 - b. The column TotalVehicleLossUSD is a roll up of the prior column values.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- h. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- i. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.12. Results Menu: Debris Generation

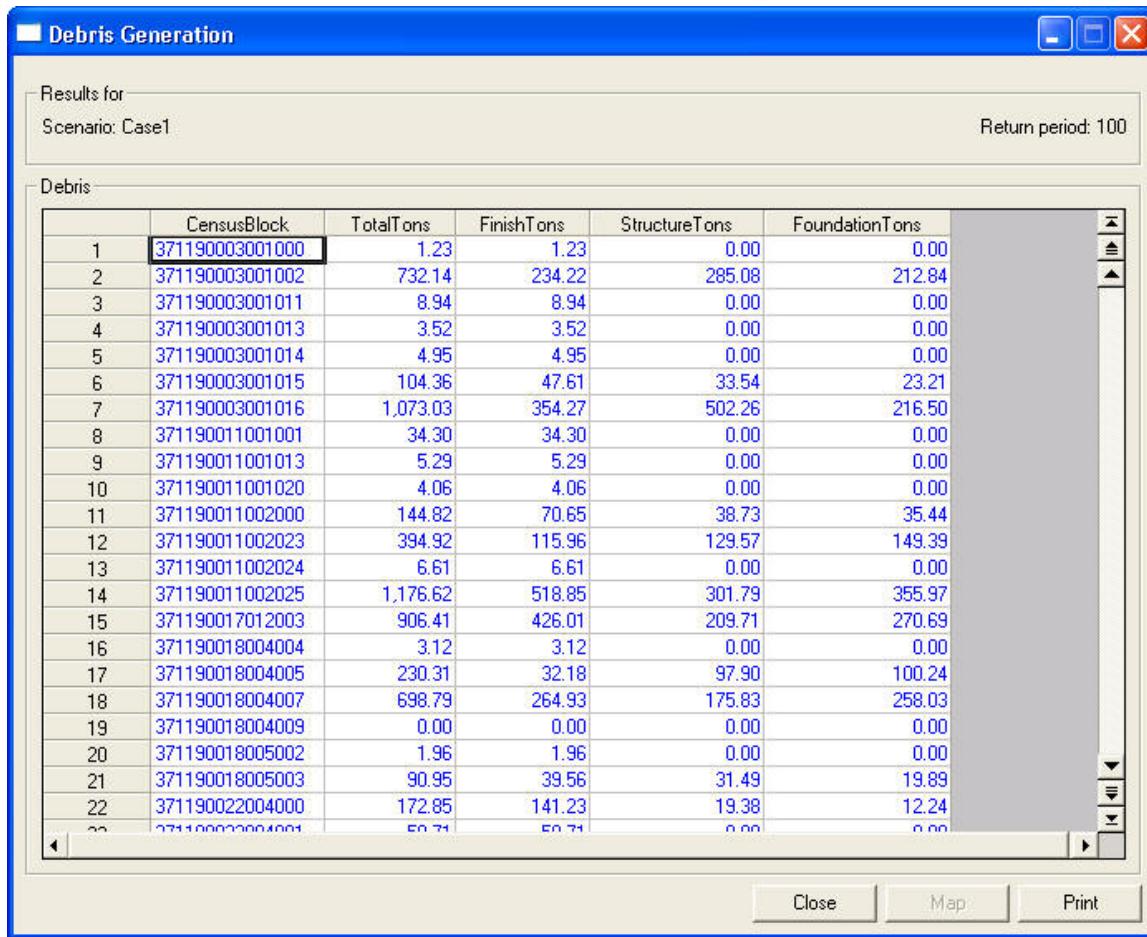


Figure 3-283: HAZUS Results Menu, Debris Generation Dialog

- a. This menu is an enhancement over the existing Earthquake Results menu. Currently Fire Following and Debris are stand-alone menus in results, whereas they are included in induced damage throughout the rest of the model. For consistency, the flood model will add the Induced Damage Results menu.

- b. Selection of this menu shall allow the user to view results for induced damage such as Fire Following, and Debris.
- c. All tabs shall have a pull down menu allowing the user to access the return periods analyzed in the study case.
- d. All tabs under the Induced Damage menu shall have command buttons for CLOSE, MAP, and PRINT. To use the MAP command button, the user shall have to select a column of results.
- e. If no results have been developed for Fire Following or Debris, the MAP and PRINT command buttons shall be inactive.
- f. All tables shall allow the user to view the scenario information that developed the results using the right mouse button capabilities. The user shall also be able to access the metadata for the table being viewed through this capability.
- g. Modifications Required.

3.2.8.3.13. Results Menu: Casualties

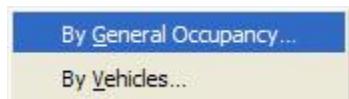


Figure 3-284: HAZUS Results Menu, Casualties Submenu

- a. Selection of Casualties brings up the submenu shown above. The submenu selections are By General Occupancy and By Vehicles.
- b. HAZUS currently does not analyze casualties in either case. Primarily because of the difficulty in finding published models that address how casualties can occur during flooding. As the flood science develops, this will change.

3.2.8.3.13.1. Results Menu Casualties Submenu: By General Occupancy Dialog

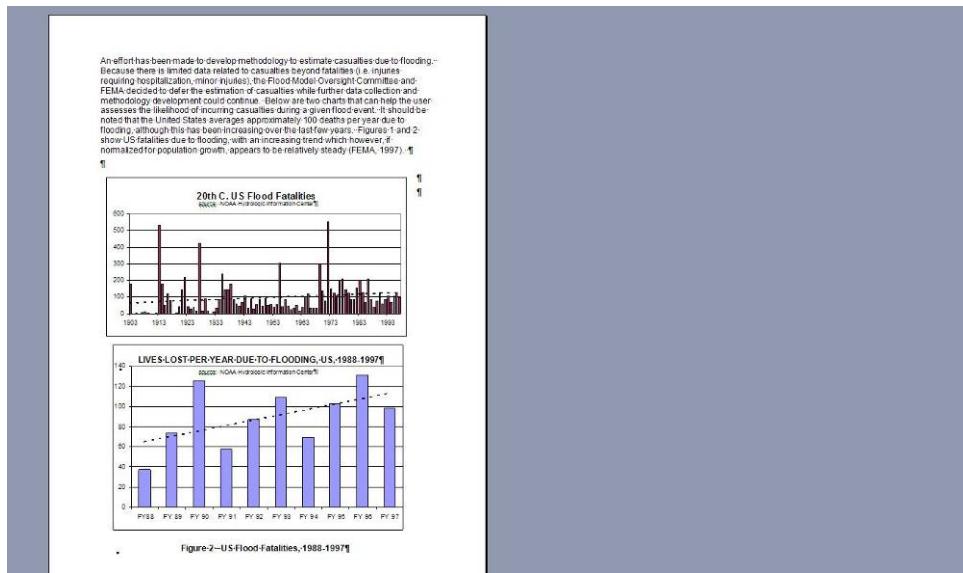


Figure 3-285: HAZUS Results Menu, Casualties Submenu: By General Occupancy Dialog

- a. Selection of By General Occupancy on the Casualties submenu opens the document shown above. The document describes the current state of the art in casualty modeling for flooding and discusses that the United States, on average, has a little over 100 deaths per year over the entire nation due to flooding. This was one reason why FEMA did not invest heavily in the development of casualty modeling.

3.2.8.3.13.2. Results Menu Casualties Submenu: By Vehicles Dialog

The screenshot shows a Windows dialog box titled "RES_GENERIC_DUMMY". Inside, a table is displayed with the header "Generic Dummy results". The table has six columns: "Tract", "CountyFips", "BldgSchemesId", "Tract6", "TractArea", and "Length". There are 26 rows of data. The first row's "Tract" column value, "37119000100", is highlighted with a blue selection bar. The "Length" column values range from 0.54 to 7.57. At the bottom of the dialog are "Close" and "Print" buttons.

	Tract	CountyFips	BldgSchemesId	Tract6	TractArea	Length
1	37119000100	37119	NC1	000100	1.89	
2	37119000200	37119	NC1	000200	0.54	
3	37119000300	37119	NC1	000300	0.82	
4	37119000400	37119	NC1	000400	1.75	
5	37119000500	37119	NC1	000500	1.69	
6	37119000600	37119	NC1	000600	1.09	
7	37119000700	37119	NC1	000700	1.29	
8	37119000800	37119	NC1	000800	1.34	
9	37119000900	37119	NC1	000900	1.11	
10	37119001000	37119	NC1	001000	1.58	
11	37119001100	37119	NC1	001100	1.87	
12	37119001200	37119	NC1	001200	4.22	
13	37119001300	37119	NC1	001300	2.60	
14	37119001400	37119	NC1	001400	2.15	
15	37119001503	37119	NC1	001503	7.93	
16	37119001504	37119	NC1	001504	3.52	
17	37119001505	37119	NC1	001505	5.24	
18	37119001506	37119	NC1	001506	5.46	
19	37119001602	37119	NC1	001602	4.79	
20	37119001603	37119	NC1	001603	2.56	
21	37119001604	37119	NC1	001604	4.26	
22	37119001701	37119	NC1	001701	1.55	
23	37119001702	37119	NC1	001702	3.71	
24	37119001800	37119	NC1	001800	4.63	
25	37119001903	37119	NC1	001903	6.56	
26	37119001907	37119	NC1	001907	7.57	

Figure 3-286: HAZUS Results Menu, Casualties Submenu: By Vehicles Dialog

- a. This menu item brings up the HAZUS flood dummy dialog shown above. The flood model does not estimate casualties that occur when people are in vehicles. This is due in part because a large number of the people who die in vehicle related flood incidents were ignoring warnings and drive into the flood waters. This menu item should be disabled.

3.2.8.3.14. Results Menu: Shelter

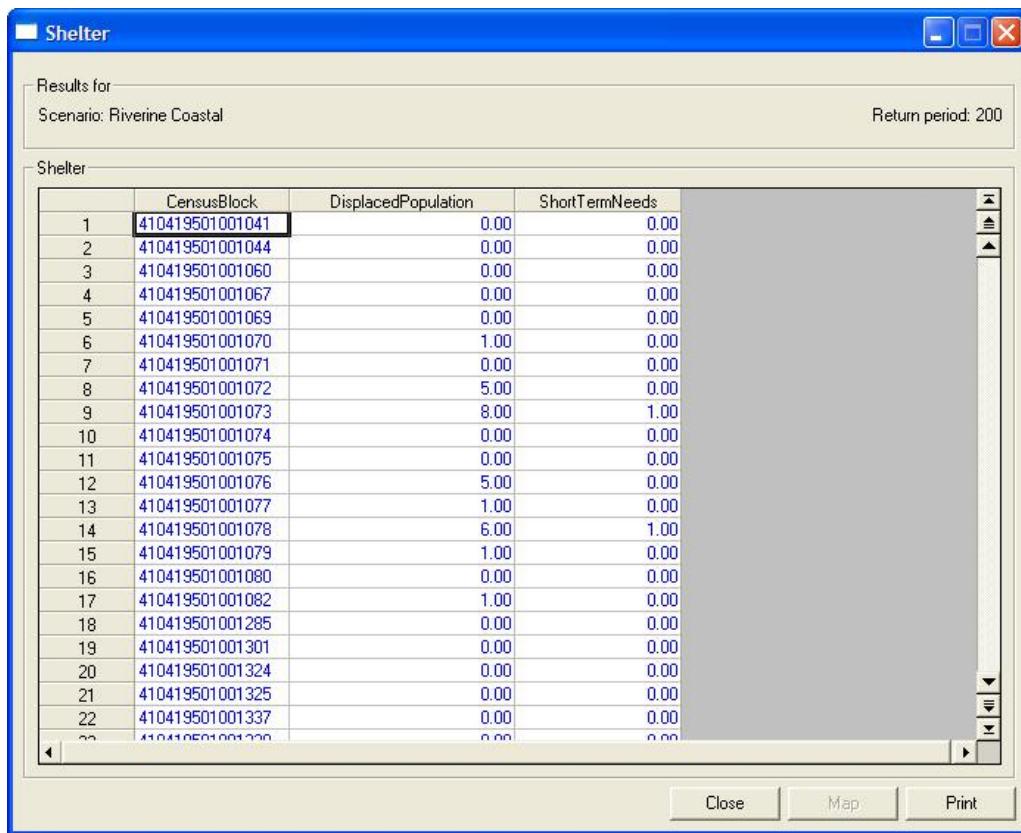


Figure 3-287: HAZUS Results Menu, Shelter Dialog

- a. Selection of the Shelter menu item on the Results menu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the Shelter requirements analysis the user may have performed. The dialog has the following features:
 - a. The dialog does not have tabs.
 - b. The dialog has a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The dialog does not have a combo box.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.

- f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map and Print.
- b. Results table is flFRShelter.
- c. Table view is absv_FRShelter.
- d. The dialog has a single data grid that displays the results for the shelter requirements analysis. The data is not editable and is displayed in blue text.
- a. The data grid column names are: CensusBlock, DisplacedPopulation, and ShortTermNeeds.
- e. Selection of the Close command button closes the dialog and returns the user to the base map view.
- f. Selection of the Map command button allows the user to create a thematic map of any selected column within the data grid. The Map command button is disabled until the user has highlighted a column.
- g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	N

3.2.8.3.15. Results Menu: Indirect Economic Loss Dialog

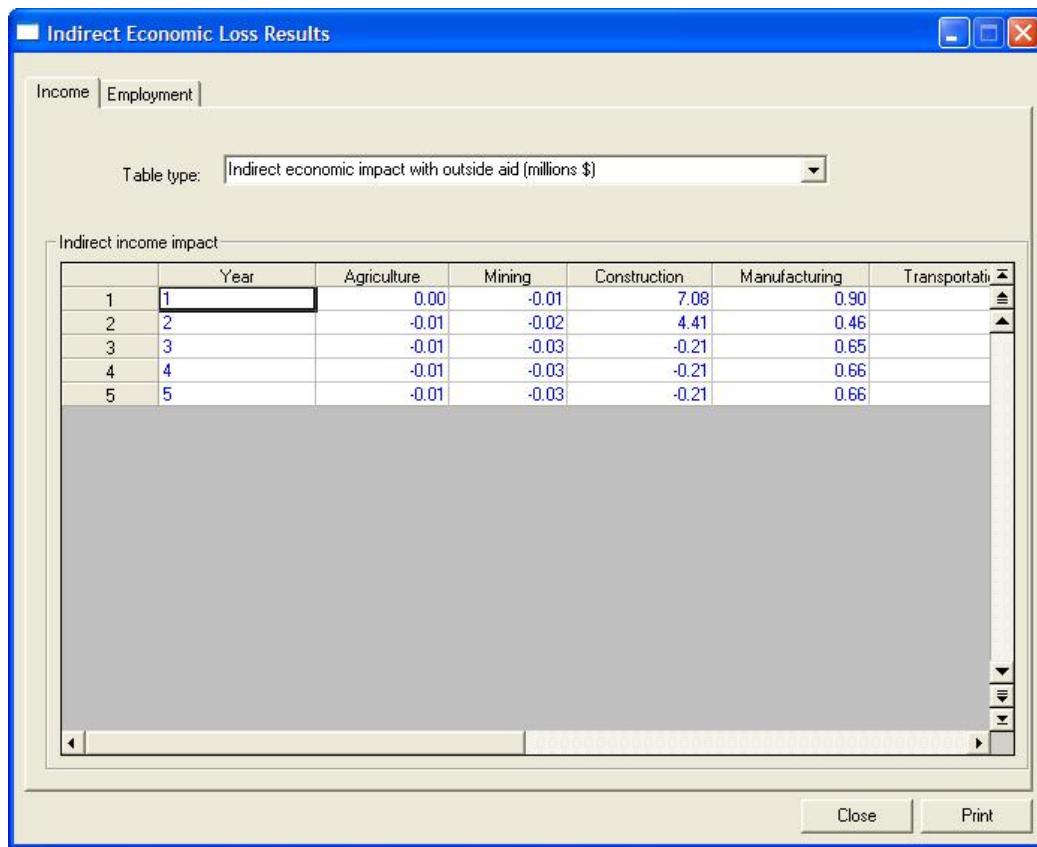


Figure 3-288: HAZUS Results Menu, Indirect Economic Loss Dialog, Income Tab

- a. Selection of the Indirect Economic Loss menu item on the Results menu opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the Indirect Economic Loss Module (IELM) the user may have performed. The dialog has the following features:
 - a. The dialog has two tabs labeled Income and Employment. The Income tab is the default.
 - b. The dialog does not have a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The dialog has a combo box on both tabs labeled Table Type.
 - d. The dialog does not have radio buttons.

- e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close and Print.
- b. Results table is fIELMLossResults.
- c. Table views are:

Tab	Combo Box Selection	View
Income	Indirect economic impact with outside aid (millions \$)	absvIELMIncWithAid
Income	Indirect economic impact without outside aid (millions \$)	absvIELMIncWithoutAid
Employment	Indirect economic impact with outside aid (millions \$)	absvIELMEmpWithAid
Employment	Indirect economic impact without outside aid (millions \$)	absvIELMEmpWithoutAid

- d. When viewing the Income tab, the Indirect Economic Loss dialog has a single combo box labeled Table Type. The options are Indirect economic impact with outside aid (millions \$) and Indirect economic impact without outside aid (millions \$). Selection allows the user to view the IELM results for the counties synthetic economy with and without outside assistance.
- e. The dialog has a single data grid that displays the results depending on the combo box selection. The data is not editable and is displayed in blue text.
- a. The data grid column names are: Year, Agriculture, Mining, Construction, Manufacturing, Transportation, Trade, Finance, Services, Government, Miscellaneous, and Total.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of Print opens a standard print dialog and allows the user to print the entire table.

- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.8.3.15.1. Results Menu, Indirect Economic Loss: Employment Tab

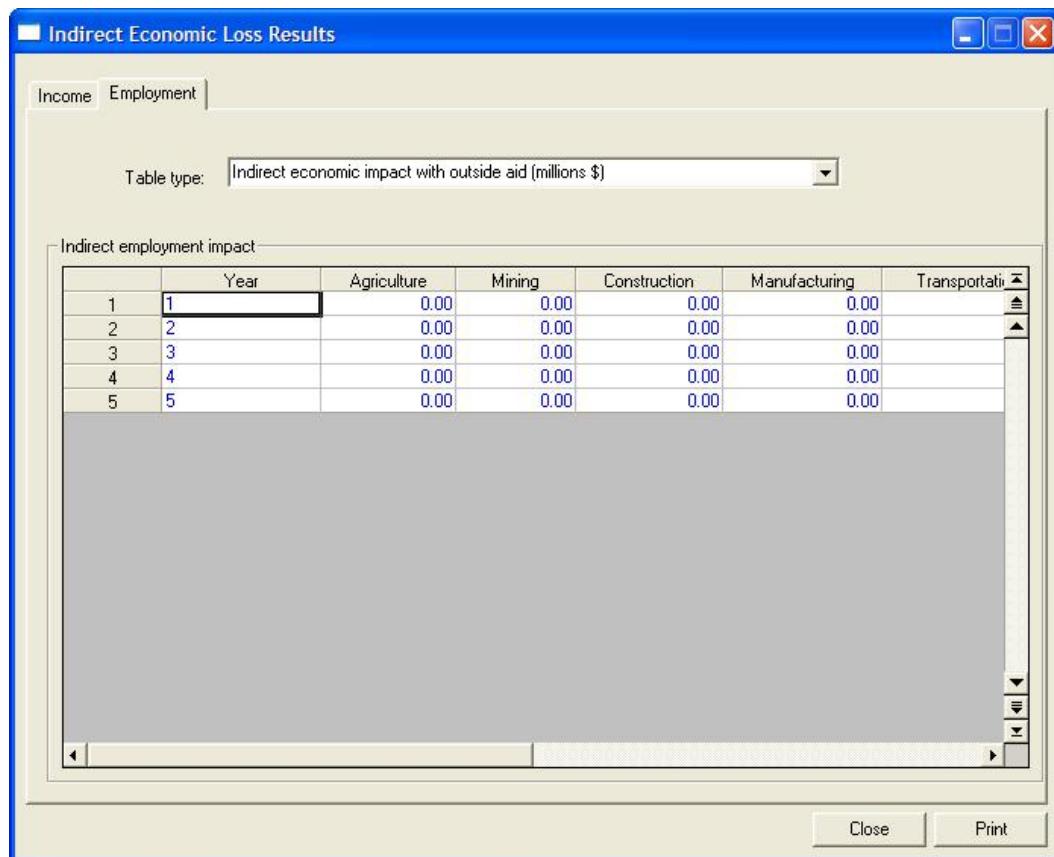


Figure 3-289: HAZUS Results Menu, Indirect Economic Loss Dialog, Employment Tab

- a. Selection of the Employment tab on the Indirect Economic Loss dialog opens the dialog shown above. The dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to view the results for the Indirect Economic Loss Module (IELM) the user may have performed. The dialog has the following features:

- a. The dialog has two tabs labeled Income and Employment. The Income tab is the default.
 - b. The dialog does not have a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The dialog has a combo box on both tabs labeled Table Type.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close and Print.
- b. Results table is fIELMLossResults.
 - c. Table views are:

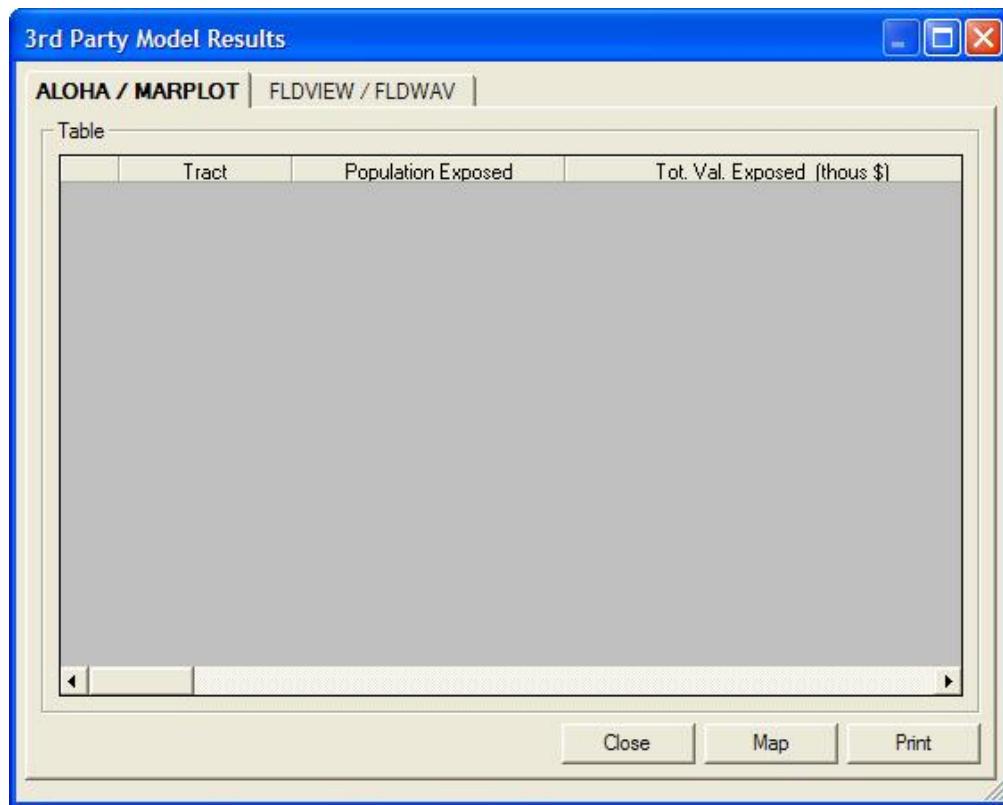
Tab	Combo Box Selection	View
Employment	Indirect economic impact with outside aid (millions \$)	absv_IELMEmWithAid
Employment	Indirect economic impact without outside aid (millions \$)	absv_IELMEmWithoutAid

- d. When viewing the Employment tab, the Indirect Economic Loss dialog has a single combo box labeled Table Type. The options are Indirect economic impact with outside aid (millions \$) and Indirect economic impact without outside aid (millions \$). Selection allows the user to view the IELM results for the counties synthetic economy with and without outside assistance.
- e. The dialog has a single data grid that displays the results depending on the combo box selection. The data is not editable and is displayed in blue text.

- a. The data grid column names are: Year, Agriculture, Mining, Construction, Manufacturing, Transportation, Trade, Finance, Services, Government, Miscellaneous, and Total.
- f. Selection of the Close command button closes the dialog and returns the user to the base map view.
- g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	Y
Data Dictionary	Y
Meta Data	Y

3.2.8.3.16. Results Menu: 3rd Party Models



**Figure 3-290: HAZUS Results Menu, 3rd Party Model Results Dialog,
ALOHA / MARPLOT Tab**

- a. Selection of the 3rd Party Models menu item on the Results menu opens the dialog shown above. The dialog is a custom HAZUS Flood dialog and designed to allow the users to view the results created by the 3rd party software models. The dialog has the following features:
 - a. The dialog has two tabs labeled ALOHA/MARPLOT and FLDVIEW/FLDWAV. The ALOHA/MARPLOT tab is the default.
 - b. The dialog does not have a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The dialog does not have combo boxes.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.

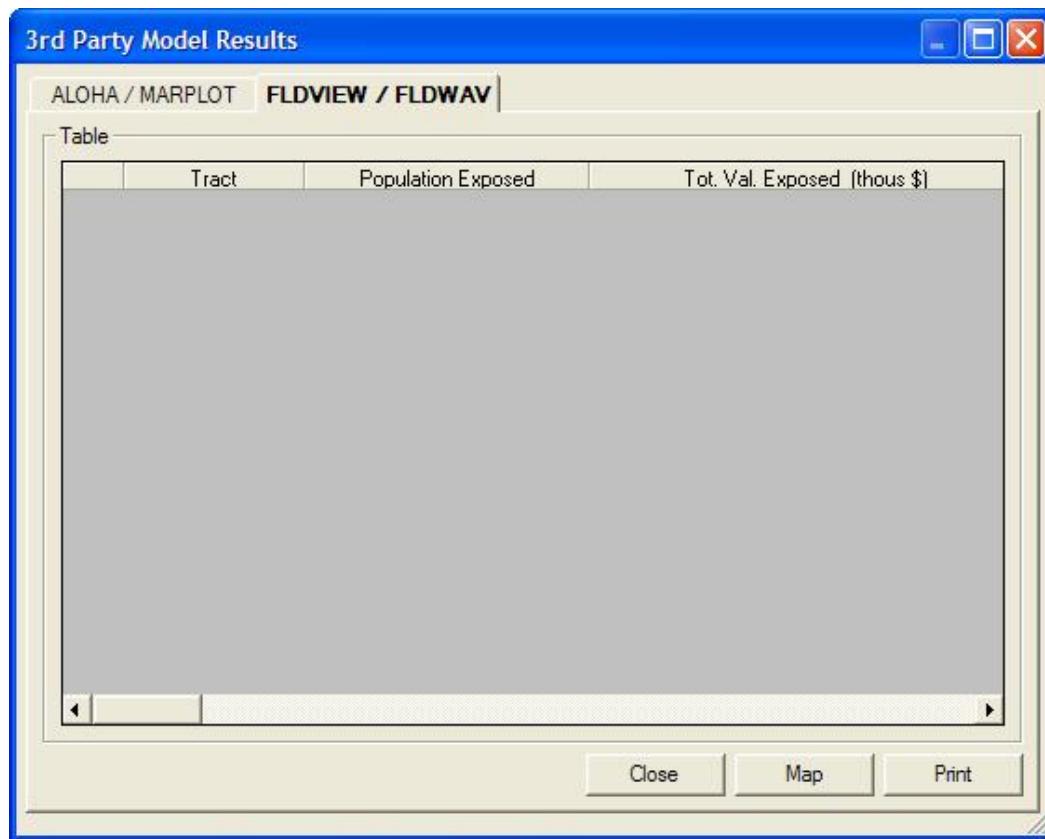
- f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map and Print.
- b. Results table(s) are not accessible by the Flood Model.
- c. Table views are not accessible by the Flood Model:

Model	View
ALOHA	N/A
MARPLOT	N/A
FLDVIEW	N/A
FLDWAV	N/A

- d. The dialog has a single data grid that displays the results from the models that have been run. The data is not editable and is displayed in blue text.
- e. Selection of the Close command button closes the dialog and returns the user to the base map view.
- f. Selection of the Map command button maps the results displayed in the data grid.
- g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	N
Data Dictionary	Y
Meta Data	N

3.2.8.3.16.1. Results Menu, 3rd Party Models: FLDVIEW/FLDWAV Tab



**Figure 3-291: HAZUS Results Menu, 3rd Party Model Results Dialog,
FLDVIEW/FLDWAV Tab**

- a. Selection of the 3rd Party Models menu item on the Results menu opens the dialog shown above. The dialog is a custom HAZUS Flood dialog and designed to allow the users to view the results created by the 3rd party software models. The dialog has the following features:
 - a. The dialog has two tabs labeled ALOHA/MARPLOT and FLDVIEW/FLDWAV. The ALOHA/MARPLOT tab is the default.
 - b. The dialog does not have a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The dialog does not have combo boxes.
 - d. The dialog does not have radio buttons.

- e. The dialog does not have a check box.
 - f. The dialog has a single data grid.
 - g. The dialog does not have text boxes.
 - h. The dialog has command buttons labeled Close, Map and Print.
- b. Results table(s) are not accessible by the Flood Model.
- c. Table views are not accessible by the Flood Model:

Model	View
FLDVIEW	N/A
FLDWAV	N/A

- d. The dialog has a single data grid that displays the results from the models that have been run. The data is not editable and is displayed in blue text.
- e. Selection of the Close command button closes the dialog and returns the user to the base map view.
- f. Selection of the Map command button maps the results displayed in the data grid.
- g. Selection of Print opens a standard print dialog and allows the user to print the entire table.
- h. Through the use of a right mouse click user can access a submenu as noted in the table below. Enabled items include:

Function	Enabled
Add New Record	N
Delete Selected Records	N
Import	N
Export	N
Data Dictionary	Y
Meta Data	N

3.2.8.3.17. Results Menu: Quick Look Analysis Report

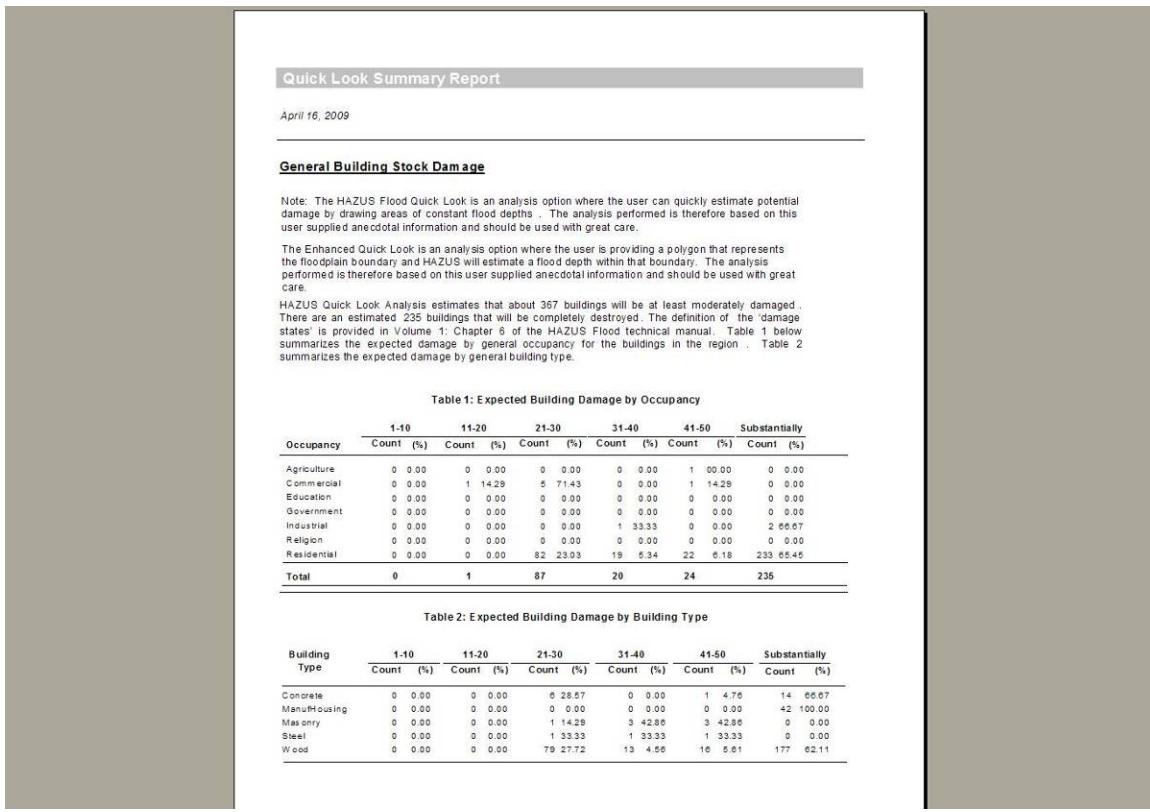


Figure 3-292: HAZUS Results Menu, Quick Look Analysis Report

- Selection of the Quick Look Analysis Report on the Results Menu opens the Crystal Report summary document shown above. The document displays the results of the Quick analysis performed by the user.
- Data for the Crystal Report is stored in the tables: hzCensusBlock, hzTract, hzCensusBlock, flFRGBSDmgCountGOccupB, and flStudyCase.
- The Crystal Report view is absv_CRGBSDmgCountGOccupAll.

3.2.8.3.18. Results Menu: Summary Reports

- Selection of the Summary Reports menu item on the Results menu opens a dialog with a number of tabs that allows the user to select from a large number of summary reports developed in Crystal Reports.

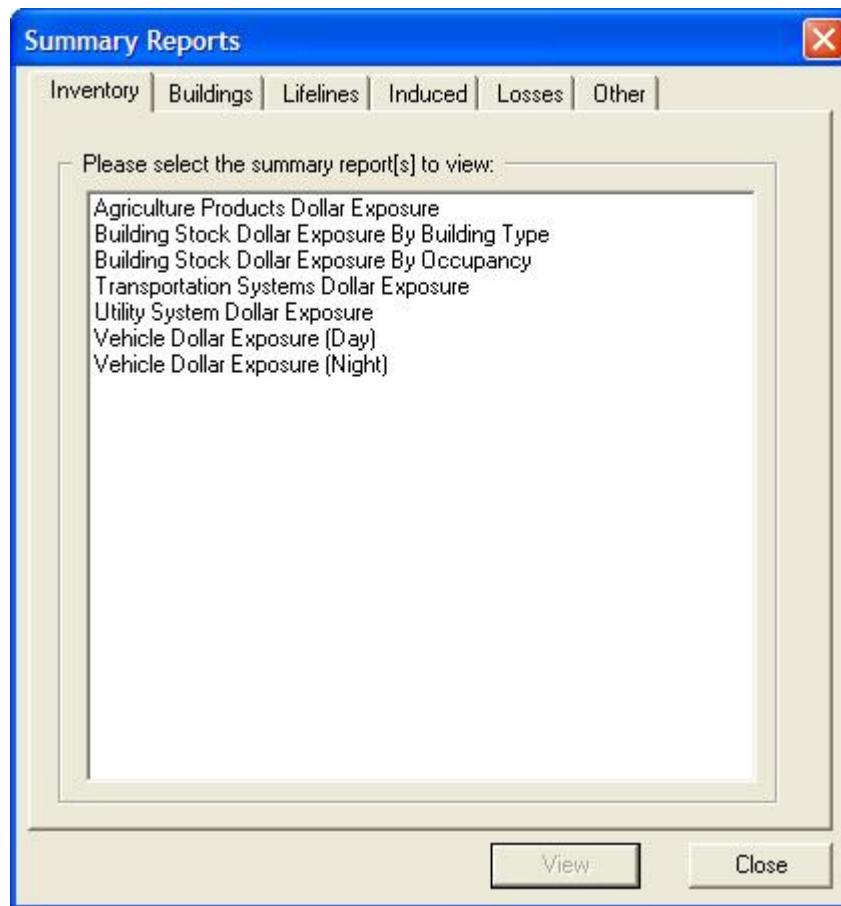


Figure 3-293: HAZUS Results Menu, Summary Reports, Inventory Tab

- b. Selection of the Summary Reports opens the dialog shown above. The dialog is a custom HAZUS Flood dialog designed to allow the user to select from a series of customized Crystal Report summary reports that display data for the scenario that is open.
 - a. The dialog has six tabs labeled Inventory, Buildings, Lifelines, Induced, Losses, and Other. Inventory is the default tab.
 - b. The dialog does not have a frame that provides the user with a quick recap of their scenario name and return period being displayed.
 - c. The dialog does not have a combo box.
 - d. The dialog does not have radio buttons.
 - e. The dialog does not have a check box.

- f. The dialog has a single data grid.
 - g. The dialog has a single non-editable text box that displays the available reports for that tab.
 - h. The dialog has command buttons labeled: Close and Print.
- c. On the inventory tab, the reports that are available deal with the exposed inventory (flooded blocks) to the scenario flood. Available reports include: Agriculture Products Dollar Exposure, Building Stock Dollar Exposure By Building Type, Building Stock Exposure By Occupancy, Transportation Systems Dollar Exposure, Utility System Dollar Exposure, Vehicle Dollar Exposure (Day), and Vehicle Dollar Exposure (Night).

3.2.8.3.18.1. Results Menu, Summary Reports, Inventory Tab: Agriculture Products Dollar Exposure

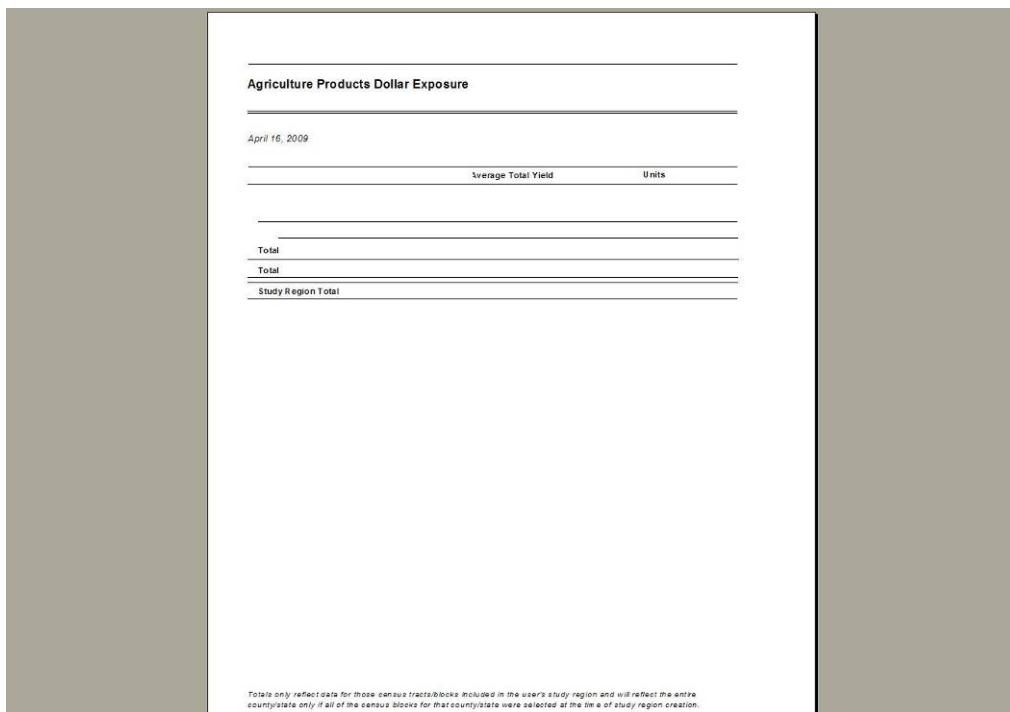


Figure 3-294: HAZUS Results Menu, Summary Reports, Inventory Tab, Agriculture Products Dollar Exposure

- a. Selection of the Agriculture Products Dollar Exposure opens the Crystal Report shown above.

- b. The Report uses hzCounty, flAgricultureInventory, and flAgricultureArea databases.
- c. The report uses the view absv_CRAgricultureProductsExposure.

3.2.8.3.18.2. Results Menu, Summary Reports, Inventory Tab: Building Stock Dollar Exposure By Building Type

Building Stock Exposure by Building Type

April 16, 2009

All values are in thousands of dollars

	Wood	Steel	Concrete	Masonry	Manuf. Housing	Total
Oregon						
Lincoln	3,185,049	358,306	223,085	364,057	191,297	4,311,804
Total	3,185,049	358,306	223,085	364,057	191,297	4,311,804
Study Region Total	3,185,049	358,306	223,085	364,057	191,297	4,311,804

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Marine Coastal
Return Period: 500

Page: 1 of 1

Figure 3-295: HAZUS Results Menu, Summary Reports, Inventory Tab, Building Stock Dollar Exposure By Building Type

- a. Selection of the Building Stock Dollar Exposure By Building Type opens the Crystal Report shown above.
- b. The report uses the hzCounty, hzTract, hzCensusBlock, and hzExposureGBldgTypeB databases.
- c. The report uses the view absv_CRIvGSExposureGBldgType.

3.2.8.3.18.3. Results Menu, Summary Reports, Inventory Tab: Building Stock Dollar Exposure By Occupancy

Building Stock Exposure by General Occupancy

April 16, 2009

All values are in thousands of dollars

	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
Oregon								
Lincoln	3,435,903	592,845	105,020	32,138	78,262	26,070	41,592	4,311,830
Total	3,435,903	592,845	105,020	32,138	78,262	26,070	41,592	4,311,830
Study Region Total	3,435,903	592,845	105,020	32,138	78,262	26,070	41,592	4,311,830

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-296: HAZUS Results Menu, Summary Reports, Inventory Tab, Building Stock Dollar Exposure By Occupancy

- Selection of the Building Stock Dollar Exposure By Occupancy opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, hzExposureOccupB, and hzDemographicsB databases.
- The report uses the view absv_CRIInvGBSExposureGOccupAll.

3.2.8.3.18.4. Results Menu, Summary Reports, Inventory Tab: Transportation System Dollar Exposure

The screenshot displays a Crystal Report titled "Transportation System Dollar Exposure" from April 16, 2009. The report is filtered for the state of Oregon. It includes a header note that all values are in thousands of dollars. The main table has columns for Highway, Railway, Light Rail, Bus Facility, Ports, Ferries, Airport, and Total. The data shows various infrastructure types like roads, bridges, tunnels, and facilities, with their respective dollar amounts. Totals are provided for each county and the entire study region.

Transportation System Dollar Exposure								
April 16, 2009 All values are in thousands of dollars								
	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
Oregon								
Lincoln								
Roads	1,040,322.11	47,475.00	0.00	0.00	0.00	0.00	210,722.49 #####	
Bridges	992,521.12	0.00	0.00	0.00	0.00	0.00	992,521.12	
Tunnels	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Facilities	0.00	7,390.20	0.00	0.00	30,890.00	0.00	30,792.00	60,073.30
Total	2,033,322.11	54,865.20	0.00	0.00	30,890.60	0.00	241,514.90 #####	
Total	2,033,322.11	54,865.20	0.00	0.00	30,890.60	0.00	241,514.90 #####	
Study Region Total	2,033,322.11	54,865.20	0.00	0.00	30,890.60	0.00	241,514.90 #####	

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region Scenario: Riverline Coastal Return Period: 200

Page: 1 of 1

Figure 3-297: HAZUS Results Menu, Summary Reports, Inventory Tab, Transportation System Dollar Exposure

- Selection of the Transportation System Dollar Exposure opens the Crystal Report shown above.
- The report uses the hzCounty and flExposureTransport databases.
- The report uses the view absv_CRExposureTransp.

3.2.8.3.18.5. Results Menu, Summary Reports, Inventory Tab: Utility System Dollar Exposure

Utility System Dollar Exposure

April 16, 2009

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
Oregon	\$37029.00	\$602,064.00	\$0.00	\$0.00	\$0.00	\$1,356.00	\$641,049.00
Lincoln	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Facilities	\$37029.00	\$602,064.00	\$0.00	\$0.00	\$0.00	\$1,356.00	\$641,049.00
Pipelines	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$37,029.00	\$602,064.00	\$0.00	\$0.00	\$0.00	\$1,356.00	\$641,049.00
Total	\$37,029.00	\$602,064.00	\$0.00	\$0.00	\$0.00	\$1,356.00	\$641,049.00
Study Region Total	\$37,029.00	\$602,064.00	\$0.00	\$0.00	\$0.00	\$1,356.00	\$641,049.00

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-298: HAZUS Results Menu, Summary Reports, Inventory Tab, Utility System Dollar Exposure

- Selection of the Utility System Dollar Exposure opens the Crystal Report shown above.
- The report uses the hzCounty and flExposureUtil databases.
- The report uses the view absv_CRExposureUtil.

**3.2.8.3.18.6. Results Menu, Summary Reports, Inventory Tab:
VehicleDollar Exposure (Day)**

The screenshot displays a Crystal Report titled "Vehicle Dollar Exposure (Day)" from April 16, 2009. The report is filtered for the state of Oregon. It includes a table with four columns: Cars, Light Trucks, Heavy Trucks, and Total. The data shows the following values:

	Cars	Light Trucks	Heavy Trucks	Total
Oregon				
Lincoln	\$47,747,102	\$20,077,987	\$37,168,363	\$104,993,452
Total	\$47,747,102	\$20,077,987	\$37,168,363	\$104,993,452
Study Region Total	\$47,747,102	\$20,077,987	\$37,168,363	\$104,993,452

A note at the bottom states: "Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation." The report also includes study region details: Test Region, Riverine Coastal; Scenario, 200; and Return Period, 200. The page number is Page 1 of 1.

**Figure 3-299: HAZUS Results Menu, Summary Reports, Inventory Tab,
Vehicle Dollar Exposure (Day)**

- a. Selection of the Vehicle Dollar Exposure (Day) opens the Crystal Report shown above.
- b. The report uses the hzCounty, hzTract, hzCensusBlock, and f1DayVehicleInv databases.
- c. The report uses the view absv_CRDVehicleExposure.

**3.2.8.3.18.7. Results Menu, Summary Reports, Inventory Tab:
Vehicle Dollar Exposure (Night)**

Building Stock Exposure by General Occupancy

April 16, 2009

All values are in thousands of dollars

	Residential	Commercial	Industrial	Agriculture	Religion	Government	Education	Total
Oregon								
Lincoln	3,435,903	592,845	105,020	32,138	78,262	26,070	41,592	4,311,830
Total	3,435,903	592,845	105,020	32,138	78,262	26,070	41,592	4,311,830
Study Region Total	3,435,903	592,845	105,020	32,138	78,262	26,070	41,592	4,311,830

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

**Figure 3-300: HAZUS Results Menu, Summary Reports, Inventory Tab,
Vehicle Dollar Exposure (Night)**

- Selection of the Vehicle Dollar Exposure (Night) opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, and fINightVehicleInv databases.
- The report uses the view absv_CRNightVehicleExposure.

3.2.8.3.18.8. Results Menu, Summary Reports, Buildings Tab

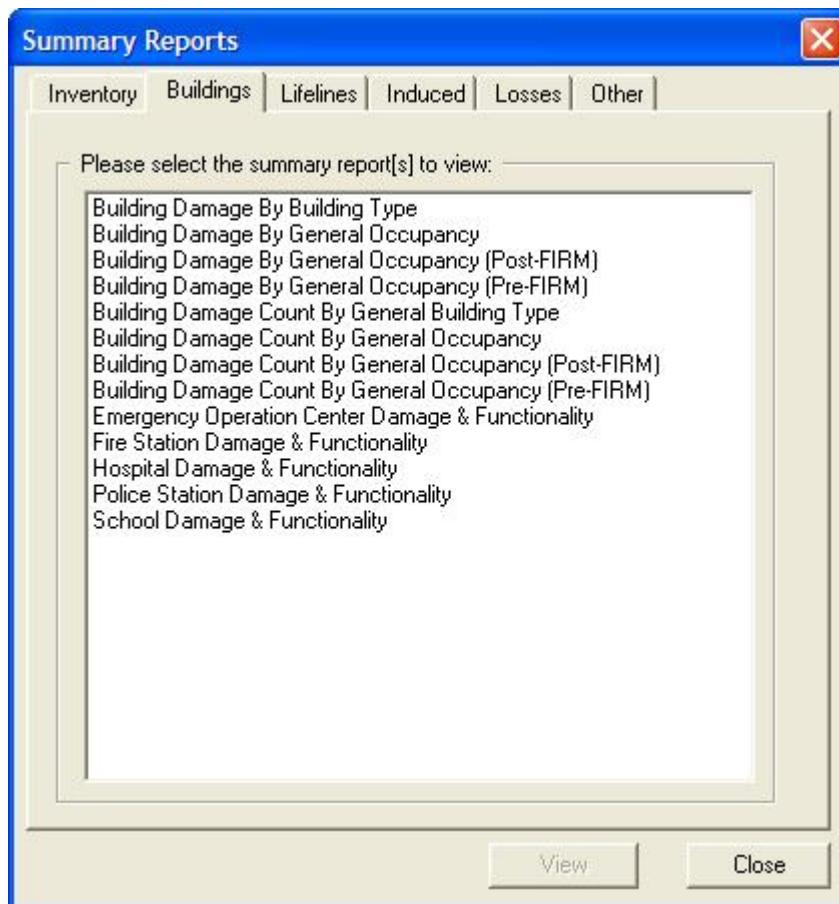


Figure 3-301: HAZUS Results Menu, Summary Reports, Buildings Tab

- a. Selection of the Buildings tab on the Summary Reports dialog give the user the opportunity to view the direct damages to buildings for both the General Building Stock and Essential Facilities. All of the reports are developed in Crystal Reports.
- b. The report options include: Building Damage By Building Type, Building Damage By General Occupancy, Building Damage By General Occupancy (Post-FIRM), Building Damage By General Occupancy (Pre-FIRM), Building Damage Count By General Building Type, Building Damage Count By General Occupancy, Building Damage Count By General Occupancy (Post-FIRM), Building Damage Count By General Occupancy (Pre-FIRM), Emergency Operation Center Damage & Functionality, FireStation Damage & Functionality, Hospital Damage & Functionality, Police Station Damage & Functionality, and School Damage & Functionality.

3.2.8.3.18.8.1. Results Menu, Summary Reports, Buildings Tab: Building Damage By Building Type

Building Damage by Building Type

April 16, 2009

All values are in thousands of square feet

Building Type	Average Damage (%) Within Each Damage Range					
	All	1-10	11-20	21-30	31-40	41-50
Oregon						
Lincoln						
Steel	8.0	7.0	20.0	10.0	15.0	11.0
ManuHousing	35.0	0.0	0.0	1.0	0.0	0.0
Masonry	15.0	20.0	45.0	18.0	18.0	27.0
Concrete	22.0	14.0	66.0	28.0	28.0	38.0
Wood	315.0	32.0	191.0	24.0	128.0	287.0
Total	396.0	73.0	324.0	305.0	183.0	366.0
Total	396.0	73.0	324.0	305.0	183.0	366.0
Scenario Total	396.0	73.0	324.0	305.0	183.0	366.0

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 250

Page: 1 of 1

Figure 3-302: HAZUS Results Menu, Summary Reports, Buildings Tab, Building Damage By Building Type

- Selection of the Building Damage By Building Type opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, f1FRGBSDmgGBldgType and f1StudyCase databases.
- The report uses the view absv_CRGBSDmgGBldgType.

3.2.8.3.18.8.2. Results Menu, Summary Reports, Buildings Tab: Building Damage By General Occupancy

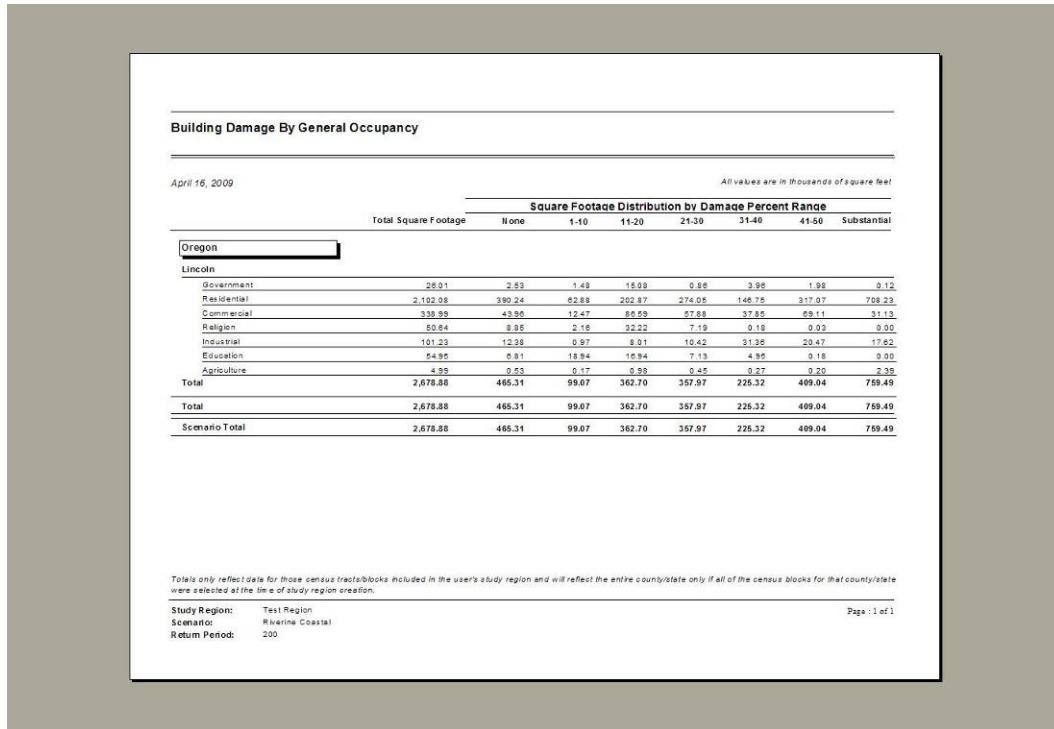


Figure 3-303: HAZUS Results Menu, Summary Reports, Buildings Tab, Building Damage By General Occupancy

- Selection of the Building Damage By General Occupancy opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, fIRGBSDmgGOccupB, and fStudyCase databases.
- The report uses the view absv_CRGBSDmgGOccupAll.

3.2.8.3.18.8.3. Results Menu, Summary Reports, Buildings Tab: Building Damage By General Occupancy (Post-FIRM)



Figure 3-304: HAZUS Results Menu, Summary Reports, Buildings Tab, Building Damage By General Occupancy (Post-FIRM)

- a. Selection of the Building Damage By General Occupancy (Post-FIRM) opens the Crystal Report shown above.
- b. The report uses the hzCounty, hzTract, hzCensusBlock, f1FRGBSDmgGOccupB, and f1StudyCase databases.
- c. The report uses the view absv_CRGBSDmgGOccupPost.

3.2.8.3.18.8.4. Results Menu, Summary Reports, Buildings Tab: Building Damage By General Occupancy (Pre-FIRM)

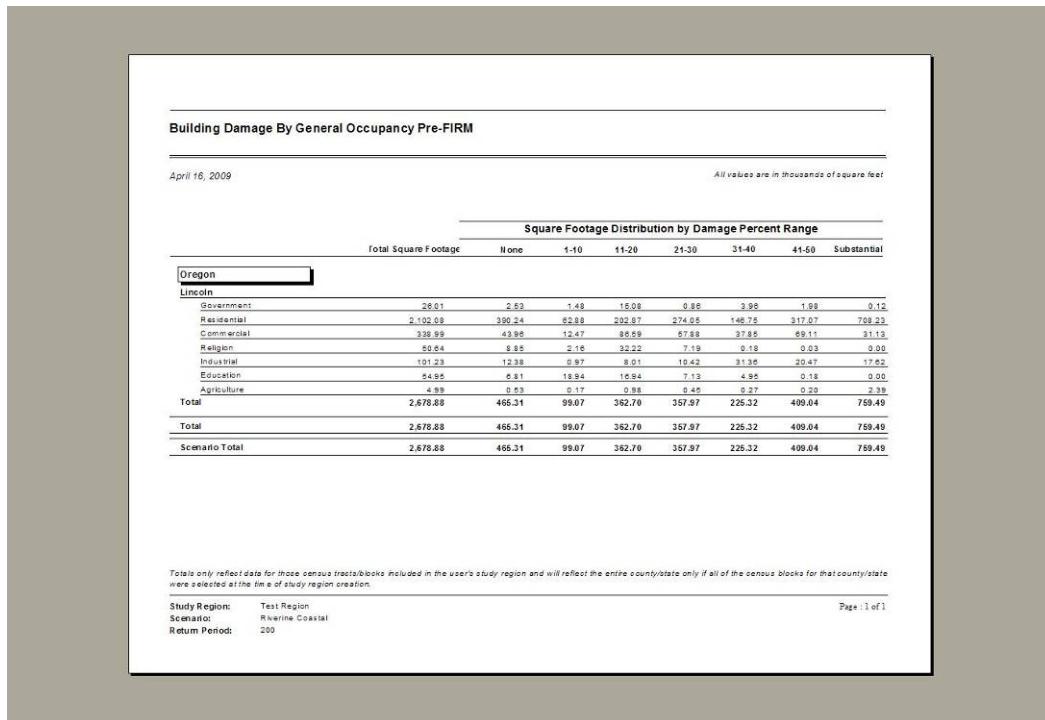


Figure 3-305: HAZUS Results Menu, Summary Reports, Buildings Tab, Building Damage By General Occupancy (Pre-FIRM)

- Selection of the Building Damage By General Building Type (Pre-FIRM) opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, fIRGBSDmgGOccupB, and fIStudyCase databases.
- The report uses the view absv_CRGBSDmgGOccupPre.

3.2.8.3.18.8.5. Results Menu, Summary Reports, Buildings Tab: Building Damage Count By General Building Type

Building Damage Count by General Building Type								
April 16, 2009								
	# of Buildings							
	None	1-10	11-20	21-30	31-40	41-50	Substantial	Total
Oregon								
Lincoln								
Steel	0	0	0	0	0	0	0	0
Manufacturing	13	0	0	0	0	0	259	222
Masonry	0	0	1	0	0	4	0	1
Concrete	0	0	1	1	1	1	0	4
Wood	102	0	49	21	20	102	153	516
Total	115	0	51	85	30	107	362	750
Scenario Total	115	0	51	85	30	107	362	750
Special Note Regarding Building Count:								
Unlike the earthquake and hurricane models, the flood model performs its analysis at the census block level. This means that the analysis starts with a small number of buildings within each census block and applies a series of distributions necessary for analyzing the potential damage. The application of these distributions and the small number of buildings make the flood model more sensitive to rounding errors that introduces uncertainty into the building count results. Please use these results with suitable caution.								
Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.								
Study Region:	Test Region							
Scenario:	Region Coastal							
Return Period:	200							
Page: 1 of 1								

Figure 3-306: HAZUS Results Menu, Summary Reports, Buildings Tab, Building Damage Count By General Building Type

- Selection of the Building Damage Count By General Building Type opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, fIRGBSDmgCountGBldgType, and fStudyCase databases.
- The report uses the view absv_CRGBSDmgCountGBldgType.

3.2.8.3.18.8.6. Results Menu, Summary Reports, Buildings Tab: Building Damage Count By General Occupancy

Building Damage Count by General Occupancy

April 16, 2009

Count of Buildings (#) by Range of Damage (%)

	None	1-10	11-20	21-30	31-40	41-50	Substantial	Total
Oregon	0	0	1	0	0	0	0	1
Lincoln	0	0	2	2	0	1	0	5
	0	0	0	0	0	0	0	0
	0	0	0	0	2	0	2	4
	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0
Total	115	0	52	87	31	110	364	759
Scenario Total	115	0	52	87	31	110	364	759

Special Notice Regarding Building Count:

Unlike the earthquake and hurricane models, the flood model performs its analysis at the census block level. This means that the analysis starts with a small number of buildings within each census block and applies a series of distributions necessary for analyzing the potential damage. The application of these distributions and the small number of buildings make the flood model more sensitive to rounding errors that introduces uncertainty into the building count results. Please use these results with suitable caution.

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-307: HAZUS Results Menu, Summary Reports, Buildings Tab, Building Damage Count By General Occupancy

- Selection of the Building Damage Count By General Occupancy opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, fIRGBSDmgCountGOccupB, and fStudyCase databases.
- The report uses the view absv_CRGBSDmgCountGOccupAll.

3.2.8.3.18.8.7. Results Menu, Summary Reports, Buildings Tab: Building Damage Count By General Occupancy (Post-FIRM)



Figure 3-308: HAZUS Results Menu, Summary Reports, Buildings Tab, Building Damage Count By General Occupancy (Post-FIRM)

- Selection of the Building Damage Count By General Occupancy (Post-FIRM) opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, f1FRGBSDmgCountGOoccupB, and f1StudyCase databases.
- The report uses the view absv_CRGBSDmgCountGOoccupPost.

3.2.8.3.18.8.8. Results Menu, Summary Reports, Buildings Tab: Building Damage Count By General Occupancy (Pre-FIRM)

Building Damage Count by General Occupancy Pre-FIRM

April 16, 2009

Count of Buildings (#) by Range of Damage (%)

	None	1-10	11-20	21-30	31-40	41-50	Substantial	Total
Oregon	0	0	1	0	0	0	0	1
Lincoln	0	0	49	85	29	109	362	749
Government	0	0	1	0	0	0	0	1
Residential	115	0	49	85	29	109	362	749
Commercial	0	0	2	0	1	0	0	3
Religion	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	2	0	2	4
Education	0	0	0	0	0	0	0	0
Agriculture	0	0	0	0	0	0	0	0
Study Region Total	115	0	52	87	31	110	364	759
Total	115	0	52	87	31	110	364	759
Scenario Total	115	0	52	87	31	110	364	759

Special Notice Regarding Building Count:
Unlike the earthquake and hurricane models, the flood model performs its analysis at the census block level. This means that the analysis starts with a small number of buildings within each census block and applies a series of distributions necessary for analyzing the potential damage. The application of these distributions, and the small number of buildings make the flood model more sensitive to rounding errors that introduces uncertainty into the building count results. Please use these results with suitable caution.

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-309: HAZUS Results Menu, Summary Reports, Buildings Tab, Building Damage Count By General Occupancy (Pre-FIRM)

- Selection of the Building Damage Count By General Occupancy (Pre-FIRM) opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, fIRGBSDmgCountGOccupB, and fIStudyCase databases.
- The report uses the view absv_CRGBSDmgCountGOccupPre.

3.2.8.3.18.8.9. Results Menu, Summary Reports, Buildings Tab: Emergency Operation Center Damage & Functionality



Figure 3-310: HAZUS Results Menu, Summary Reports, Buildings Tab, Emergency Operation Center Damage & Functionality

- Selection of the Emergency Operation Center Damage & Functionality opens the Crystal Report shown above.
- The report uses the hzCounty, hzEmergencyCtr, fFREmergencyCtr, and cIEF databases.
- The report uses the view absv_CREmergencyCtrFunctionality.

3.2.8.3.18.8.10. Results Menu, Summary Reports, Buildings Tab: Fire Station Damage & Functionality

Fire Station Facilities Damage and Functionality

April 16, 2009

Dollar values are in thousands.

	Count of Fire Stations	Total Building Damage (\$)	Total Content Damage (\$)	Non-Functional Fire Stations	Average Restoration Time
District					
Oregon					
Lincoln					
Fire Station	1	77	441	0	480
Total	1	77	441	0	480
Total	1	77	441	0	480
Scenario Total	1	77	441	0	480

If this report displays all zeros, two possibilities can explain this:

- (1) None of your facilities were flooded. This can be checked by mapping the inventory data on the map grid.
- (2) The analysis was not run. This can be tested by checking the run box on the Analysis menu and seeing if a message box ask you to replace the existing results.

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-311: HAZUS Results Menu, Summary Reports, Buildings Tab, Fire Station Damage & Functionality

- a. Selection of the Fire Station Damage & Functionality opens the Crystal Report shown above.
- b. The report uses the hzCounty, hzFireStation, fIIFRFireStation, and cIEF databases.
- c. The report uses the view absv_CRFireStationFunctionality.

3.2.8.3.18.8.11. Results Menu, Summary Reports, Buildings Tab: Hospital Damage & Functionality

Care Facilities (Hospital) Damage and Functionality					
April 24, 2009					
	Total # of Beds	Total Building Damage (\$)	Total Content Damage (\$)	Non-Functional Hospitals	Average Restoration Time
North Carolina					
Mecklenburg					
Medium Hospital (50 to 150 Beds)	118	9636.06	26188.27	0	\$00
Total	118	9636.06	26188.27	0	\$00
Total	118	9636.06	26188.27	0	\$00
Scenario Total	118	9636.06	26188.27	0	\$00

If this report displays all zeros, two possibilities can explain this:
 (1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.
 (2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box ask you to replace the existing results.

Totals only reflect data for those census blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Mecklenburg NC Page: 1 of 1
 Scenario: Case 1
 Return Period: 100

Figure 3-312: HAZUS Results Menu, Summary Reports, Hospital Damage & Functionality

- Selection of the Hospital Damage & Functionality opens the Crystal Report shown above.
- The report uses the hzCounty, hzCareFlty, flFRCareFlty, and cIEF databases.
- The report uses the view absv_CRCareFunctionality.

3.2.8.3.18.8.12. Results Menu, Summary Reports, Buildings Tab: Police Station Damage & Functionality

Police Station Facilities Damage and Functionality

April 16, 2009

Dollar values are in thousands.

	Count of Police Stations	Total Building Damage (\$)	Total Content Damage (\$)	Non-Functional Police Stations	Average Restoration Time
Oregon	8481 (String)				
Lincoln					
Police Station	1	870.32	2373.00	0	900
Total	1	870.32	2373.00	0	900
Total	1	870.32	2373.00	0	900
Scenario Total	1	870.32	2373.00	0	900

If this report displays all zeros, two possibilities can explain this:
 (1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.
 (2) The analysis was not run. This can be tested by checking the run box on the Analysis Menus and seeing if a message box ask you to replace the existing results.

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
 Scenario: Riverine Coastal
 Return Period: 200

Page: 1 of 1

Figure 3-313: HAZUS Results Menu, Summary Reports, Buildings Tab, Police Station Damage & Functionality

- Selection of the Police Station Damage & Functionality opens the Crystal Report shown above.
- The report uses the hzCounty, hzPoliceStation, fIIFRPoliceStation, and cIEF databases.
- The report uses the view absv_CRPOLiceStationFunctionality.

3.2.8.3.18.8.13. Results Menu, Summary Reports, Buildings Tab: School Damage & Functionality

School Damage and Functionality					
<i>April 16, 2009</i>					
<i>Dollar values are in thousands.</i>					
Count of Schools	Total Building Damage (\$)	Total Content Damage (\$)	Non-Functional Schools	Average Restoration Time	
Oregon					
Lincoln					
Grade Schools (Primary and High Schools)	2	100.26	641.48	0	555
Total	2	100.56	641.48	0	555
Total	2	100.56	641.48	0	555
Scenario Total	2	100.56	641.48	0	555
If this report displays all zeros, two possibilities can explain this: (1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid. (2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box ask you to replace the existing results.					
<i>Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.</i>					
Study Region:	Test Region				Page 1 of 1
Scenario:	Riverine Coastal				
Return Period:	200				

Figure 3-314: HAZUS Results Menu, Summary Reports, Buildings Tab, School Damage & Functionality

- a. Selection of the School Damage & Functionality opens the Crystal Report shown above.
- b. The report uses the hzCounty, hzSchool, fIFRSchool, and cIEF databases.
- c. The report uses the view absv_CRSchoolFunctionality.

3.2.8.3.18.9. Results Menu, Summary Reports, Lifelines Tab

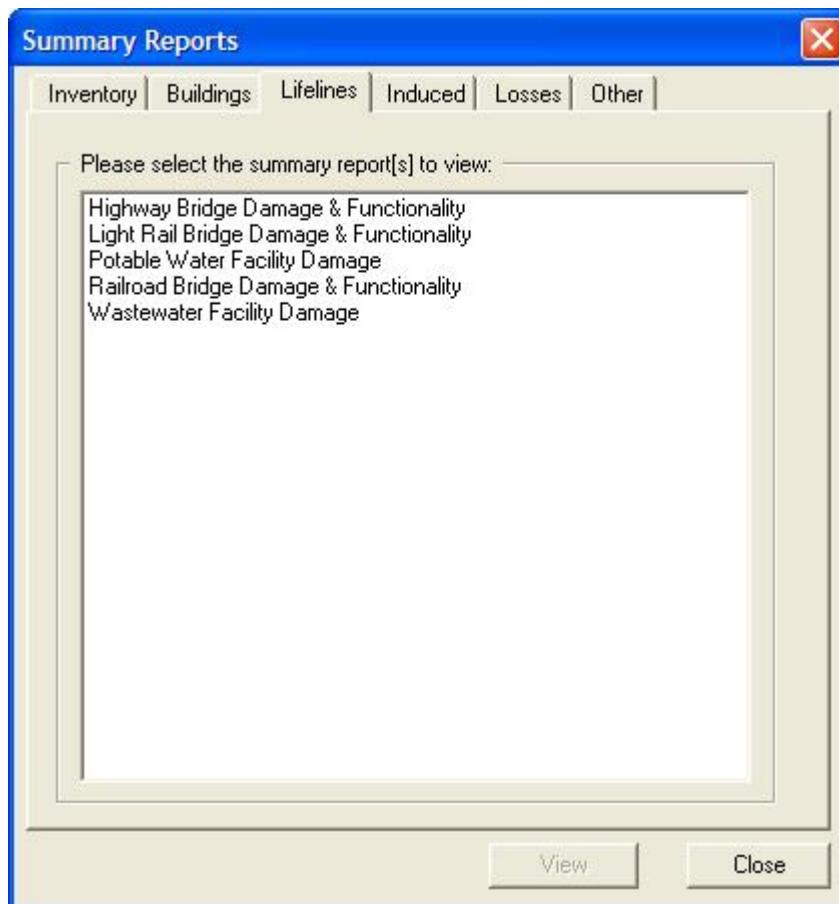


Figure 3-315: HAZUS Results Menu, Summary Reports, Lifelines Tab

- a. Selection of the Lifelines tab on the Summary Reports dialog gives the user the opportunity to view the direct damages to lifeline features that the flood model assesses. All of the reports are developed in Crystal Reports.
- b. The report options include: Highway Bridge Damage & Functionality, Light Rail Bridge Damage & Functionality, Potable Water Facility Damage, Railroad Bridge Damage & Functionality, and Waste Water Facility Damage.

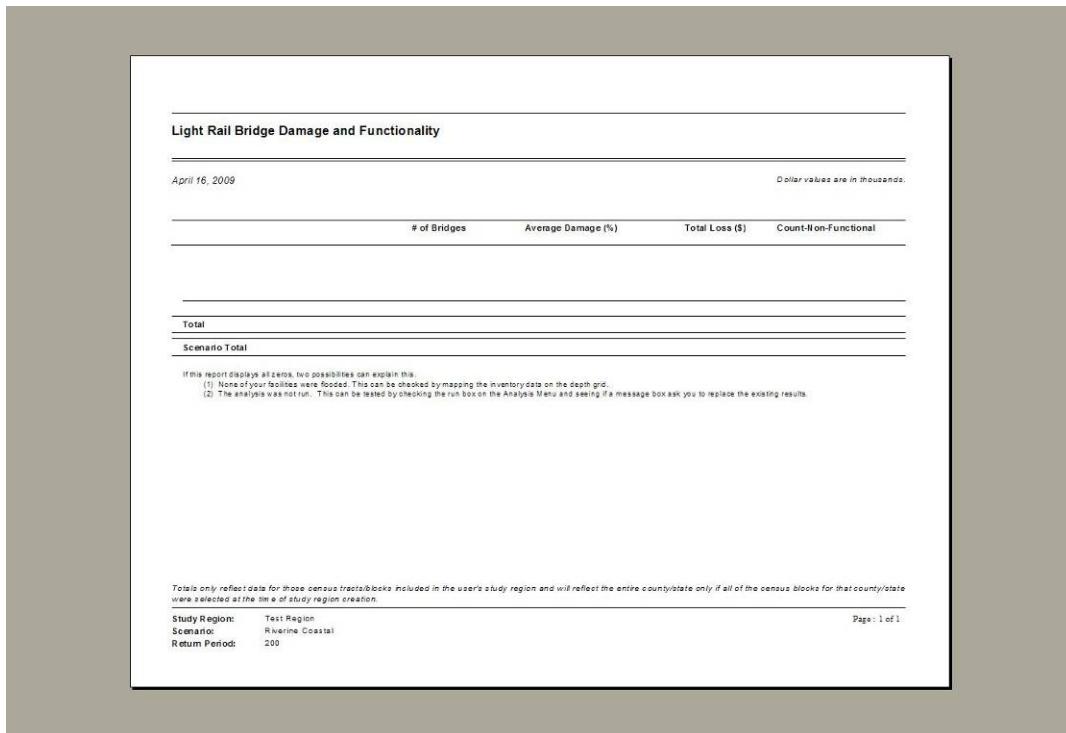
3.2.8.3.18.9.1. Results Menu, Summary Reports, Lifelines Tab: Highway Bridge Damage & Functionality



Figure 3-316: HAZUS Results Menu, Summary Reports, Lifelines Tab, Highway Bridge Damage & Functionality

- Selection of the Highway Bridge Damage & Functionality opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzBridge, and f1Bridge databases.
- The report uses the view absv_CRHwyBridgeDmg.

3.2.8.3.18.9.2. Results Menu, Summary Reports, Lifelines Tab: Light Rail Bridge Damage & Functionality



**Figure 3-317: HAZUS Results Menu, Summary Reports, Lifelines Tab,
Light Rail Bridge Damage and Functionality**

- Selection of the Light Rail Bridge Damage & Functionality opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzBridge, and flBridge databases.
- The report uses the view absv_CRLtRailBridgeDmg.

3.2.8.3.18.9.3. Results Menu, Summary Reports, Lifelines Tab: Potable Water Facility Damage

Potable Water System Facility Damage

April 16, 2009

Dollar values are in thousands.

# of Facilities	Average Damage (%)	Total Loss (\$)	Non-Functional Facilities
Total			
Scenario Total			

If this report displays all zeros, two possibilities can explain this:

- (1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.
- (2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box ask you to replace the existing results.

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for the county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-318: HAZUS Results Menu, Summary Reports, Lifelines Tab, Potable Water Facilities Damage

- a. Selection of the Potable Water Facilities Damage opens the Crystal Report shown above.
- b. The report uses the hzCounty, hzPotableWaterFlty, and fIIFRPotableWater Flty databases.
- c. The report uses the view absv_CRPotableWaterFltyDmgFunct.

3.2.8.3.18.9.4. Results Menu, Summary Reports, Lifelines Tab: Railroad Bridge Damage & Functionality

Railroad Bridge Damage and Functionality			
April 16, 2009		Dollar values are in thousands.	
# of Bridges	Average Damage (%)	Total Loss (\$)	Count-Non-Functional
<hr/>			
Total			
Scenario Total			
If this report displays all zeros, two possibilities can explain this: (1) None of your facilities were flooded. This can be checked by mapping the inventory data on the DERM grid. (2) The analysis was not run. This can be tested by checking the run box on the Analysis menu and seeing if a message box ask you to replace the existing results.			
<small>Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for the county/state were selected at the time of study region creation.</small>			
Study Region:	Test Region	Page: 1 of 1	
Scenario:	Riverine Coastal		
Return Period:	200		

Figure 3-319: HAZUS Results Menu, Summary Reports, Lifelines Tab, Railroad Bridge Damage & Functionality

- Selection of the Railroad Bridge Damage & Functionality opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzBridge, and flBridge databases.
- The report uses the view absv_CRRailwayBridgeDmg.

3.2.8.3.18.9.5. Results Menu, Summary Reports, Lifelines Tab: Wastewater Damage

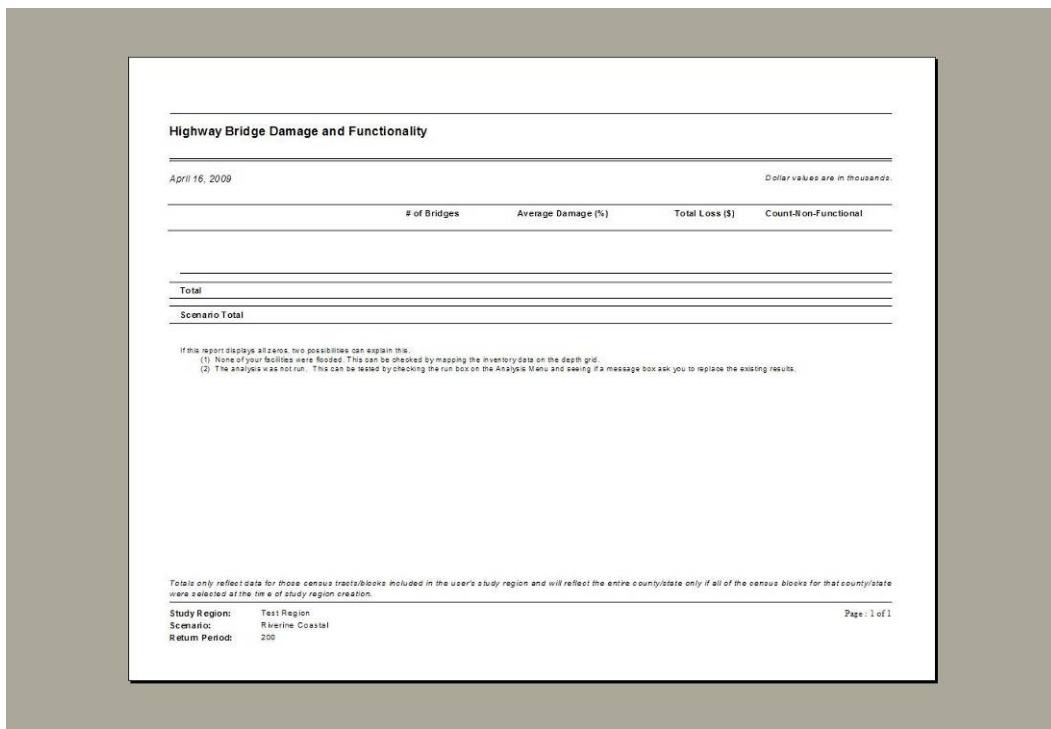


Figure 3-320: HAZUS Results Menu, Summary Reports, Lifelines Tab, Wastewater Damage

- a. Selection of the Wastewater Damage opens the Crystal Report shown above.
- b. The report uses the hzCounty, hzWasteWaterFlty, and flFRWasteWaterFlty databases.
- c. The report uses the view absv_CRWasteWaterFltyDmgFunct.

3.2.8.3.18.10. Results Menu, Summary Reports, Induced Tab

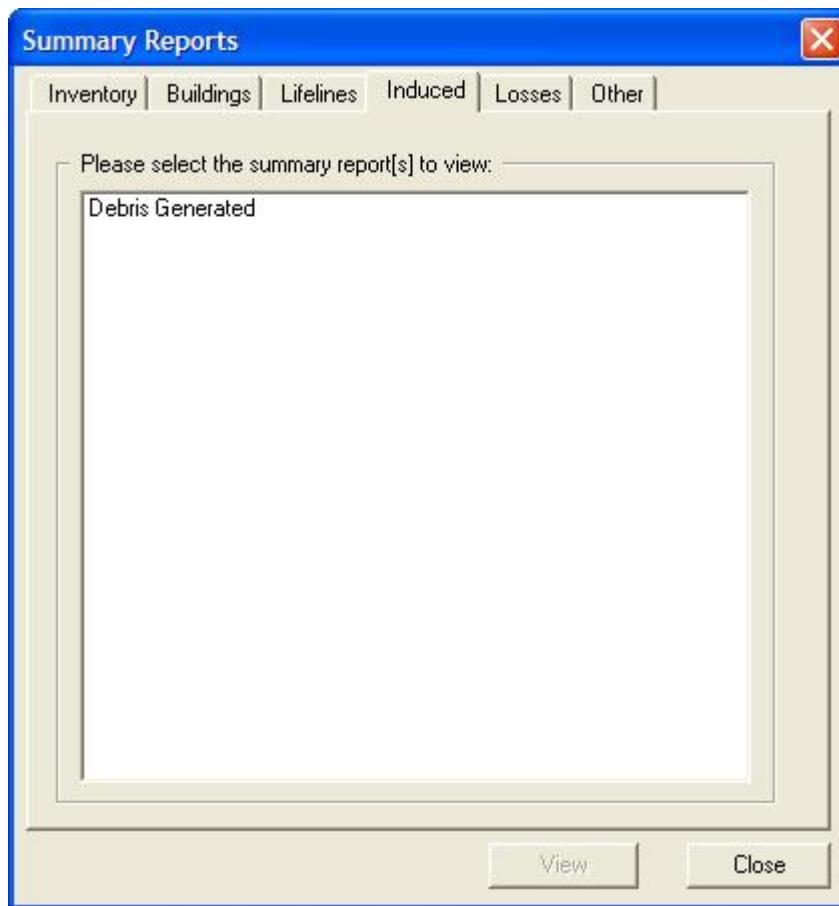


Figure 3-321: HAZUS Results Menu, Summary Reports, Induced Tab

- a. Selection of the Induced tab on the Summary Reports dialog give the user the opportunity to view induced damages to their study region. All of the reports are developed in Crystal Reports.
- b. The report options include: Debris Generated.

3.2.8.3.18.10.1. Results Menu, Summary Reports, Induced Tab: Debris Generated

Debris Summary Report

April 24, 2009 All values are in tons.

	Buildings	Structures	Foundations	Total
North Carolina				
Mecklenburg	16,516	17,512	14,836	48,865
Total	16,516	17,512	14,836	48,865
Scenario Total	16,516	17,512	14,836	48,865

Totals only reflect data for those census tract blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Mecklenburg NC
Scenario: Case 1
Return Period: 100

Page: 1 of 1

Figure 3-322: HAZUS Results Menu, Summary Reports, Induced Tab, Debris Generated

- Selection of the Debris Generated opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, and fIFRDebris databases.
- The report uses the view absv_CRDebris.

3.2.8.3.18.11. Results Menu, Summary Reports, Losses Tab

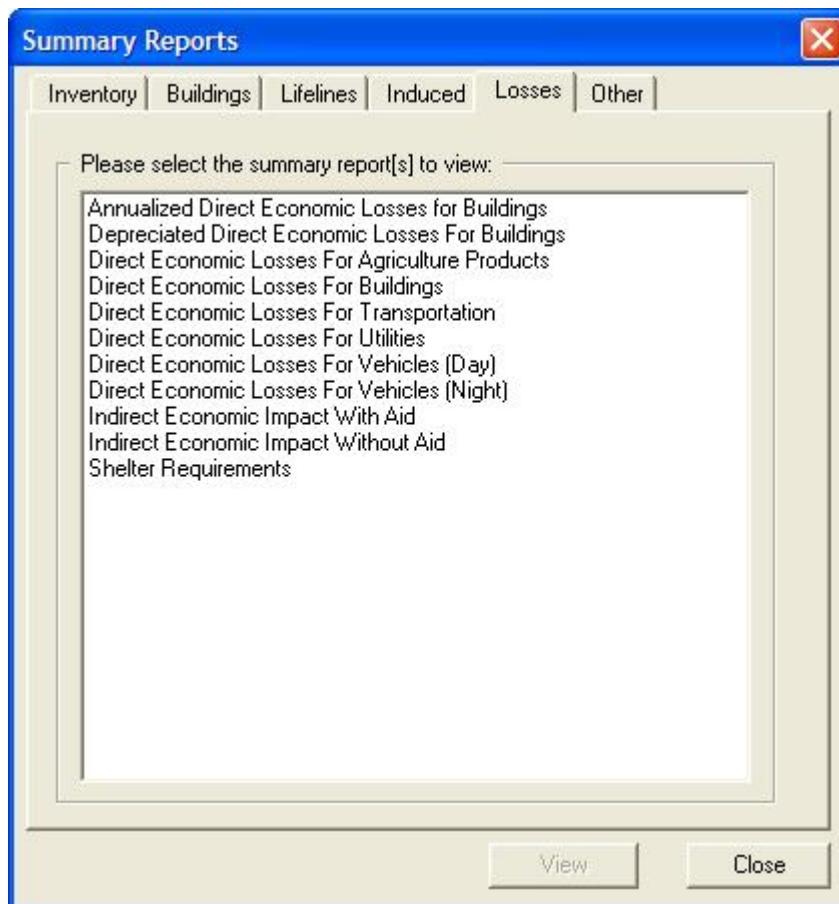


Figure 3-323: HAZUS Results Menu, Summary Reports, Losses Tab

- a. Selection of the Losses tab on the Summary Reports dialog give the user the opportunity to view the economic losses for their scenario analyses. All of the reports are developed in Crystal Reports.
- b. The report options include: Annualized Direct Economic Losses For Buildings, Depreciated Direct Economic Losses For Buildings, Direct Economic Losses For Agriculture Products, Direct Economic Losses For Buildings, Direct Economic Losses For Transportation, Direct Economic Losses For Utilities, Direct Economic Losses For Vehicles (Day), Direct Economic Losses For Vehicles (Night), Indirect Economic Impact With Aid, Indirect Economic Impact Without Aid, and Shelter Requirements.

3.2.8.3.18.11.1. Results Menu, Summary Reports, Losses Tab: Annualized Direct Economic Losses for Buildings

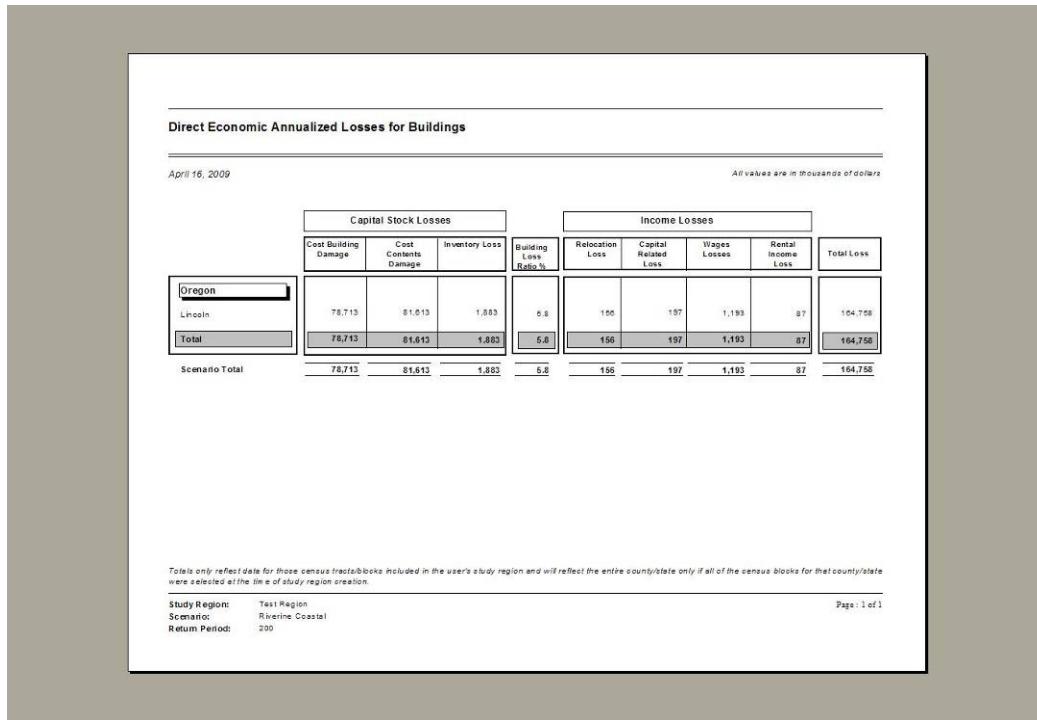


Figure 3-324: HAZUS Results Menu, Summary Reports, Losses Tab, Annualized Direct Economic Losses for Buildings

- Selection of the Annualized Direct Economic Losses for Buildings opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, f1FRGBSEcLossByTotal databases.
- The report uses the view absv_CRDirecEconLossForBldgsAll.

3.2.8.3.18.11.2. Results Menu, Summary Reports, Losses Tab: Depreciated Direct Economic Losses For Buildings

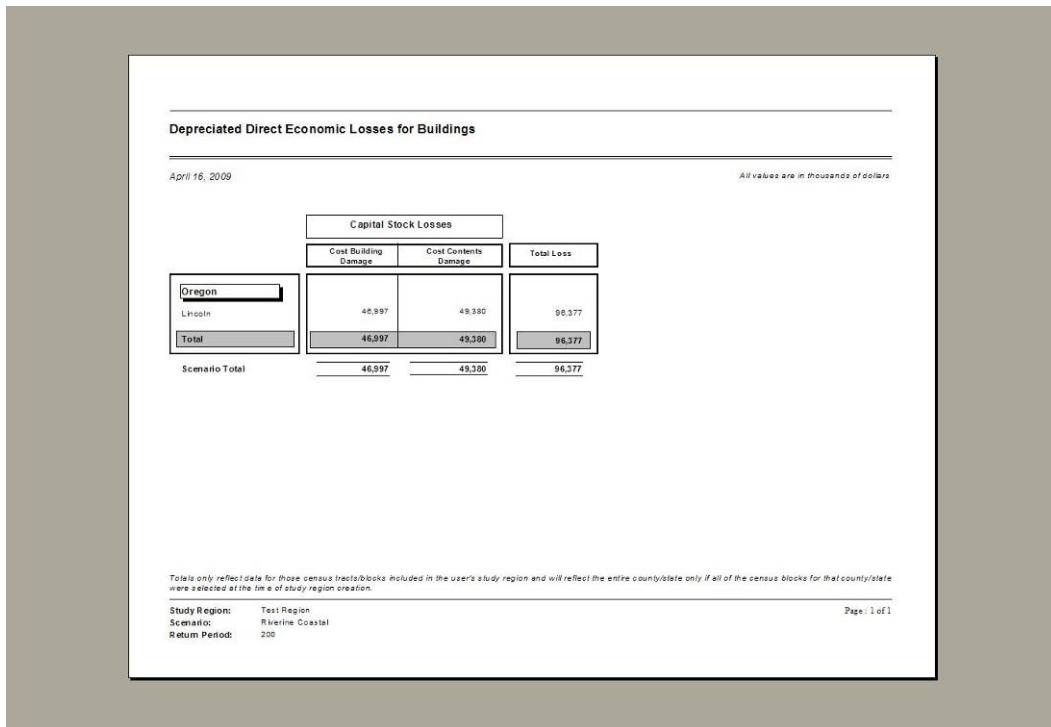


Figure 3-325: HAZUS Results Menu, Summary Reports, Losses Tab, Depreciated Direct Economic Losses For Buildings

- Selection of the Depreciated Direct Economic Losses For Buildings for Buildings opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, and flFRGBSDepLossByTotal databases.
- The report uses the view absv_CRDepEconLossForBldgsAll.

3.2.8.3.18.11.3. Results Menu, Summary Reports, Losses Tab: Direct Economic Losses For Agriculture Products



**Figure 3-326: HAZUS Results Menu, Summary Reports, Losses Tab,
Direct Economic Losses For Agriculture Products**

- a. Selection of the Direct Economic Losses For Agriculture Products opens the Crystal Report shown above.
- b. The report uses hzCounty and flFRAgricultureLossCounty databases.
- c. The report uses the view absv_CRAgricultureProductLoss.

3.2.8.3.18.11.4. Results Menu, Summary Reports, Losses Tab: Direct Economic Losses For Buildings

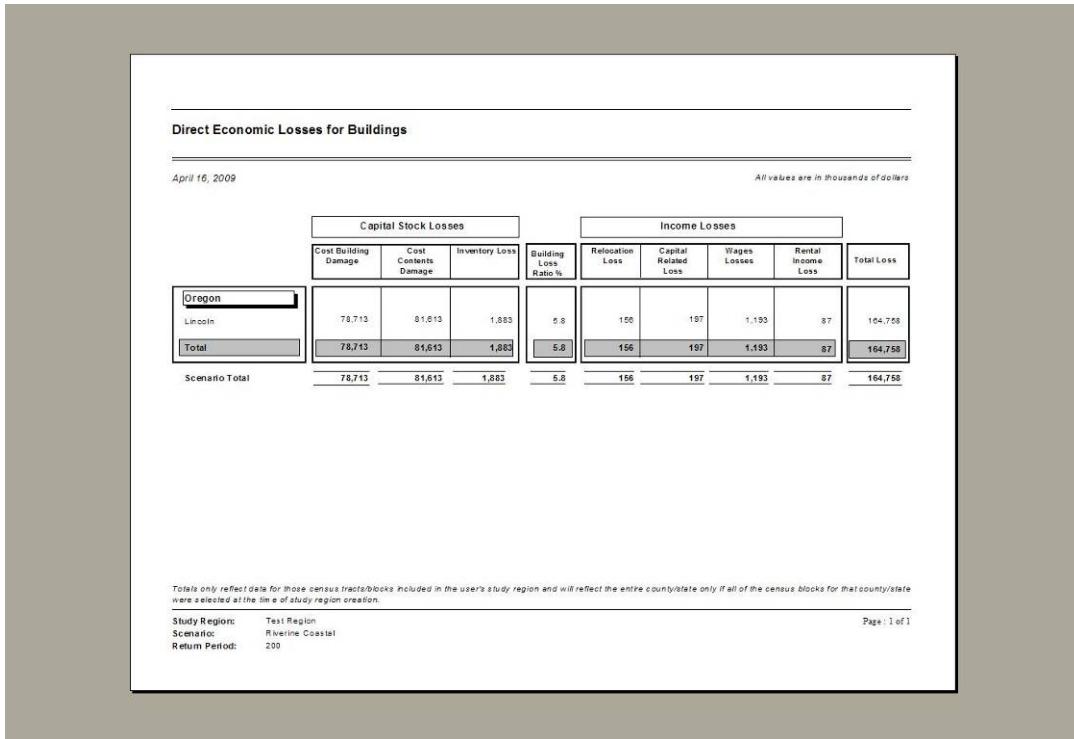


Figure 3-327: HAZUS Results Menu, Summary Reports, Losses Tab, Direct Economic Losses For Buildings

- Selection of the Direct Economic Losses For Buildings opens the Crystal Report shown above.
- The report uses the `hzCounty`, `hzTract`, `hzCensusBlock`, and `f1FRGBSEcLossByTotal` databases.
- The report uses the view `absv_CRDirectEconLossForBldgsAll`.

3.2.8.3.18.11.5. Results Menu, Summary Reports, Losses Tab: Direct Economic Losses For Transportation

Direct Economic Loss For Transportation

April 16, 2009

All values are in thousands of dollars

	Highway	Railway	Light Rail	Bus Facility	Ports	Ferries	Airport	Total
Oregon								
Lincoln								
Highways	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Ditches	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Tunnels	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Facilities	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$0.00							
Total	\$0.00							
Scenario Total	\$0.00							

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-328: HAZUS Results Menu, Summary Reports, Losses Tab, Direct Economic Losses for Transportation

- Selection of the Direct Economic Losses For Transportation opens the Crystal Report shown above.
- The report uses the hzCounty and flFRTTranspLossTotal databases.
- The report uses the view absv_CRTTranspLossTotal.

3.2.8.3.18.11.6. Results Menu, Summary Reports, Losses Tab: Direct Economic Losses For Utilities

Direct Economic Losses for Utilities

All values are in thousands of dollars.

	Potable Water	Waste Water	Oil Systems	Natural Gas	Electric Power	Communication	Total
Oregon							
Lincoln							
Facilities	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Pipelines	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00
Scenario-Total	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region Scenario: Riverine Coastal Return Period: 200 Page: 1 of 1

Figure 3-329: HAZUS Results Menu, Summary Reports, Losses Tab, Direct Economic Losses for Utilities

- Selection of the Direct Economic Losses For Utilities opens the Crystal Report shown above.
- The report uses the hzCounty and f1FRUtilityLossTotal databases.
- The report uses the view absv_CRUtilityLossTotal.

3.2.8.3.18.11.7. Results Menu, Summary Reports, Losses Tab: Direct Economic Losses For Vehicles (Day)

Direct Economic Losses For Vehicles (Day)

April 16, 2009

All values are in dollars.

	Car	Light Truck	Heavy Truck	Total Loss
Oregon				
Lincoln	\$4,100,275	\$1,549,636	\$1,869,051	\$7,518,963
Total	\$4,100,275	\$1,549,636	\$1,869,051	\$7,518,963
Scenario Total	\$4,100,275	\$1,549,636	\$1,869,051	\$7,518,963

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-330: HAZUS Results Menu, Summary Reports, Losses Tab, Direct Economic Losses for Vehicles (Day)

- Selection of the Direct Economic Losses For Vehicles (Day) opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, and fIFRVehicleLoss databases.
- The report uses the view absv_CRVehDirectEcon.

3.2.8.3.18.11.8. Results Menu, Summary Reports, Losses Tab: Direct Economic Losses For Vehicles (Night)

Direct Economic Losses For Vehicles (Night)

April 16, 2009

All values are in dollars.

	Car	Light Truck	Heavy Truck	Total Loss
Oregon				
Lincoln	\$7,514,239	\$2,839,202	\$2,437,258	\$13,790,699
Total	\$7,514,239	\$2,839,202	\$2,437,258	\$13,790,699
Scenario Total	\$7,514,239	\$2,839,202	\$2,437,258	\$13,790,699

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-331: HAZUS Results Menu, Summary Reports, Losses Tab, Direct Economic Losses for Vehicles (Night)

- Selection of the Direct Economic Losses For Vehicles (Night) opens the Crystal Report shown above.
- The report uses the hzCounty, hzTract, hzCensusBlock, and fIFRVehicleLoss databases.
- The report uses the view absv_CRVehDirectEcon.

3.2.8.3.18.11.9. Results Menu, Summary Reports, Losses Tab: Indirect Economic Impact With Aid

Income and Employment Impact (with outside aid)										
April 16, 2009										
Income impact in millions of dollars Employment impact in number of employees Positive values denote a gain; negative values denote a loss										
	Mining	Manufacturing	Trade	Services	Transportation	Finance	Government	Agriculture	Construction	Miscellaneous
								Total		
First Year										
Employment Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income Impact	0.000	0.000	0.007	0.001	0.000	0.000	-0.001	0.000	0.000	0.007
Second Year										
Employment Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income Impact	0.000	0.000	0.004	0.000	0.000	0.000	-0.001	-0.002	-0.001	0.000
Third Year										
Employment Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income Impact	0.000	0.000	0.000	0.001	0.000	0.001	-0.001	-0.002	-0.001	0.000
Fourth Year										
Employment Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income Impact	0.000	0.000	0.000	0.001	0.000	0.001	-0.001	-0.002	-0.001	0.000
Study Region:	Test Region									
Scenario:	Riverine Coastal									
Return Period:	200									
Page: 1 of 2										

Figure 3-332: HAZUS Results Menu, Summary Reports, Losses Tab, Indirect Economic Impact With Aid

- Selection of the Indirect Economic Impact With Aid opens the Crystal Report shown above.
- The report uses the fIELMLossResults database.
- The report uses the view absv_CRIELMWithAid.

3.2.8.3.18.11.10. Results Menu, Summary Reports, Losses Tab: Indirect Economic Impact Without Aid

Income and Employment Impact (without outside aid)									
April 16, 2009									
Income in past in millions of dollars Employment in past in number of employees Positive values denote a gain, negative values denote a loss									
	Mining	Manufacturing	Trade	Services	Transportation	Finance	Government	Miscellaneous	Total
	Agriculture	Construction							
First Year									
Employment Impact	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000	0.000
Income Impact	0.000	0.500	0.110	0.021	0.000	0.007	0.000	0.000	0.000
Second Year									
Employment Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income Impact	0.000	0.500	0.549	0.310	0.000	0.003	0.000	0.000	0.000
Third Year									
Employment Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income Impact	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.000
Fourth Year									
Employment Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income Impact	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.000
Fifth Year									
Employment Impact	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Income Impact	0.000	0.000	0.000	0.001	0.000	0.003	0.000	0.000	0.000

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region: Test Region
Scenario: Riverine Coastal
Return Period: 200

Page: 1 of 1

Figure 3-333: HAZUS Results Menu, Summary Reports, Losses Tab, Indirect Economic Impact Without Aid

- Selection of the Indirect Economic Impact Without Aid opens the Crystal Report shown above.
- The report uses the fIELMLossResults database.
- The report uses the view absv_CRIELMWithOutAid.

3.2.8.3.18.11.11. Results Menu, Summary Reports, Losses Tab: Shelter Requirements

Shelter Summary Report		
April 16, 2009		
	# of Displaced People	# of People Needing Short Term Shelter
Oregon		
Lincoln	2,328	1,339
Total	2,328	1,339
Scenario Total	2,328	1,339

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Figure 3-334: HAZUS Results Menu, Summary Reports, Losses Tab, Shelter Requirements

- a. Selection of the Shelter Requirements opens the Crystal Report shown above.
- b. The report uses the hzCounty, hzTract, hzCensusBlock, flStudyCaseBlocks, and flFRSHELTER databases.
- c. The report uses the view absv_CRSHELTER.

3.2.8.3.18.12. Results Menu, Summary Reports, Other Tab

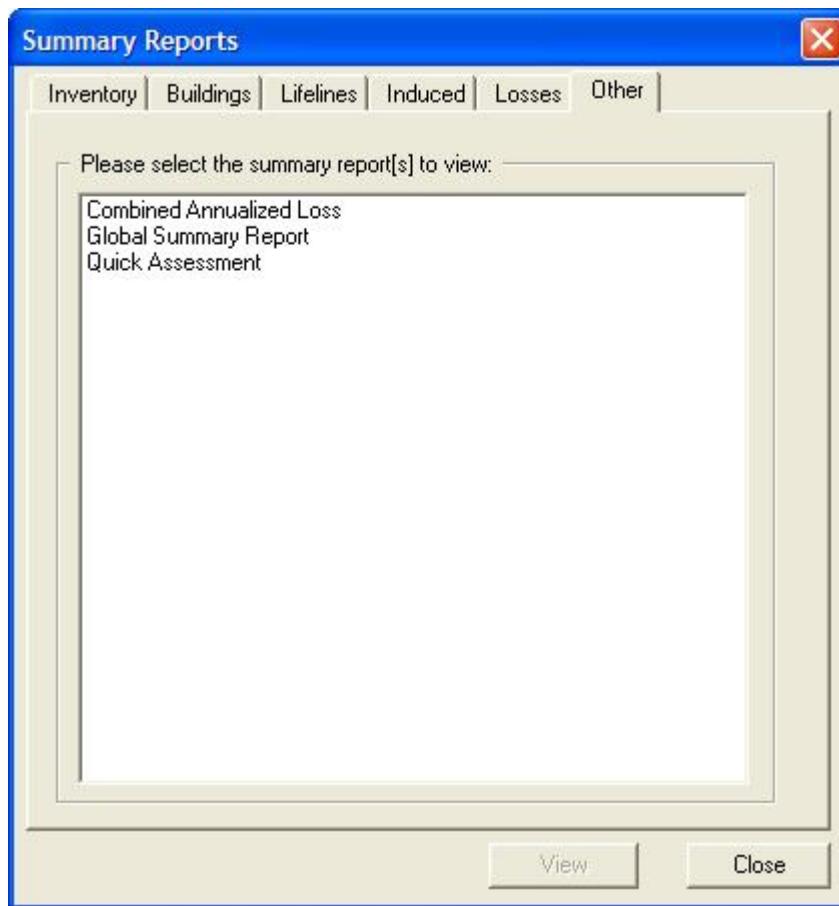
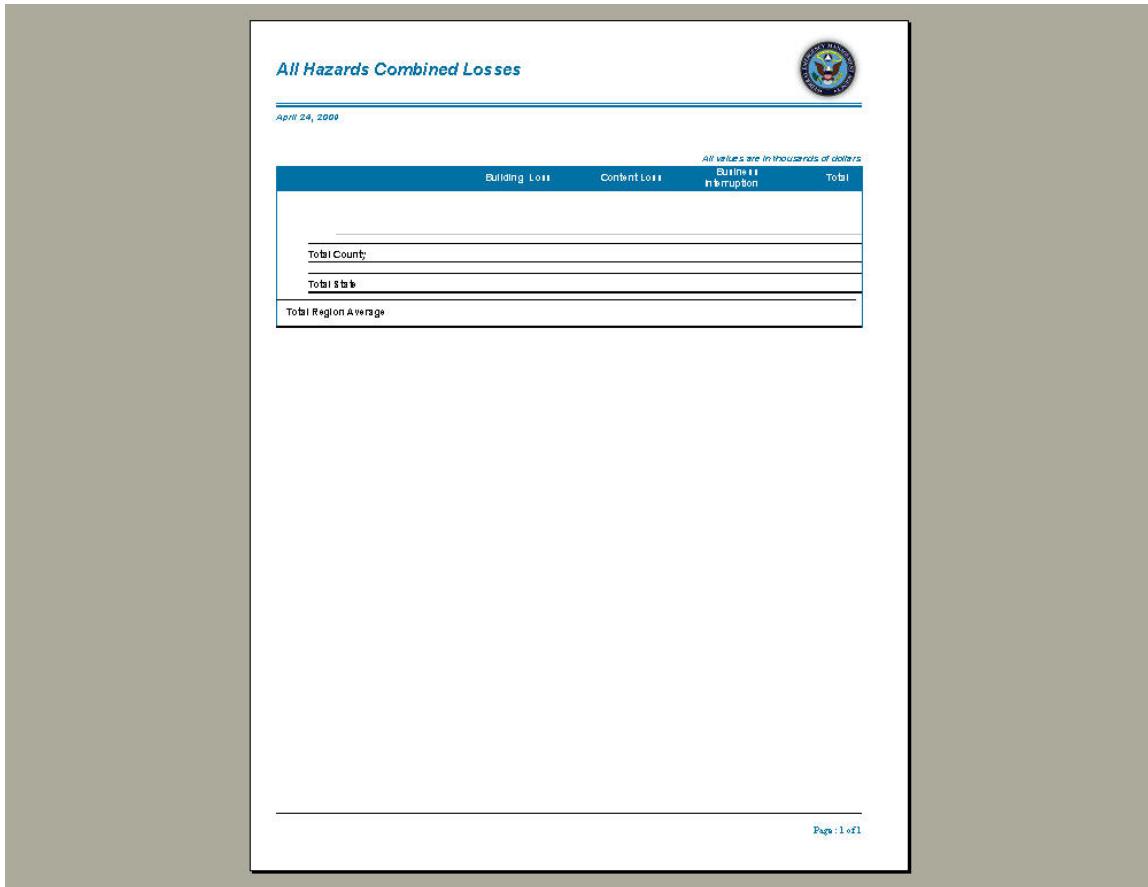


Figure 3-335: HAZUS Results Menu, Summary Reports, Other Tab

- a. Selection of the Other tab on the Summary Reports dialog give the user the opportunity to view the reports that do not fall within the definitions of the other tabs. All of the reports are developed in Crystal Reports.
- b. The report options include Combined Annualized Loss, Global Summary Report, and Quick Assessment.

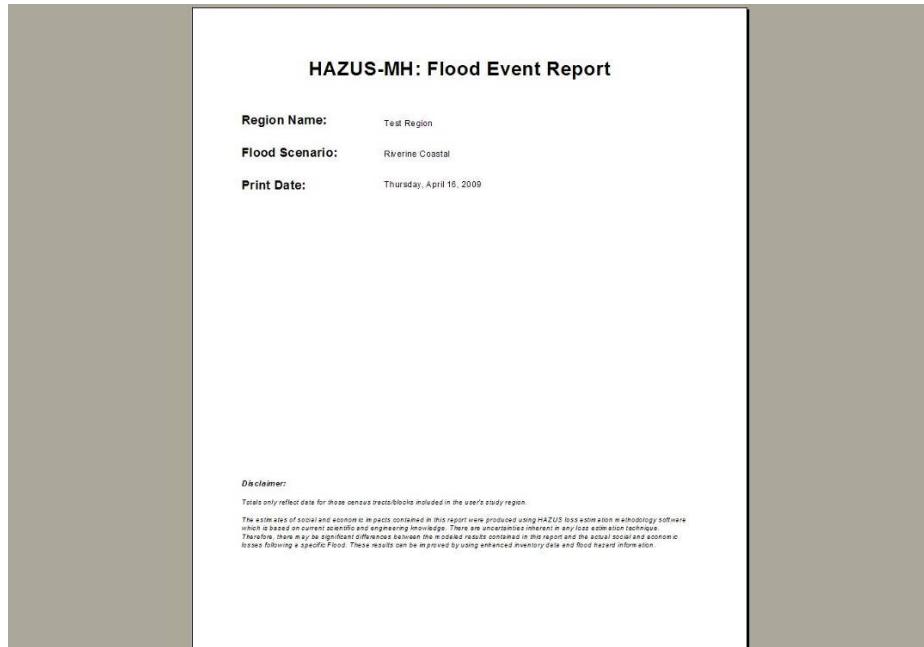
**3.2.8.3.18.12.1. Results Menu, Summary Reports, Other Tab:
Combined Annualized Losses**



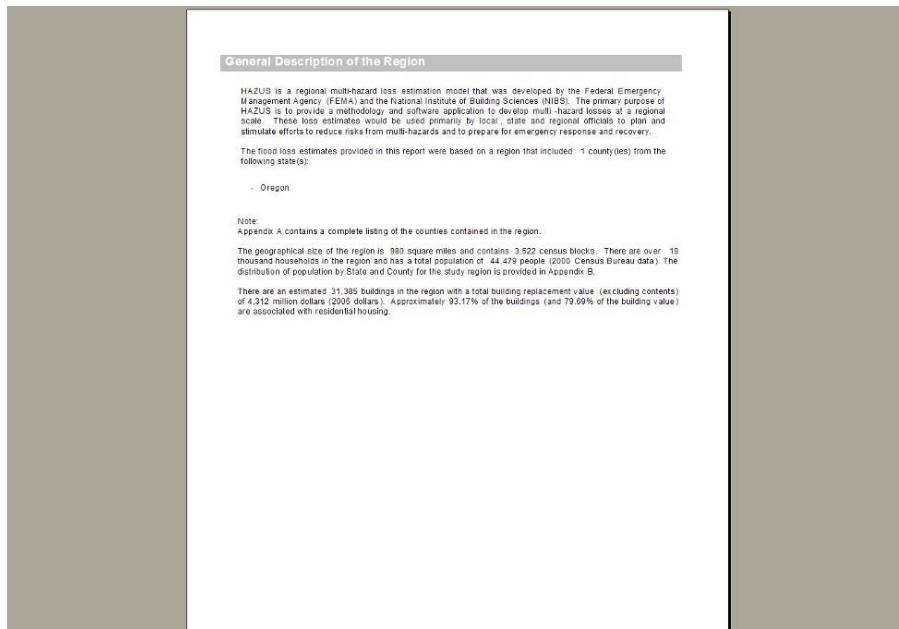
**Figure 3-336: HAZUS Results Menu, Summary Reports, Other Tab,
Combined Annualized Losses**

- a. Selection of the Combined Annualized Losses opens the Crystal Report shown above.
- b. The report uses databases that are not accessible by the Flood Model.
- c. The report uses the view dtp_RptCombinedAAL.

**3.2.8.3.18.12.2. Results Menu, Summary Reports, Other Tab:
Global Summary Report**



**Figure 3-337: HAZUS Results Menu, Summary Reports, Other Tab,
Global Summary Report (Cover Page)**



**Figure 3-338: HAZUS Results Menu, Summary Reports, Other Tab,
Global Summary Report (Page 3)**

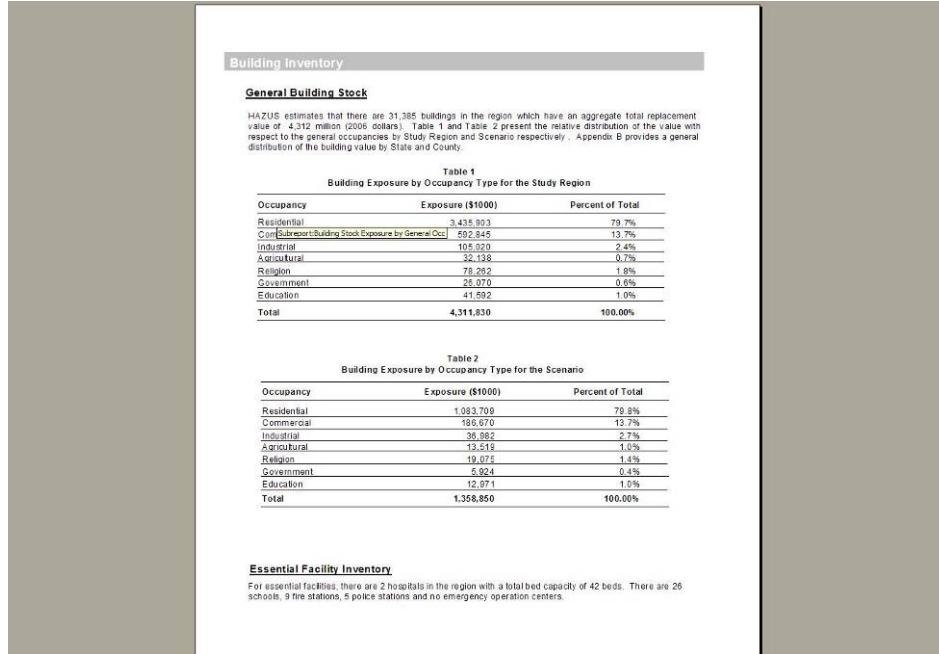


Figure 3-339: HAZUS Results Menu, Summary Reports, Other Tab, Global Summary Report (Page 4)

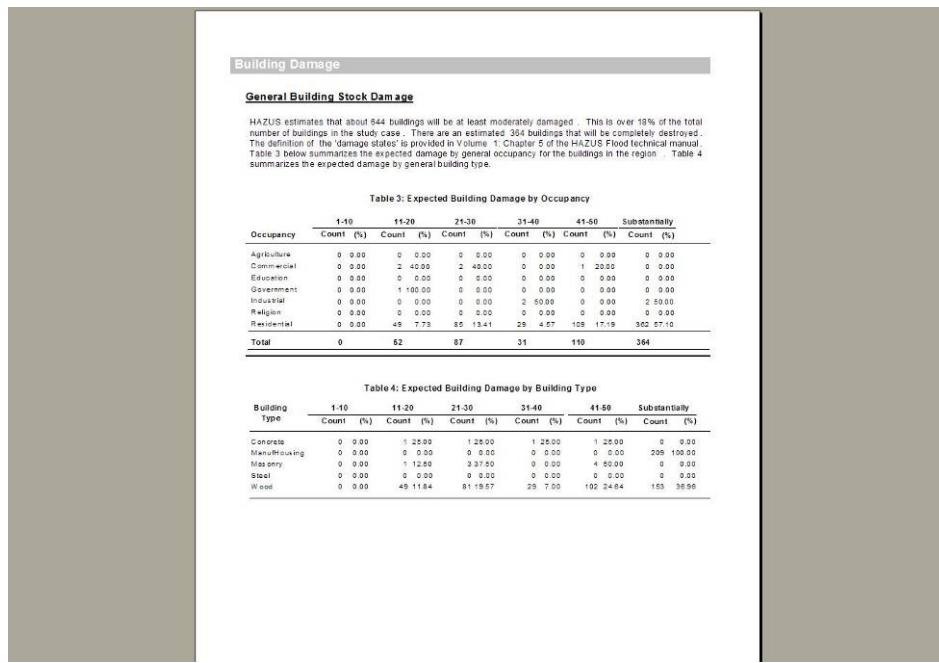


Figure 3-340: HAZUS Results Menu, Summary Reports, Other Tab, Global Summary Report (Page 6)

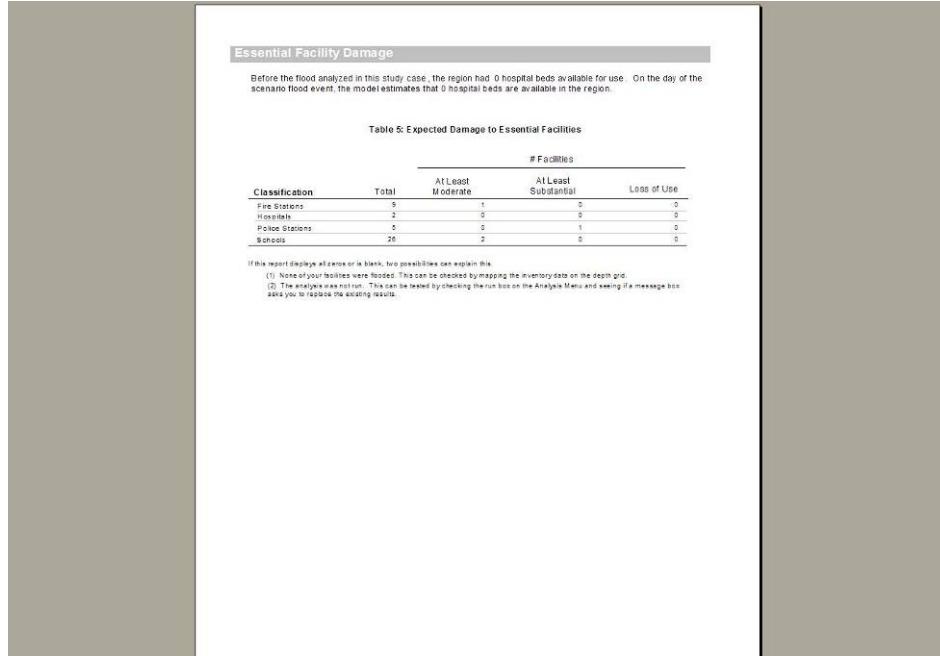


Figure 3-341: HAZUS Results Menu, Summary Reports, Other Tab, Global Summary Report (Page 7)

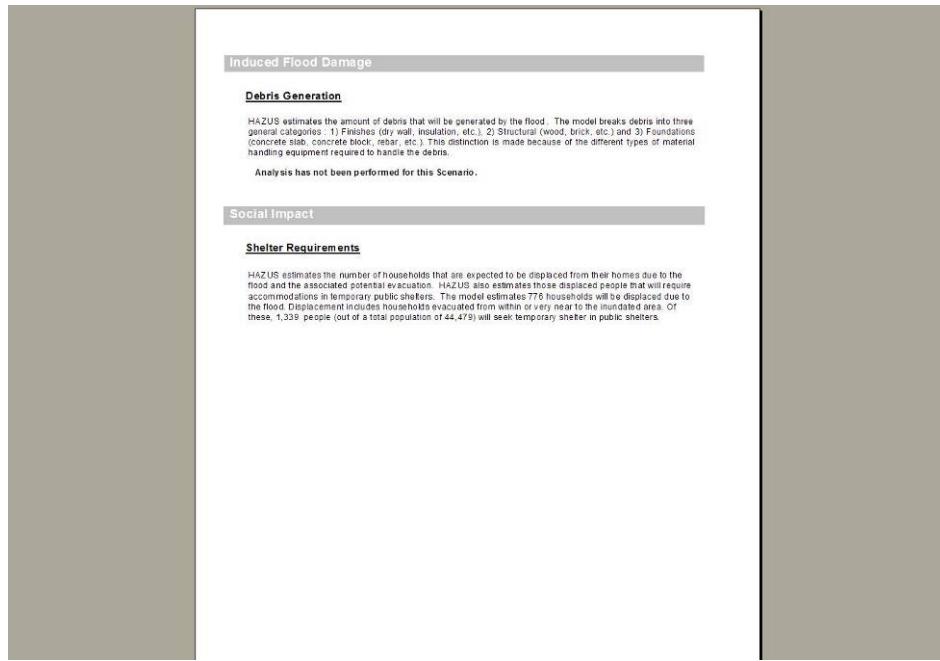


Figure 3-342: HAZUS Results Menu, Summary Reports, Other Tab, Global Summary Report (Page 8)

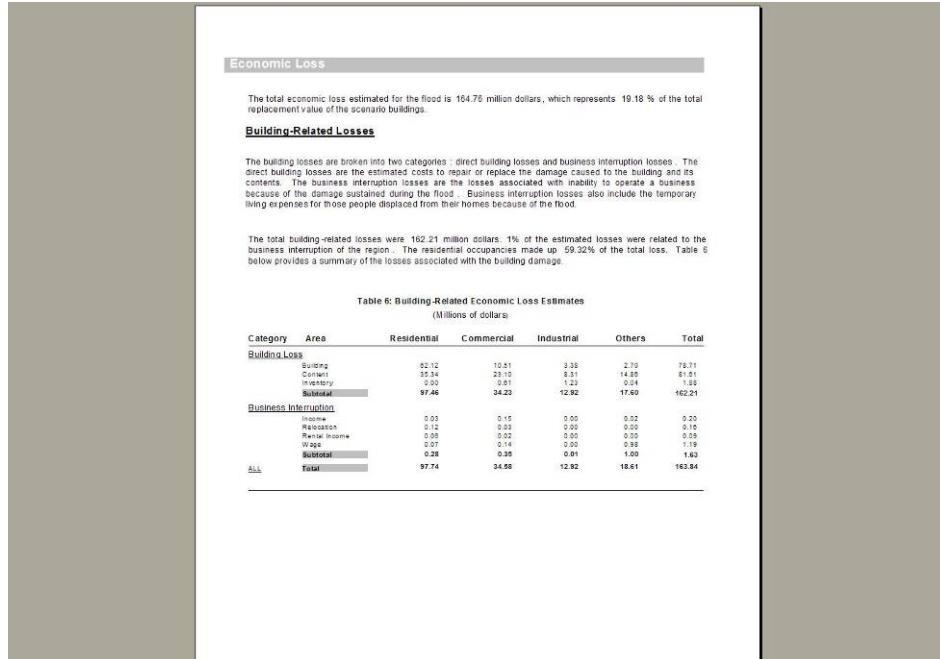


Figure 3-343: HAZUS Results Menu, Summary Reports, Other Tab, Global Summary Report (Page 9)

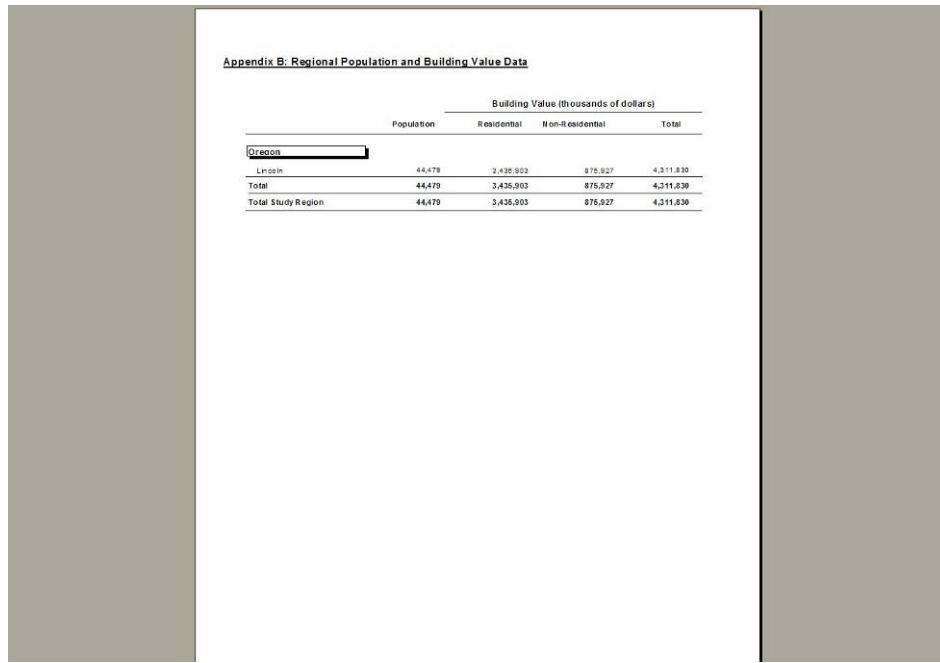


Figure 3-344: HAZUS Results Menu, Summary Reports, Other Tab, Global Summary Report (Page 11)

- a. Selection of the Global Summary Report opens the Crystal Report shown above. Pages with text only were omitted from the pictures to save space.
- b. The report uses the hzCounty, hzTract, hzCensusBlock, f1StudyCase, f1StudyCaseParms, f1StudyCaseBlocks, hzExposureOccupB, hzDemographicsB, hzExposureContentOccupB, f1FRGBSDmgCountGBldgType, f1FRGBSDmgCountGOccupB, f1FREssntFltyLossTotal, f1CREssntFlty, f1FRGBSEcLossByGOCcupT, f1FRGBSEcLossByTotal, f1FRDebris, f1FRShelter, databases.
- c. The report uses the views absv_CRSStudyCase, absv_CRIvGBSExposureGOccupAll, absv_CRIvGBSExposureGOccupAllSC, absv_CRGBSDmgCountGBldgType, absv_CRGBSDmgCountGOccupAll, absv_CREssntGlobalDmg, absv_CRIvGBSExposureGOccupAll, absv_CREconomicLossByGOccupT, absv_CRDDirectEconLossForBldgsAll, absv_CRDebris, absv_CRSshelter, and absv_CRhzCounty.

3.2.8.3.18.12.3. Results Menu, Summary Reports, Other Tab: Quick Assessment

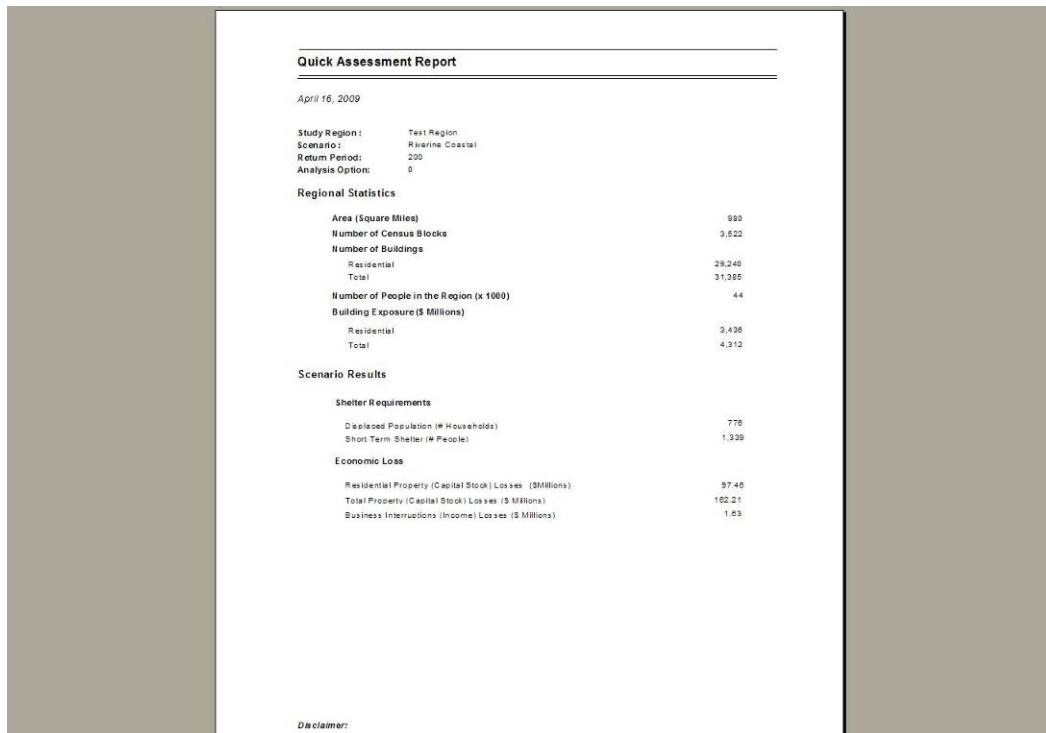


Figure 3-345: HAZUS Results Menu, Summary Reports, Other Tab, Quick Assessment

- a. Selection of the Quick Assessment opens the Crystal Report shown above.

- b. The report uses the hzCensusBlock, hzDemographicsB, hzBldgCountOccupB, hzExposureOccupB, and hzBldgCountGBldgTypeB databases.
- c. The report uses the view absv_CRFISummaryGenData.

3.2.8.3.18.12.4. Bookmarks Menu

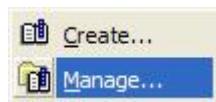


Figure 3-346: HAZUS ArcGIS Bookmarks Menu

- a. The Bookmarks Menu is ESRI's ArcGIS standard menu.
- b. The ArcGIS menu items include Create and Manage.

3.2.8.3.18.12.5. Insert Menu



Figure 3-347: HAZUS ArcGIS Insert Menu

- a. The Insert Menu is ESRI's ArcGIS standard menu.
- b. The ArcGIS menu items include Data Frame, Title, Text, Neatline, Legend, North Arrow, Scale Bar, Scale Text, Picture, and Object.

3.2.9. Selection Menu or Query Menu

The selection menu provides functionality in the earthquake model, while the query menu provides similar functionality in the hurricane and flood models plus additional options.

3.2.9.1. Selection Menu Available in Earthquake Model

- a. The selection menu allows the user to perform queries on either results or inventory data that is part of the study region layers.
- b. This feature implements mostly standard ArcMap functionality and includes the following features:
 - Select by attributes
 - Select by location
 - Select by graphics
 - Zoom to selected features
 - Statistics
 - Set selected layers
 - Clear selected features
 - Interactive selection method with the sub-options: create new selection, add to current selection, remove from current selection, and select from current selection
 - Options



Figure 3-348: HAZUS Selection Menu

- The Selection Menu is ESRI's ArcGIS standard menu with the exception of a single HAZUS menu item.
- The ArcGIS menu items include Select By Attributes, Select By Location, Select By Graphics, Zoom To Selected Features, Pan To Selected Features, Statistics, Set Selectable Layers, Clear Selected Features, Interactive Selection Method, and Options
- The HAZUS specific menu item includes Hazus Query Wizard. This menu item calls functions developed by DTI.

Table 3-24: Selection Menu Attributes Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Select by attributes	P/I	C	H	H	
Select by location	P/I	U	L/H	H	
Select by graphics	P/I	U	L/H	H	
Zoom to selected graphics	A	U	L	L	
Set selectable layers	P/I	U	L/H	H	
Clear selected features	P/I	U	L/H	H	
Interactive selection method	P/I	U	L/H	H	

3.2.9.2. Query Menu Available in Hurricane Model

The functionality of the query menu will be common to all three hazards and shall be provided by the HAZUS application shell.

3.2.9.3. Query Menu Available in Flood Model

- a. The query menu allows the user to perform an analysis on results or inventory data that have been thematically mapped on the active window.
- b. The menu shall provide features for Query, Select by theme, Select all, Clear selected, Find and calculate statistics.

3.2.9.3.1. Query

- a. This menu item requires an active map in order to provide functionality.
- b. This feature shall allow users to query the active map. Selection of this feature activates a pop-up user interactive query manager that is standard with ArcView.
- c. It is unclear how this feature shall change within ArcGIS and the ADO/SQL server database.
- d. This feature shall be preserved in the new HAZUS architecture.

3.2.9.3.2. Select By Theme

- a. This menu item requires an active map in order to provide functionality.

- b. This feature allows the user to perform a variety of standard GIS analysis on the active layers. This feature is a standard ArcView functionality.
- c. It is unclear how this feature shall change within ArcGIS.
- d. This feature shall be preserved in the new HAZUS architecture.

3.2.9.3.3. Select All

- a. This menu item is active when no active map layer is present, but it does not perform a function. When an active map layer is present, Select all will select all features; this is standard for ArcView.
- b. It is unclear how this feature will change within ArcGIS.
- c. This feature will be preserved in the new HAZUS architecture.

3.2.9.3.4. Clear All

- a. This menu item becomes active when the Select all feature has been used. This feature serves to clear the selection from the shape file.
- b. This feature shall be preserved in the new HAZUS architecture.

3.2.9.3.5. Find

- a. Issue: Discussions with DTI are required to determine the scope of functionality of this feature. The feature is active at all times, but where the search functions operate is not clear.

3.2.9.3.6. Calculate Statistics

- a. This feature requires an active layer before functionality is provided. This feature will automatically calculate statistics for the data table and column selected in the map.
- b. Selection of this item shall cause a pop-up menu to appear with the dbf file from which the map layer was created.
- c. The pop-up menu shall have two command buttons: OK and Cancel.

- d. If the user selects OK, results are displayed. The pop-up information panel shows the table name (dbf file name), the column that was selected for the map, and the relevant statistics including: Count, Minimum, Maximum, Range, Sum, Mean, Variance, Standard Deviation.

Table 3-25: Query Menu Attribute Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Query Menu	P	C			
Query	P	C			
Select by theme	P	C			
Select all	P	C			
Clear all	P	C			
Find	P	C			Further definition of this feature is required.
Calculate statistics	P	C			

3.2.10. Tools Menu



Figure 3-349: HAZUS Tools Menu

- a. The Selection Menu is ESRI's ArcGIS standard menu with the exception of a single HAZUS menu item.
- b. The ArcGIS menu items include Editor Toolbar, Graphs, My Places, Online Services, Macros, Customize, Extensions, Styles, and Options.

- c. The HAZUS specific menu item includes the Flood Options, which was developed by ABS Consulting.

3.2.10.1. Earthquake Model

This menu allows access to standard ArcMap features:

- Editor toolbar
- Graphs with sub-options: create, manage, and load
- Styles with sub-options: style references, style manager, export map styles
- Options

Table 3-26: Tools Menu Attributes Ranking by Features

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Editor Toolbar	A	C	H	M	
Graphs	PI	U	L/H	H	
Styles	PI	U	L/H	H	
Options	PI	U	L/H	H	

3.2.10.2. Flood Model

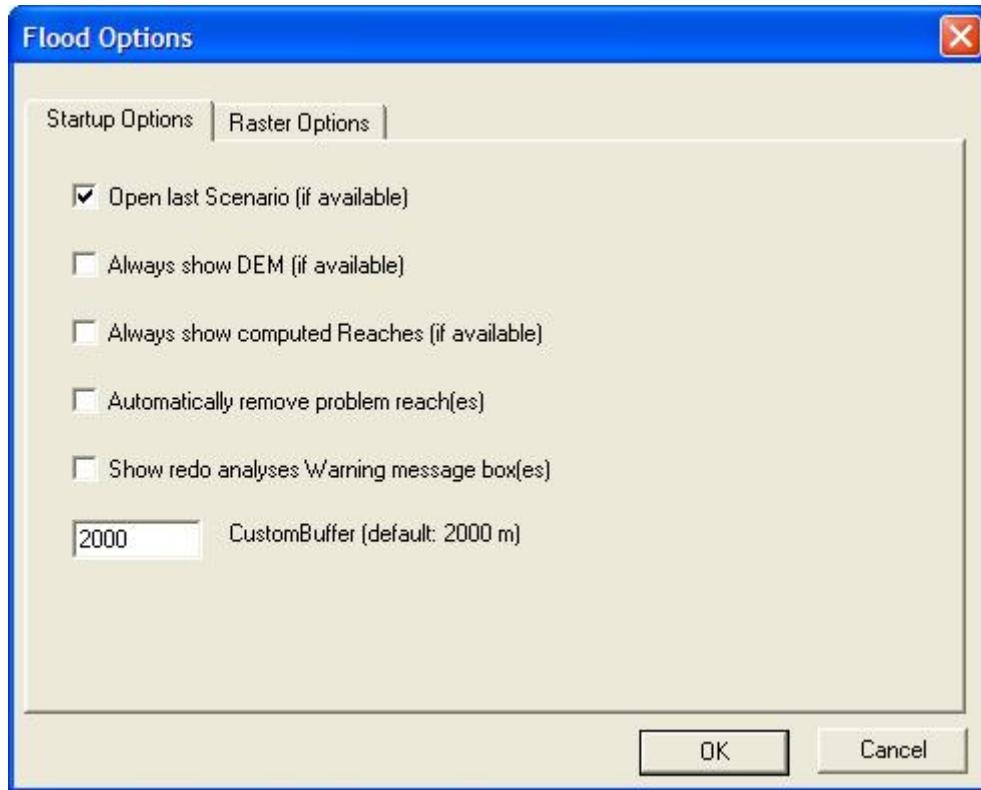


Figure 3-350: HAZUS Tools Menu: Flood Options Dialog, Startup Tab

- a. Selection of Flood Options on the Tools Menu opens the dialog shown above. This dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to customize how the HAZUS Flood Model opens on startup and the raster view options. The dialog has the following features:
 - a. The dialog has two tabs labeled Startup Options and Raster Options. The Startup tab is the default.
 - b. The dialog does not have combo boxes.
 - c. The dialog does not have radio buttons.
 - d. The dialog has five check boxes on the Startup Options tab and one check box on the Raster Options tab.
 - e. The dialog does not have any data grids.

- f. The dialog has a single editable text box on both tabs.
 - g. The dialog has command buttons labeled OK and Cancel.
- b. The dialog has five check boxes on the Startup Options tab. These check boxes provide the user with the following startup options.
- a. Open Last Scenario (if available). This option will automatically store the last open scenario and open the scenario when the study region is opened.
 - b. Always show DEM (if available). This option will place the DEM in the table of contents and display the DEM with the hillshade and value gradation.
 - c. Always show computed Reaches (if available). This option is similar to the show DEM option. It preserves the chosen and computed reaches (and shorelines) in the table of contents and displays them in the standard HAZUS format.
 - d. Show redo analysis Warning message box(es). This option is designed to allow the user to turn on and off analysis warning messages.
- c. The dialog has a single editable text box that allows the user to set a custom buffer on the study region. The default value is set to 2,000 meters.
- d. Selection of the command button OK closes the Flood Options dialog, saves any changes made by the user so the options are enabled, and returns the user to the base map view.
- e. Selection of the command button Cancel closes the Flood Options dialog, discards any changes made by the user, and returns the user to the base map view.

3.2.10.2.1. Tools Menu: Flood Options Dialog, Raster Options Tab

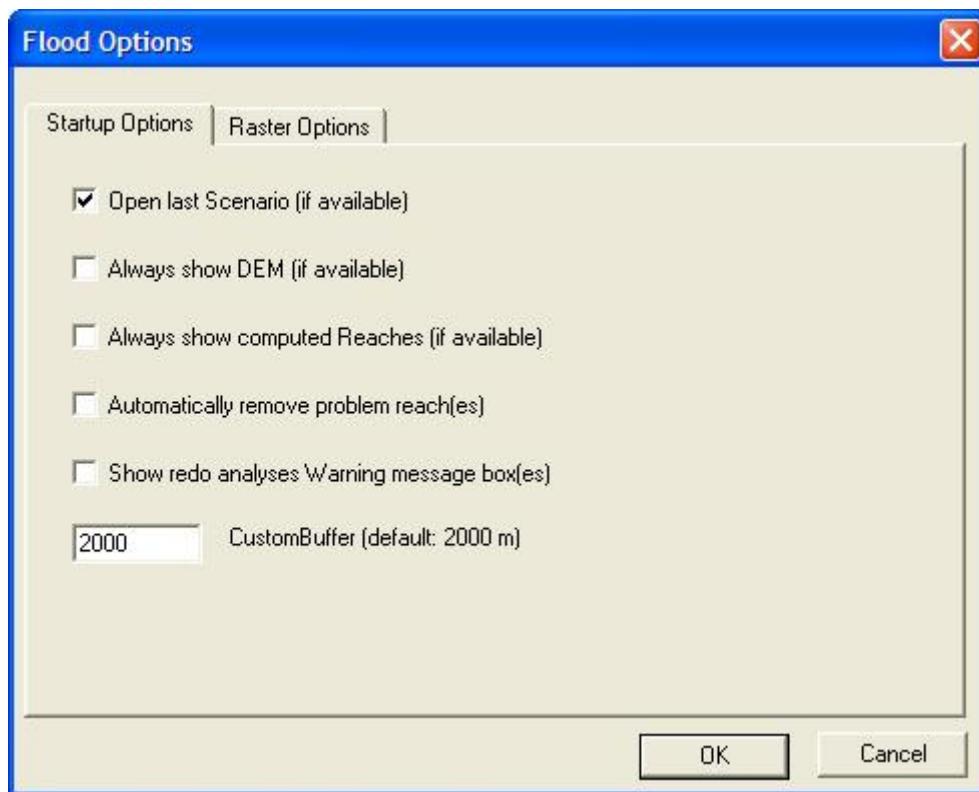


Figure 3-351: HAZUS Tools Menu: Flood Options Dialog, Raster Options Tab

- a. Selection of the Raster Options tab on the Flood Options dialog opens the view shown above. This dialog is based on the standard HAZUS Flood dialog and is designed to allow the users to customize how the HAZUS Flood Model opens on startup and the raster view options. The dialog has the following features:
 - a. The dialog has two tabs labeled Startup Options and Raster Options. The Startup tab is the default.
 - b. The dialog does not have combo boxes.
 - c. The dialog does not have radio buttons.
 - d. The dialog has one check box on the Raster Options tab.
 - e. The dialog does not have any data grids.

- f. The dialog has a single editable text box on both tabs.
 - g. The dialog has command buttons labeled OK and Cancel.
- b. The dialog has a single editable text box labeled Default raster transparency with the default value set to 50%. The dialog lets the user know that the options are 0% to 100%.
- c. The dialog has a single check boxes labeled Automatically Merge multiple DEM paths without asking. This dialog is designed to reduce the number of messages the user gets from ArcGIS. The option allows HAZUS to merge multiple DEM paths into a single DEM for the study region.
- d. Selection of the command button OK closes the Flood Options dialog, saves any changes made by the user so the options are enabled, and returns the user to the base map view.
- e. Selection of the command button Cancel closes the Flood Options dialog, discards any changes made by the user, and returns the user to the base map view.

3.2.10.3. Tools Menu Not Available in Hurricane Model

3.2.11. Map Menu

3.2.11.1. Map Menu Not Available in Earthquake Model

3.2.11.2. Map Menu Available in Hurricane Model

- a. The map menu shall have the following options:
 - Study region boundaries
 - Study region counties
 - Study region tracts
 - Default surface roughness map
- b. The user shall be able to overlay a pre-defined map of the default surface roughness on the study region.

- c. The user shall be able to overlay a pre-defined map of 10-, 20-, 50-, 100-, 200-, 500-, or 1,000-year return period wind speeds on the study region.

3.2.11.3. Map Menu Available in Flood Model

3.2.11.3.1. Create Thematic Map

- a. This feature is active when a shape (ArcView version) file has been opened and the file has an attribute that can be displayed thematically. This useful feature shall be maintained in the new HAZUS architecture.

3.2.11.3.2. Modify Thematic Map

- a. This menu shall allow the non-GIS user to access the GIS functionality to modify the thematic map. Level 2 and Level 3 users are likely to bypass this capability in favor of the “double-click” access via the layer control column. This feature, while a duplication of existing GIS functionality, is useful to the non-GIS user.
- b. The pop-up menu activated by this selection shall display all active map layers to select the thematic layer to be modified.
- c. The pop-up menu shall have command buttons to OK the selection or Cancel the process.

3.2.11.3.3. Change View

- a. This menu item shall allow the user to perform simple display modifications to the active map window.
- b. As with the zoom buttons on the toolbar, the user shall be able to use this menu to zoom in or out on the active map.
- c. The user shall also be able to shift the visible map left or right (changing the X coordinates) or shift the map up or down (changing the Y coordinates).
- d. This functionality will be maintained in the new HAZUS architecture.

3.2.11.3.4. Previous View

- a. This menu item shall allow the user to quickly restore the active map window to the previous view. This item is useful if the user makes a typographical error when using the functionality discussed in the Change View functionality of this map menu. This menu provides an alternative path to existing GIS functionality.
- b. This functionality will be maintained in the new HAZUS architecture.
- c. Modifications are required.

3.2.11.3.5. View Entire Layer

- a. This menu item shall allow the user to quickly restore the active map window to show the entire map layer. As with previous menu items, this feature is an alternative path to existing GIS functionality.
- b. This functionality shall be maintained in the new HAZUS architecture.
- c. The menu item has two periods following the text, implying the capability of additional user input or menus. Neither is available, and the periods shall be removed.
- d. Modifications are required.

3.2.11.3.6. Study Region Boundary

- a. This menu item shall allow the user to map the study region boundary. This menu seems frivolous because the study region boundary is the main shape file that is opened when the user selects or creates the study region. This menu might have better functionality with the recommendations below.
- b. The menu should be modified to read “Study Region Political Boundaries.” This will allow the user, who may be at sub-county or sub-city, to add layers that help define the location of the study region within the political boundaries of Cities, Counties, or States.
- c. This menu will have additional functionality than is currently provided. The study region boundary is defined and carried by the model as part of accessing the model’s functionality.

- d. It should be helpful to users to view political boundaries that are larger than the flood model study region.
- e. Modifications are required.

3.2.11.3.7. Study Region Political Boundaries

- a. This menu item shall be added to allow users of all three models to view political boundaries (either the baseline supplemental data or user supplied). For example, political boundaries of interest include County (supplied), State (supplied), City (not supplied), Senate District (not supplied), Congressional District (not supplied), State Senate District (not supplied), and State Assembly District (not supplied). Users are likely to be interested in other local political boundaries and should be able to easily supply them.
- b. Users shall access a browse window allowing them to select the political boundary or user-supplied data they are interested in.
- c. A folder shall be supplied to allow the user to place the data layers in an easily locatable and retrievable location.
- d. This menu feature does not exist.
- e. New functionality is required.

3.2.11.3.8. Study Region Census Tracts

- a. This menu item allows the user to quickly display the census tracts used by the earthquake model. The flood model will require additional functionality due to the different resolution required.
- b. It is recommended that the menu item be modified to “Study Region Census Boundaries” and then have a sub-menu that allows the user to select between Census Tract, Census Block Group, and Census Block.
- c. The flood model shall require the capability of viewing all three boundaries.
- d. The flood model shall require the capability to view Census Blocks and Census Block Groups as well as Tract boundaries.

- e. Modifications are required.

3.2.11.3.9. Study Region Census Boundaries

- a. This menu item shall be added to allow users of all three models to view census boundaries. Earthquake and wind users will typically work with census tract boundaries but may want to view census block groups or census blocks. Likewise, flood users will typically work with census block boundaries but may want to view larger census boundaries. Census boundaries shall be supplied with the model.
- b. Users shall access a browse window allowing them to select the census boundary they are interested in.
- c. This menu feature does not exist.
- d. New functionality is required.

3.2.11.3.10. Earthquake

- a. This menu item allows the earthquake user to access earthquake-specific maps via a sub-menu with the following tabs: Soil Type, Liquefaction Susceptibility, Landslide Susceptibility, and Ground Water Depth.
- b. For the sake of model integration and multi-hazard display, it is recommended that this menu be modified to “Other Hazard Maps...” with a sub-menu to select earthquake, hurricane, and flood maps. A pop-up menu below this menu shall allow the user to browse and select hazard maps. It is recommended that the user have access to user-supplied maps such as faults, historic storm tracks, and Q3 maps.
- c. This menu shall be removed and a new menu created.
- d. Users shall have access to hazard maps used by the other models, allowing them to gain insight on potential hazard interaction.
- e. Current functionality shall be removed.

3.2.11.3.11. Inundation Maps

- a. This menu item allows the earthquake model user to access maps of secondary damage sources such as Dam, Tsunami, Seiche, Levee that may fail or be caused by an earthquake. This menu item does not supply information to the flood model user and is likely to be confusing. As stated, this menu is hazard-specific and should be removed from flood and hurricane user views.
- b. This menu shall be removed and a new menu created.
- c. Users shall have access to hazard maps used by the other models, allowing them to gain insight on potential hazard interaction.
- d. Current functionality shall be removed.

3.2.11.3.12. FEMA Q3

- a. This menu item allows the user to quickly access the FEMA Q3 maps. For the flood model, this is a useful menu item; however, for other models, this feature has limited usefulness.
- b. This menu shall be removed and a new menu created.
- c. Users shall have access to hazard maps used by the other models, allowing them to gain insight on potential hazard interaction.

3.2.11.3.13. FEMA Floodways

- a. This menu item should allow the user to map the FEMA Floodways.
- b. This menu shall be removed and a new menu created.
- c. Users shall have access to hazard maps used by the other models allowing them to gain insight on potential hazard interaction..

3.2.11.3.14. SLOSH Basins

- a. This menu item allows the user to quickly access files created by the SLOSH program. For the flood model, this is a useful menu item; however, for other models, this feature has limited usefulness.

- b. This menu shall be removed and a new menu created.
- c. Users shall have access to hazard maps used by the other models, allowing them to gain insight on potential hazard interaction.

3.2.11.3.15. Inland Hurricane Speed Model

- a. This menu item allows the user to quickly access the hurricane model maps. For the hurricane model, this may be a useful menu item; however, for other models, this feature has limited usefulness.
- b. This menu shall be removed and a new menu created.
- c. Users shall have access to hazard maps used by the other models, allowing them gain insight on potential hazard interaction.

3.2.11.3.16. Elevation Contours (10 m)

- a. This menu item allows the user to access the baseline contours provided with the current HAZUS supplemental data. For the flood model, this data is not usable and may be confusing to Level 1 users. Additionally, the baseline elevation data for flood model users is the NED-H. The users shall have directions for accessing the USGS Web site and downloading the NED-H 7.5-minute quads for their study region.
- b. It is recommended that this feature be removed for flood model users. Earthquake and hurricane model contractors will need to determine the usefulness for their purposes.
- c. This menu shall be removed and a new menu created.
- d. Users shall have access to hazard maps used by the other models, allowing them to gain insight on potential hazard interaction.

3.2.11.3.17. Land Use/Land Cover

- a. This menu item allows the user to access the baseline maps of land use and land cover supplied on the supplemental data CD-ROMs.
- b. Remove current functionality.

3.2.11.3.18. Other Hazard Maps

- a. This menu item shall be added to allow users of all three models to view hazard maps, especially those of the other hazards models. For example, a flood model user may want to view the USGS Project 97 probability map. Hurricane users may want to overlay damage estimates with FEMA Q3 to identify potential problem areas.
- b. Users shall access a browse window, allowing them to select the hazard maps they are interested in. Each hazard should have a folder within the browse window to allow easy identification of the hazard maps and also allow the user a single location to store user-supplied hazard data (such as soil maps within an earthquake folder).
- c. New functionality is required.

3.2.11.3.19. Other Geographic Data Maps

- a. This menu item shall be added to allow users of all three models to view general geographic map such as Land Use/Land Cover. These maps provide the user with additional information but are not used in the flood model or earthquake model (as currently defined).
- b. Users shall access a browse window, allowing them to select the geographic maps they are interested in. A specific location shall be identified for the user so they can easily provide additional data.
- c. New functionality is required.

3.2.11.3.20. Projection...

- a. This menu item allows the user to alter the project of the active map window. This functionality is supplied by the GIS system HAZUS is operating within. This functionality is available only for vector data. This functionality is critical for Level 1 flood model users who will be utilizing the NED-H (raster data in Albers Equal Area projection).
- b. Users will need to project their vector data to match prior to performing analysis. This should be supported by functionality within the HAZUS model.
- c. This menu activates a pop-up menu. Within this pop-up menu, the user shall have access to two pull-down menus that allow the user to select the desired projection Category and Type.

The pop-up menu also allows the user to specify Standard or Custom projection via option buttons. The pop-up menu shall also have command buttons to allow the user to OK the selection or Cancel the process.

- d. This functionality shall be maintained in the new HAZUS architecture.
- e. Issue: The flood model needs to define the requirement for projection of raster data. This functionality is currently not available in HAZUS, ArcView, MapObjects, or MapInfo. Third party software is available.
- f. Issue: Additional methodology development is required to ensure that the project feature satisfies the flood model requirements.
- g. Further methodology development is required.

3.2.11.3.21. Map Units....

- a. This menu item allows users to modify the map units to support their own requirements. This functionality is standard for the GIS platforms.
- b. This menu activates a pop-up menu. Within this pop-up menu the user shall have access to a pull-down menu displaying the different map units available. The pop-up menu shall also have command buttons to OK the selection or Cancel the process.
- c. This functionality shall be maintained in the new HAZUS architecture.

3.2.11.3.22. Distance Units...

- a. This menu item allows the user to change the units that distance measurements are displayed in. This functionality is standard for the GIS platforms.
- b. Note: Accurate distance measurement is dependent on projection. This issue becomes more critical for raster data, which may come in a variety of projections.
- c. This menu activates a pop-up menu. Within this menu the user shall have access to a pull-down menu displaying the different distance units available. The pop-up menu shall also have command buttons to OK the selection or Cancel the process.

Table 3-27: Flood Model Results Menu Attributes Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Map Menu	P	C	L	L	
Create Thematic Map	P	C	L	L	
Modify Thematic Map	P	U	L	L	
Change View	P	U	L	L	
Previous View	P	I	L	L	
View Entire Layer	P	U	L	L	
Study Region Boundary	P		M	L	Remove functionality
Study Region Political Boundaries	P	C	H	M	New functionality
Study Region Census Tracts	P	U	L	L	Relocate and modify functionality
Study Region Census Boundaries	P	U	L	L	New functionality
Earthquake	P	U	L	L	Relocate functionality
Inundation Maps	P	U	L	L	Relocate functionality
FEMA Q3	P	U	L	L	Relocate functionality
FEMA Floodways	P	U	L	L	Relocate functionality
SLOSH Basins	P	U	L	L	Relocate functionality
Inland Wind Speed Model	P	U	L	L	Relocate functionality
Elevation Contours (10m)	P	C	M	L	Modify and relocate functionality
Land Use/Land Cover	P	U	L	L	Relocate functionality
Other Hazards Map	P	C	M	M	New functionality
Other Geographic Data Maps	P	C	M	M	New functionality
Projection	P	C	L	L	
Map Units	P	U	L	L	
Distance Units	P	I	L	L	

3.2.12. Help Menu

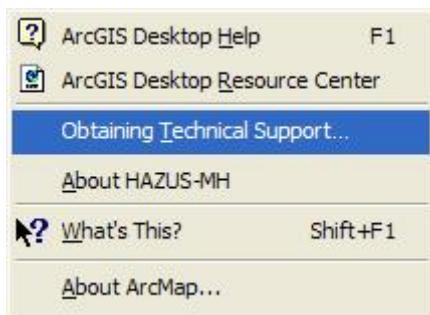


Figure 3-352: HAZUS Help Menu

- a. The Help Menu is ESRI's ArcGIS standard menu with the exception of a pair of HAZUS menu item.
- b. The ArcGIS menu items include ArcGIS Desktop Help, ArcGIS Desktop Resource Center, What's This, and About ArcMap.
- c. The HAZUS specific menu items include Obtaining Technical Support, and About HAZUS-MH, which were developed by DTI.

3.2.12.1. Help Menu Available in Earthquake Model

- a. This menu option provides information that may assist the HAZUS-MH user in the execution of the HAZUS software. In addition, it contains information about software and obtaining available technical support to use the software.

3.2.12.1.1. Online Help

- a. No online help is to be developed for HAZUS-MH; this is consistent with the HAZUS99-SR2. DTI proposes that additional funds be allocated to develop online help for the earthquake model.

3.2.12.1.2. ArcGIS Desktop Help

- a. This menu shall allow the user to access the ArcGIS desktop help in the same manner as the corresponding menu option in ArcMap.

- b. This feature shall link the user to the standard ArcGIS online help, which covers all native features of ArcMap, but not the custom features added in HAZUS-MH.

3.2.12.1.3. What's This?

- a. This option shall allow the user to click on selected items of the HAZUS Desktop application and get help about them. The list of those selected items is not yet decided.

3.2.12.1.4. Obtaining Technical Support

- a. This option shall provide the user with the telephone number, fax number, and email address for HAZUS technical support.
- b. This option shall consist of a single dialog box that identifies the contact information for technical support that is available to the HAZUS-MH user.

3.2.12.1.5. About HAZUS-MH

- a. This option shall show the HAZUS copyright message.
- b. This option shall consist of a single dialog box that contains a version history list for all HAZUS-MH components.

Table 3-28: Help Menu Attributes Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Online Help	IP	C	H	M	
ArcGIS Desktop Help	A	C	L	L	
Obtaining HAZUS-MH Technical Support	A	U	L	L	
About HAZUS-MH...	A	U	M	L	

3.2.12.2. Help Menu Available in Hurricane Model

- a. The help menu shall have the following options:
 - About hurricane preview model
 - Obtaining technical support

3.2.12.3. Help Menu Available in Flood Model

- a. The help menu shall provide users with three options supporting their efforts with HAZUS: Help, Obtaining technical support, and About HAZUS.

3.2.12.3.1. Help

- a. Online help is currently unavailable for HAZUS99, although it shall be available for HAZUS-MH.
- b. Each hazard model shall have specific online help.
- c. The flood model help shall be a duplication of the user manual.
- d. Each hazard shall have a help file that is activated when the user selects a specific hazard.
- e. Each help file shall contain general HAZUS direction and assistance.
- f. The help file shall not be context sensitive.
- g. New functionality required.

3.2.12.3.2. Obtaining Technical Support

- a. This menu item shall provide the user with a telephone number and e-mail address to contact someone able to assist them with flood model issues.
- b. Modifications are required.



Figure 3-353: HAZUS Help Menu: Obtaining Technical Support Dialog

- a. Selection of the Obtaining Technical Support menu item on the Help Menu opens the dialog shown above. This dialog is a custom dialog developed by DTI. The dialog provides the user with the necessary information to contact ABS Consulting for technical support with HAZUS.

3.2.12.3.3. About HAZUS

- a. About HAZUS shall provide an overview of the HAZUS version and copyright information. This feature shall change only to reflect the new HAZUS version number.
- b. Modifications are required.

Table 3-29: Help Menu Attributes Ranking by Feature

Reference	Feature Attributes				
	Status	Benefit	Effort	Risk	Comments
Help Menu	P	C	M	M	
Help	P	C	M	L	ABS shall provide DTI with Flood Model Help
Obtaining Technical Support	P	I	L	L	
About HAZUS	P	U	L	L	

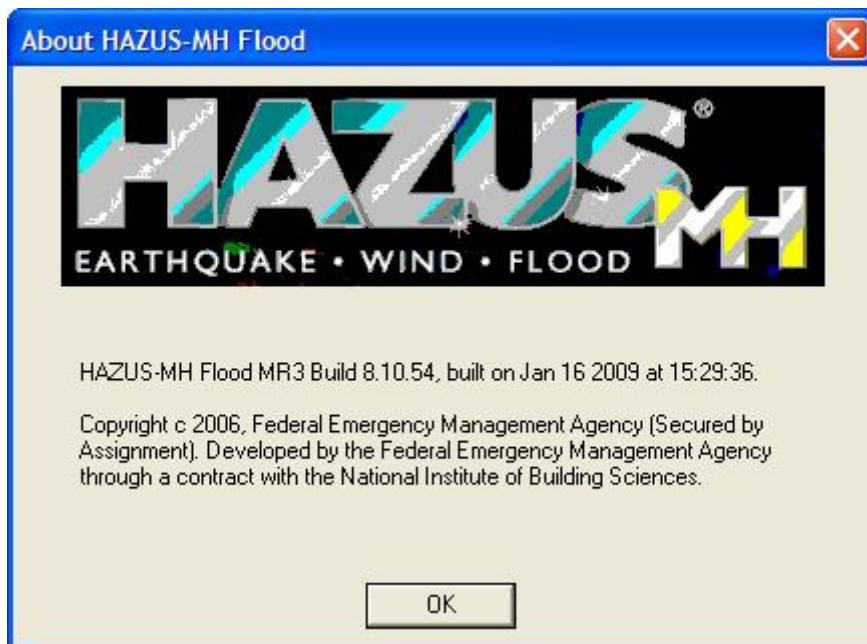


Figure 3-354: HAZUS Help Menu: Help About HAZUS Dialog

- a. Selection of the Help About HAZUS menu item on the Help Menu opens the dialog shown above. This dialog is a custom dialog developed by DTI. The dialog provides the user with the information on the installed build of HAZUS and specifically the Flood Model. The information includes the Maintenance Release number (MR3 in this case), the Build Number (8.10.54 in this case), and the date and time of the build. The dialog also provides the copyright information and the development language for HAZUS.

3.2.13. Window Menu (Flood Model Exclusive)

- a. This menu shall allow the user to create a layout for printing maps and redrawing the map window. The functionality is derived from the HAZUS GIS development environment (ArcView and MapInfo).
- b. The menu shall have a display function that identifies the active map window.
- c. This functionality shall be maintained in the new three-tiered HAZUS architecture.

3.2.13.1. New Layout Window

- a. The user shall have the capability to develop map layouts in order to print results from the HAZUS model.

- b. Selection of this menu item shall call up the layout window with the active map already formatted for printing, and the legend, scale, title, and subtitles.
- c. The HAZUS splash screen shall also be provided.
- d. Upon selection of this menu, a new menu bar providing additional editing capabilities shall appear.
- e. The new menu shall have File, Edit, Layout, and Graphics.
- f. Because this functionality shall not change for the flood model, and because it currently uses standard GIS descriptions and tools, no further details shall be provided in this SRS.
- g. This functionality shall be maintained in the new HAZUS architecture.

3.2.13.2. Redraw Window

- a. The user shall have the capability to redraw the active map window.
- b. This functionality is standard GIS-based capabilities that shall not change for the flood model.

3.3. Performance Requirements

- a. HAZUS-MH shall run at speeds similar to HAZUS99; however, it is known that (1) the new N-tier architecture, (2) the performance penalties of COM components packaging, (3) the SQL2K/MSDE slower performance (compared to the current Dbase-based tables), and (4) the “unknown” performance of the ArcView Version 8.01 GIS platform will introduce some performance degradation in HAZUS-MH compared to HAZUS99.
- b. HAZUS-MH shall run on hardware at least twice as fast as compared to hardware used for HAZUS99.
- c. HAZUS-MH shall be written using a more optimized analysis and aggregation code than the one used in HAZUS99.
- d. Query-response time requirements: TBD. (Due to lack of historical data, it is not possible to determine the date or entity responsible for this TBD. Therefore, this SRS is not compliant

with Section 4.3.3.1 of IEEE Standard 830-1998, Recommended Practice for Software Requirements Specifications.)

3.4. Design Constraints

The following constraints have an affect on the requirements themselves and the eventual design of HAZUS:

- a. Implementation environment, which includes the tools, programming languages, and databases that must be used.
- b. Required development conventions such as the design notations and coding standard.
- c. Hardware limitations.
- d. Partner applications (i.e., applications that are not part of HAZUS but with which HAZUS shall collaborate).
- e. Commercial off-the-shelf components.
- f. Timeline constraints including known deadlines.
- g. Financial constraints (i.e., requirements must not exceed budget).

Several design constraints have been placed on each HAZUS-MH hazard model. The hazard model must:

- a. Be implemented in the prescribed three-tier architectural framework.
- b. Avoid design decisions that may prevent or inhibit future Web enablement of HAZUS-MH.
- c. Operate with ESRI's ArcGIS.
- d. Operate within a common application startup and menus.
- e. Operate with modified versions of existing BIT and InCAST tools.
- f. Operate with the MSDE RDBMS.
- g. Operate with a common low-level RDBMS access via ADO interface.

h. Operate with common underlying inventory and census data.

Additional design constraints are imposed on the individual hazard models to ensure consistency and the efficient development of the overall HAZUS application.

3.5. Software System Attributes

3.5.1. Reliability

Reliability requirements are discussed in Subsection 2.4.9.

3.5.2. Availability

HAZUS shall be available on a Microsoft 2000 Operating System, on ArcView 8X suite of GIS software developed using Microsoft Visual Studio 6.0 along with relevant third party software.

3.5.3. Security

Security considerations are discussed in Subsection 2.4.11.

3.5.4. Maintainability

The HAZUS application shall be maintained on the existing version of the Operating System and other software tools as long as they are supported by the software vendors.

3.5.5. Portability

The HAZUS application will be extended to newer versions of operating systems and software tools when authorized by FEMA and NIBS with additional funding. Portability will also depend upon the supported features of the new operating system as well as software tools.

Appendix B

HAZUS-MH Earthquake Menu Specifications

This appendix lists the HAZUS-MH Earthquake Menu specifications. The features listed below as “ArcMap Standard” are features inherited directly from ArcGIS/ArcMap (that is, they do not require coding). They are desirable features but are not required for proper HAZUS-MH functionality. As of this SRS version, all ArcGIS features are kept. Pending implementation, integration, and testing, if these standard features do not integrate correctly within HAZUS-MH, they will be removed or fixed pending budget approval, at NIBS/FEMA discretion.

Earthquake Model—Menus				
Menu Bar	Level 1	Level 2	ArcMap Standard	Custom
File				
	Region wizard			•
	Switch wizard			•
	Save		•	
	Save as....			•
	Add data		•	
	Add data from geography network		•	
	Page setup		•	
	Print preview		•	
	Print		•	
	Map properties		•	
	Export map		•	
	Exit		•	
Edit				
	Undo		•	•
	Redo		•	•
	Cut		•	•
	Copy		•	•
	Paste		•	•
	Paste special		•	•
	Delete		•	•
	Copy map to clipboard		•	•
	Find		•	•
	Select all elements		•	•

Earthquake Model—Menus				
Menu Bar	Level 1	Level 2	ArcMap Standard	Custom
View				
	Data view		●	
	Layout view		●	
		Fixed zoom in	●	
		Fixed zoom out	●	
		Full extent	●	
		Go back to previous extent	●	
		Go to next extent	●	
		Zoom to selected features	●	
		Zoom to whole page	●	
		Zoom to 25%	●	
		Zoom to 50%	●	
		Zoom to 75%	●	
		Zoom to 100%	●	
		Zoom to 200%	●	
		Zoom to 400%	●	
	Overview...			●
		Create	●	
		Manage	●	
	Table of contents		●	
	Status bar		●	
	Overflow labels		●	
	Identify results		●	
	Scrollbars		●	
	Rulers		●	
	Guides		●	
	Grid		●	
		General	●	
		Grids	●	
		Frame	●	
		Map cache	●	
		Annotation groups	●	
		Size and position	●	
		Data frame	●	
		Coordinate system	●	
		Illumination	●	
		Extent rectangles	●	

Earthquake Model—Menus				
Menu Bar	Level 1	Level 2	ArcMap Standard	Custom
Inventory		Square footage		●
		Building count		●
		Occupancy mapping		●
		Dollar exposure		●
		Foundation type		●
		Valuation parameters		●
		AEBM Inventory		●
		AEBM Profiles		●
		Building Import Tool (BIT)		●
	General building stock	Inventory data		●
	Essential facilities	Occupancy mapping		●
	High potential loss facilities	Inventory data		●
		Occupancy mapping		●
	User defined structures	Inventory data		●
		Occupancy mapping		●
	Transportation systems	Inventory data		●
		Occupancy mapping		●
	Utility systems	Inventory data		●
		Occupancy mapping		●
	Hazardous materials			●
	Demographics			●
	View classification	Utility facilities		●
		High potential loss facilities		●
		Transportation facilities		●
		General building stock		●
		Essential facilities		●
		User defined facilities		●
Hazard				
	Scenario...	Define a new scenario		●
		Use predefined scenario		●
		Delete an existing scenario		●
		Define hazard maps		●
	Show current...			●
Analysis				

Earthquake Model—Menus				
Menu Bar	Level 1	Level 2	ArcMap Standard	Custom
Damage functions	Damage functions	Buildings		●
		Transportation systems		●
		Utility systems		●
	Restoration functions	Essential facilities		●
		Transportation systems		●
		Utility systems		●
Parameters	Parameters	General building stock		●
		Hazard		●
		Contours		●
		Inundation data files		●
		Fire following		●
		Potable water network		●
		Debris		●
		Casualties		●
		Shelter		●
		Building economic		●
	Parameters	Military installations economic		●
		Lifeline economic		●
		Indirect economic		●
		Default classes		●
		Ground Truthing Off		●
		Run		●
Results				
	Ground motion or failure	Ground motion by census tract		●
		Contours / ground failure maps		●
	General building stock	By occupancy		●
		By building type		●
		By count		●
		AEBM		●
	Essential facilities			●
	Military installations			●
	User defined structures			●
	Transportation systems			●

Earthquake Model—Menus				
Menu Bar	Level 1	Level 2	ArcMap Standard	Custom
	Utility systems			●
	Inundation			●
	Fire following earthquake			●
	Debris			●
		By general building type		●
		By occupancy		●
		By building type		●
		Annual by occupancy		●
		Annual by building type		●
		Annual by general bldg type		●
	Shelter			●
		By general occupancy	●	●
		By specific occupancy	●	●
		By building type	●	●
		Annual by general occupancy	●	●
		Annual by specific occupancy	●	●
		Annual by building type	●	●
	Military installations economic loss			●
	Lifelines economic loss	Transportation systems	●	●
		Utility systems	●	●
	Indirect economic loss		●	●
	Summary reports		●	●
Selection				
	Select by attributes		●	●
	Select by location		●	●
	Select by graphics		●	●
	Zoom to selected features		●	●
	Statistics		●	●
		Study region tract	●	●
		Study region boundary	●	●
	Clear selected features		●	●
		Select from current selection	●	●
	Interactive selection methods	Create new selection	●	●
		Add to current selection	●	●
	Options		●	●

Earthquake Model—Menus				
Menu Bar	Level 1	Level 2	ArcMap Standard	Custom
Tools				
	Edit toolbar		•	
		Create	•	
		Manage	•	
		Load	•	
		Style references	•	
		Style manager	•	
		Export map style	•	
		Raster	•	
		Geoprocessing	•	
		Data interoperability	•	
		General	•	
		CAD	•	
		Layout view	•	
		Tables	•	
		Data view	•	
		Table of contents	•	
Help				
	ArcGIS desktop help		•	
	About HAZUS...			•
	What's this?		•	
	Obtaining technical support			•
Earthquake Model—Toolbars				
Tool Bar	Tools	ArcMap Default	ArcMap Customized	Custom
Standard Toolbar				
	Region wizard			•
	Switch wizard			•
	Save	•		
	Save workspace		•	
	Print	•	•	•
	Cut	•	•	•
	Copy	•	•	•

Earthquake Model—Menus				
Menu Bar	Level 1	Level 2	ArcMap Standard	Custom
	Paste	●	●	●
	Delete	●	●	●
	Undo	●	●	●
	Redo	●	●	●
	Add data	●	●	●
	Map scale	●	●	●
Tools Toolbar				
	Editor Toolbar	●		
	Zoom In	●		
	Zoom Out	●		
	Fixed Zoom In	●		
	Fixed Zoom Out	●		
	Pan	●		
	Full Extent	●		
	Go back to Previous Extent	●		
	Go to next extent	●		
	Select features	●		
	Select elements	●		
	Identify	●		
	Measure	●		
	Editor	●		
	Edit	●		
	Create new feature	●		
	Edit task	●		
	Current sub type	●		
	Split	●		
	Rotate	●		
	Shared	●		
	Edit	●		
Layout Toolbar				
	Attributes	●	●	●
	Zoom in	●	●	●
	Zoom out	●	●	●
	Pan	●	●	●
	Fixed Zoom In	●	●	●

Earthquake Model—Menus				
Menu Bar	Level 1	Level 2	ArcMap Standard	Custom
	Fixed Zoom Out	●	●	●
	Zoom Whole Page	●	●	●
	Zoom 100%	●	●	●
	Go Back to Extent	●	●	●
	Go Forward to Extent	●	●	●
	Zoom control	●	●	●
	Change layout	●	●	●