

Improving DEMA's understanding of DEOS and HAZUS-MH

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State Hazard Mitigation Officer

Introduction

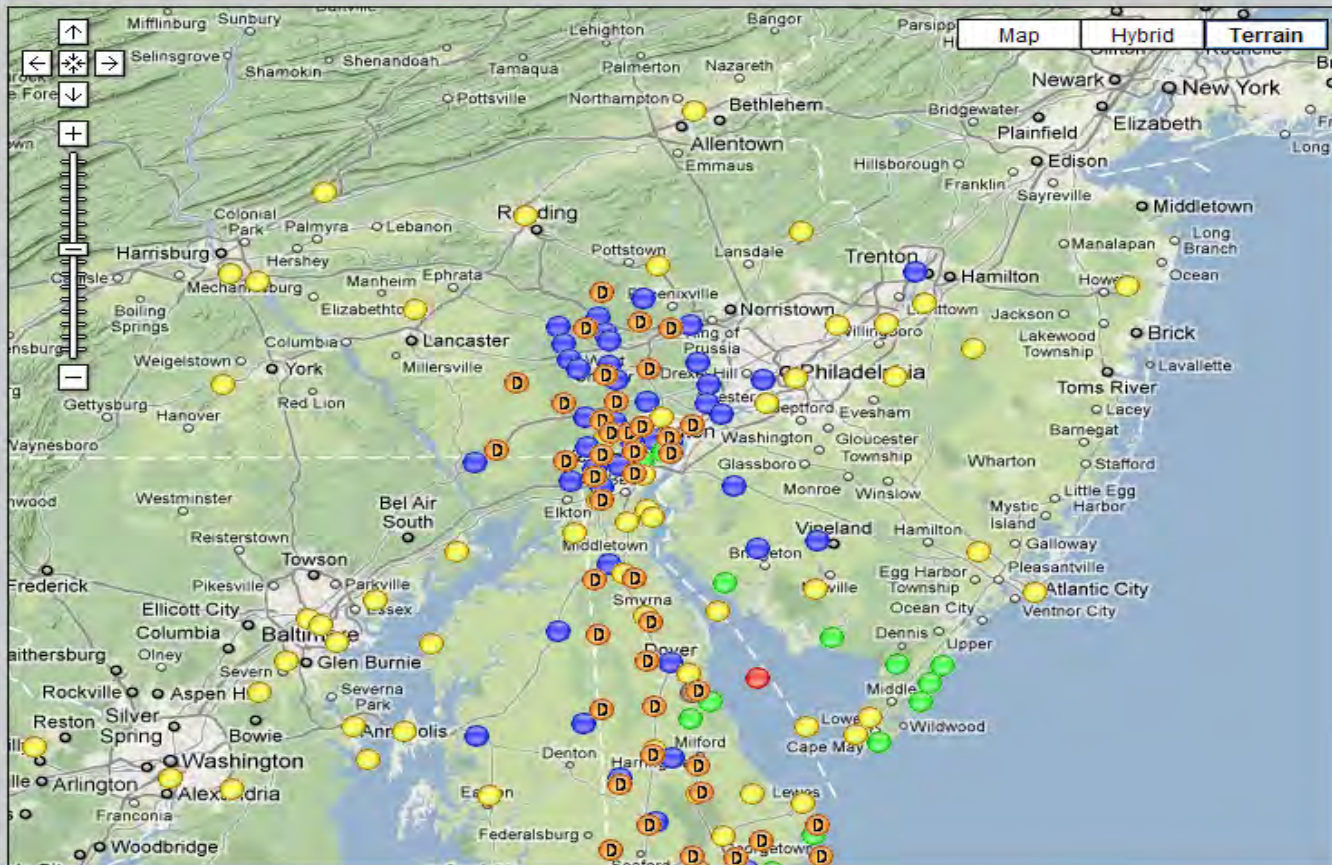
- Delaware Environmental Observing System (DEOS) and DEMA
- HAZUS-MH

The Delaware Environmental Observing System (DEOS) is a support tool for decision makers involved with emergency management, natural resource monitoring, transportation, and other activities throughout the State of Delaware. Our primary goal is to provide state agencies and the citizens of Delaware with immediate information about environmental conditions in and around the State. DEOS also archives data for historical environmental studies and research.

DEOS



DEOS GeoBrowser



Station Legend:

- All Station Types
- **D**: DEOS Weather Stations
- Other Weather Stations
- Streamflow Stations
- Tidal Stations
- Wave Buoy Stations
- Water Quality Stations

Weather Fields:

- On Off Loop Opacity
- Radar 100% ▾
- NWS Warnings

Sea Surface Temperature:

- On Off
- 8 Day Average
- 3 Day Average
- 1 Day Average

[Click for Data Fields Reference](#)

ODD-DIVAS: DWCC Current Data - Windows Internet Explorer
 http://www.deos.udel.edu/odd-divas/station_current.php?network=DEOS&station=DWCC&units=Er

Newark, DE-White Clay Creek Station

ID	DWCC	Network	DEOS
City/State	White Clay Creek/DE	Elevation	279 ft.
Latitude	39° 44' N	Longitude	75° 44' W
Updated	10:30 am	Date	November 1, 2011

Observations

Data Type	Measurement	Time	Chart	Data
Rainfall	0.00 in	10:30 am		
24-Hour Rainfall	0.00 in	10:30 am		
Air Temperature	52.4 °F	10:30 am		
Dewpoint Temperature	38.8 °F	10:30 am		
Relative Humidity	60 %	10:30 am		
Wind Speed	5.0 mph	10:30 am		
Wind Gust	10.5 mph	10:30 am		
Wind Direction	29.6 ° (NNE)	10:30 am		

[Change to SI units](#)
 Station updates every 5 minutes

Note: All observations were obtained from the Delaware Environmental Observing System network

Generated by ODD-DIVAS version 2.1.10-0.

W3C HTML 4.01 ✓ W3C CSS ✓

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 Please read the [Data Disclaimer](#) before using any data.

Browser

Map Hybrid Terrain

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Weather Fields:

On Off Loop Opacity

Radar On Off Loop Opacity 100%

NWS Warnings On Off

Sea Surface Temperature:

On Off

8 Day Average On Off

3 Day Average On Off

1 Day Average On Off

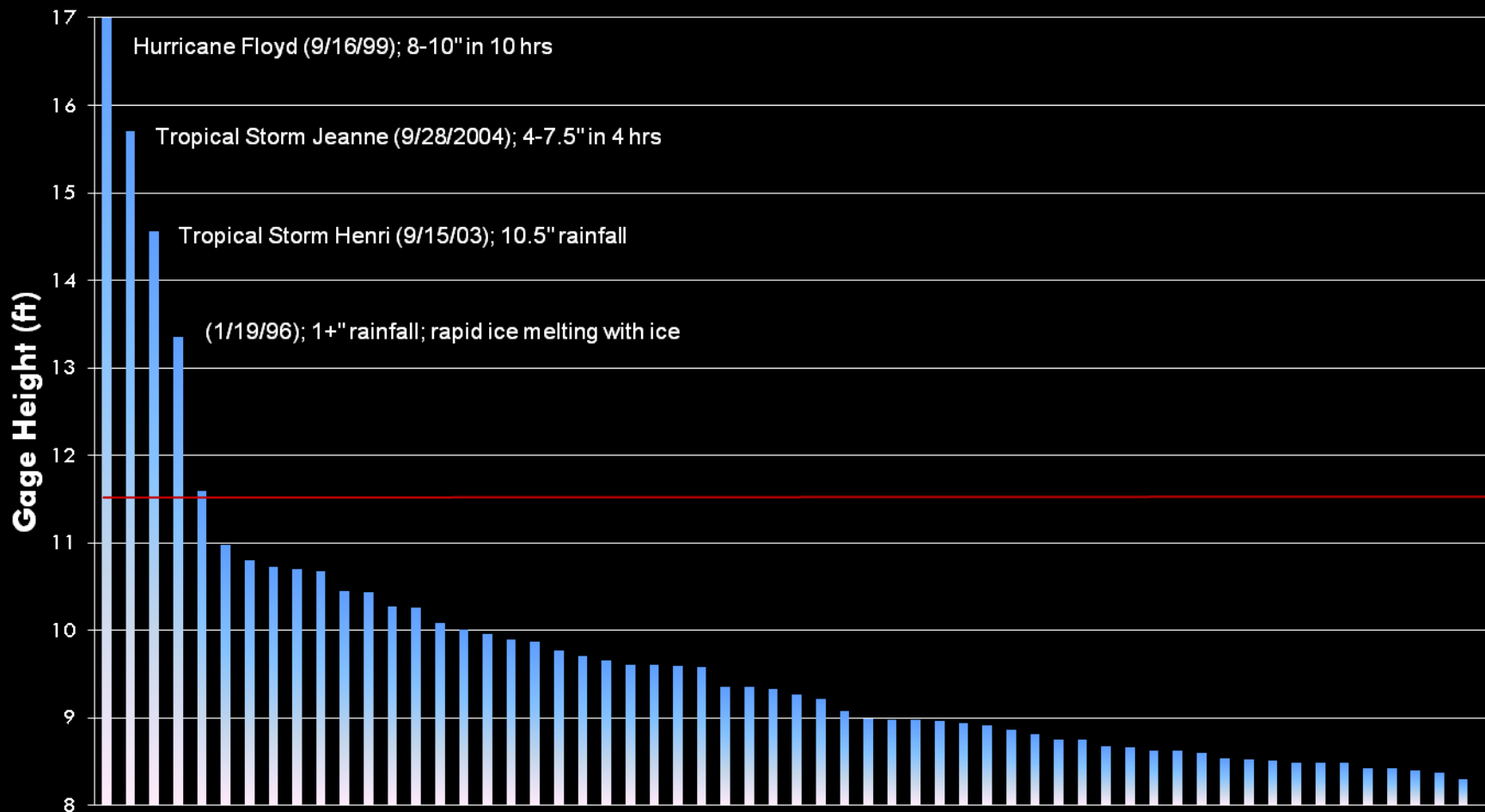
[Click for Data Fields Reference](#)



- Weather Stations
- Streamflow Stations
- Tidal Stations
- Wave buoy stations

- Establishes Recurrence Intervals
- Charts peak discharge by date
- Charts peak gage height by date

DELAWARE GEOLOGICAL SURVEY
Peak Gage Heights of Record for White Clay Creek at Newark
Station 01478650
Period of Record 1994 - 2011



- Specifying the actual impacts at specific heights
- Defining level of heightened concern in layman's terms

- What is HAZUS –MH?
- Critical Use
- Improving HAZUS-MH Outputs

- GIS based tool use on a personal computer
- Available from FEMA free of charge
- Requires installation of ArcGIS 10 and Windows XP SP3 on a 32-bit system

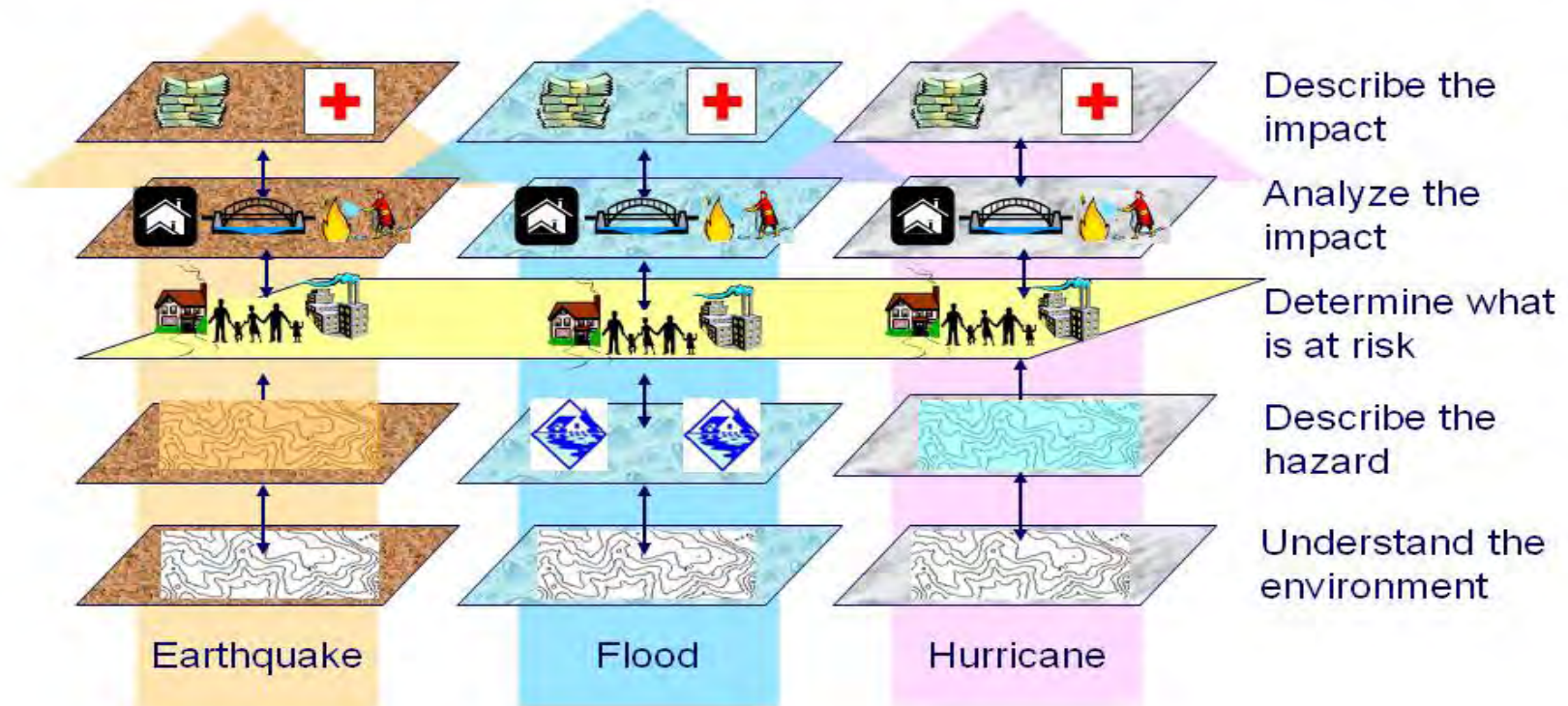
What is HAZUS- MH?

- Hurricane Winds
- Riverine and Coastal Flooding
- Earthquakes
- Storm Surge

Supported Hazards

- Program initiated in 1992
- Earthquake model first released in 1997
- Hurricane and Flood Module development initiated in 1998
- Surge Model released with latest version in 2011

How does HAZUS-MH estimate losses?



FEMA

Estimating Losses with HAZUS-MH

- HAZUS-MH provided Inventory
 - General building types and occupancies
 - Lifelines
 - Replacement Costs
 - Demographics
 - Hazard Specific
 - Specific building Types
 - Elevation
 - Building configurations

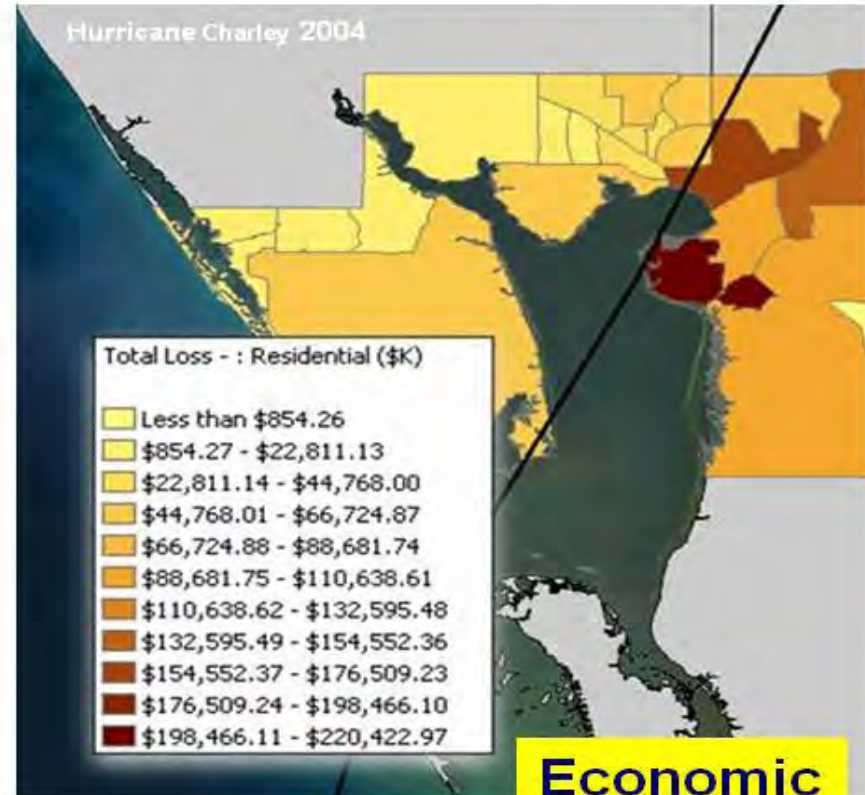
HAZUS-MH Output



**Physical
Impacts**



**Social
Impacts**



**Economic
Impacts**



FEMA

HAZUS-MH Output

- State Hazard Mitigation Plan
 - Hazard Identification and Risk Assessment
 - Hurricane Winds
 - Flood
 - Earthquake
 - Three year update requirement
 - Last update: August 27, 2010
 - Next Revision due: June 1, 2013

Jurisdiction	Estimated Losses
MCD Upper Christiana	\$7,038,000
MCD Wilmington	\$13,000
Middletown	\$681,000
New Castle	\$3,600,000
Newark	\$8,902,000
Newport	\$62,000
Odessa	\$34,000
Smyrna	\$161,000
Townsend	Negligible
Wilmington	\$3,443,000
TOTAL	\$68,636,000

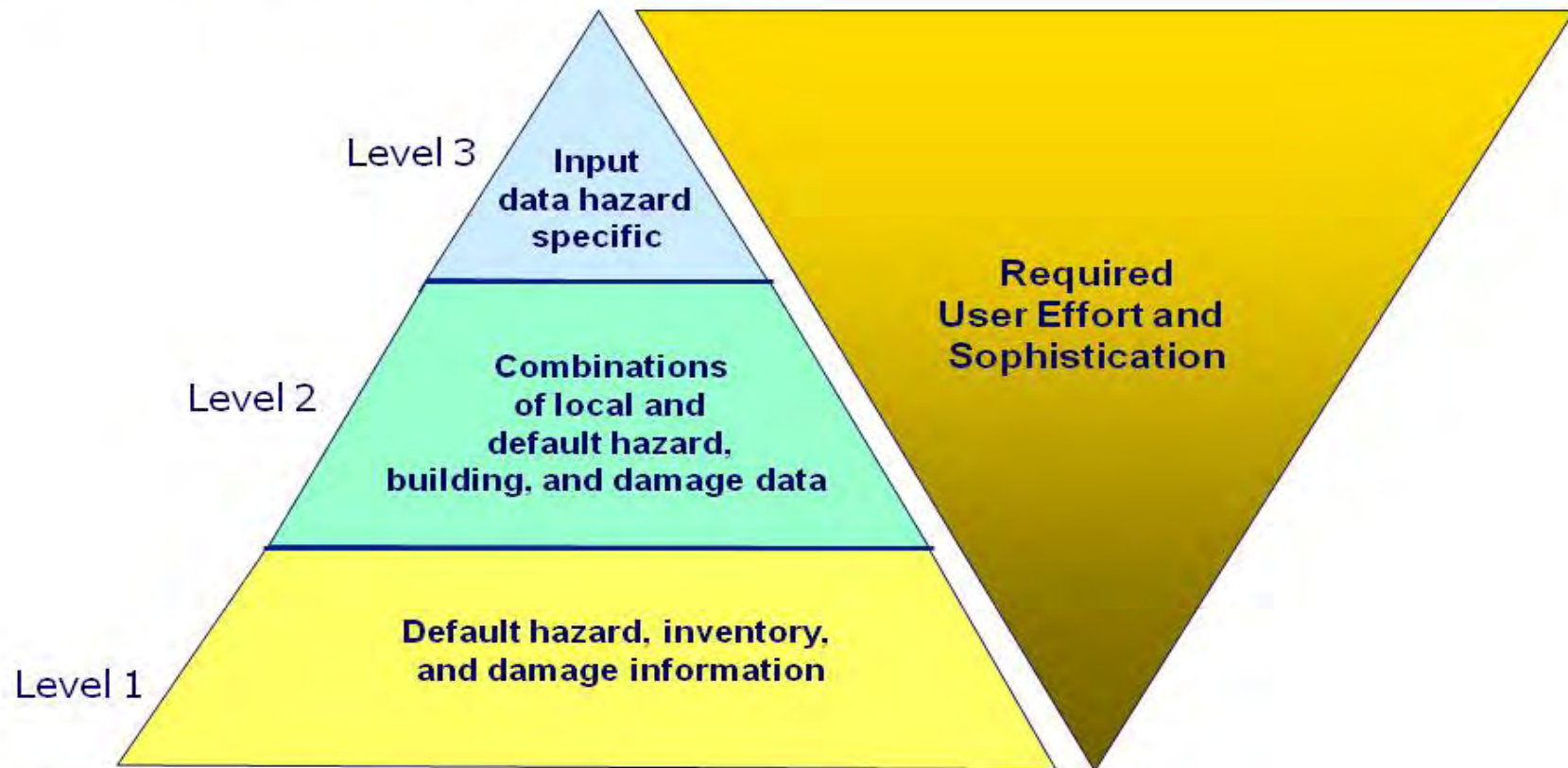
Potential 1% Flood Loss - NCC

New Castle County	\$68,636,000
Kent County	\$19,002,000
Sussex County	\$129,520,000
Statewide Total	\$217,158,000

Potential 1% Flood Loss – Statewide

- Estimating Hurricane Impacts
 - Uses Hurricane Advisories
 - Produces loss estimations specific to the Hurricane
 - Handout

Levels of Analysis



FEMA

Improving the HAZUS-MH Output

- Evaluating and Updating Inventories
 - Demographic Data
 - General Building Stock
 - Essential Facilities
 - Transportation Systems

Transportation Systems

Highway Systems

Railway Systems

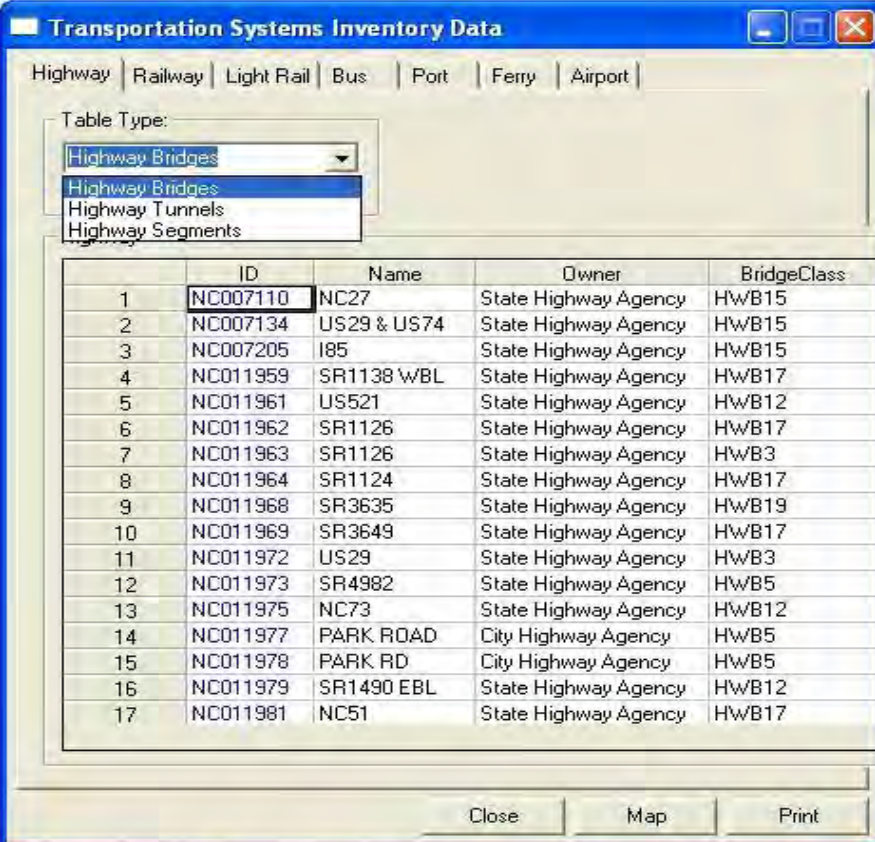
Light Rail Systems

Bus Facilities

Port Facilities

Ferry Facilities

Airport Systems



The screenshot shows a software window titled "Transportation Systems Inventory Data". It has a menu bar with options: Highway, Railway, Light Rail, Bus, Port, Ferry, Airport. Below the menu bar is a "Table Type:" dropdown menu currently set to "Highway Bridges", with a list of options: Highway Bridges, Highway Tunnels, and Highway Segments. The main area contains a table with 17 rows and 5 columns: ID, Name, Owner, and BridgeClass. The first row is highlighted. At the bottom of the window are buttons for "Close", "Map", and "Print".

	ID	Name	Owner	BridgeClass
1	NC007110	NC27	State Highway Agency	HWB15
2	NC007134	US29 & US74	State Highway Agency	HWB15
3	NC007205	I85	State Highway Agency	HWB15
4	NC011959	SR1138 WBL	State Highway Agency	HWB17
5	NC011961	US521	State Highway Agency	HWB12
6	NC011962	SR1126	State Highway Agency	HWB17
7	NC011963	SR1126	State Highway Agency	HWB3
8	NC011964	SR1124	State Highway Agency	HWB17
9	NC011968	SR3635	State Highway Agency	HWB19
10	NC011969	SR3649	State Highway Agency	HWB17
11	NC011972	US29	State Highway Agency	HWB3
12	NC011973	SR4982	State Highway Agency	HWB5
13	NC011975	NC73	State Highway Agency	HWB12
14	NC011977	PARK ROAD	City Highway Agency	HWB5
15	NC011978	PARK RD	City Highway Agency	HWB5
16	NC011979	SR1490 EBL	State Highway Agency	HWB12
17	NC011981	NC51	State Highway Agency	HWB17



*Each inventory grouping has multiple inventory items

Improving HAZUS-MH Outputs

- The Goal: Increasing DEMA's ability to effectively anticipate the impacts to potential disasters to facilitate a quicker response time to request for assistance.

Questions???

DEOS, HAZUS, and DEMA