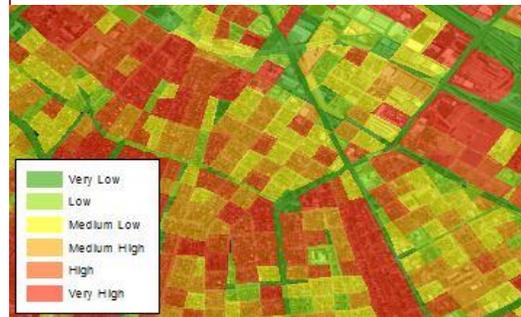## Identifying Vulnerable Populations for Emergency Planning

Within the Flood Risk Report and Flood Risk Database are the results of FEMA's Hazus-MH model presented as Average Annualized Loss (AAL) estimates. HAZUS is a GIS-based planning tool that estimates structural damage, as well as economic and social losses resulting from natural hazards. The estimates included in these products are a result of a nationwide model and when paired with other data, can be used to draw conclusions regarding your community's risk. The information contained in the AAL can be used to identify flood-prone areas, communicate relative flood risk, provide potential damage severity information for different flood frequencies, and identify possible locations for mitigation options. The AAL becomes a practical and useful tool when paired with local information to enhance risk awareness and support mitigation planning efforts.

In this example, the AAL is overlaid with the Census data of Households with individuals 65 and older to show how these tools may assist in evacuation planning during a 1% annual-chance flooding event.

Ingredients:
-AAL data from Flood Risk Database
-Census/demographic data

Very Low
Low
Medium Low
Medium High
High
Very High

Using AAL Data To Identify Vulnerable Populations

Step 1: Using ArcMap 9.x/10.x, use **ADD DATA** to navigate to the Flood Risk Database (FRD) and add the L_RA_AAL (AAL Data). From the FRD_Spatial Layers dataset within the FRD, add the S_CenBlk (Census Blocks).

Step 2: Right click on the L_RA_AAL layer and select **PROPERTIES**. Go to the **DEFINITION QUERY** tab and enter the following: **"RETURN_PER" = '01pct'** and then click OK.

Step 3: Right click on S_CenBlk_Ar and select **JOINS AND RELATES**, and then **JOIN**. In the Join Data Window, from the dropdowns, select for line 1 "CEN_BLK_ID." Select for line 2 the layer "L_RA_AAL", select for line 3 "CEN_BLK_ID" (may populate automatically). Click OK.

Step 4: Right click S_CenBlk_Ar and select Properties from the menu. Go to the symbology tab. Select Quantities from the left window pane. In the classification window, change the classes to 6. Note the low value for the fifth class and then go to the definition query tab and add **AND L_RA_AAL.TOT_LOSSES >** and then the low value from the fifth class.

Step 5: Download the 2010 Census demographic data at the tract level from census.gov. http://1.usa.gov/1MG30fJ

Step 6: Using **ADD DATA** load the Census tract data and then right click on the layer and select **OPEN ATTRIBUTE TABLE**.

Step 7: In the attribute table window click the table options icon in the upper left corner and select **ADD FIELD**. In the Add Field Window, for Name type "hshld65per" (no quotes) and for Type, select Double from the drop down. (Continue on reverse side)

Step 8: Right click on the new field and select **FIELD CALCULATOR**. In the lower window enter the following: **([DP0150001]/ [DP0130001])*100**. Click OK. When it is done close the attribute window.

Step 9: Right click on the Census data again and select **PROPERTIES**. Go to the **DEFINITION QUERY** tab and enter the following: **"hshld65per" > 30** and then click OK. This selects the blocks where 30% or more of the Census block residents are 65 years or older.

Step 10: In the main window click the Selection menu and click **SELECT BY LOCATION**. In the window that opens check S_CenBlk_Ar in the top window, and set the source layer to the Census data layer. Click OK. The Census Blocks in S_CenBlk_Ar that are selected are the areas where flood damage is rated as high or very high and more than 30% of the Census block residents are 65 years or older. These identified areas could be targeted for evacuation assistance during a potential flood event or for an increased flood risk awareness campaign.

Evidence Drawn From AAL Data

Planning Staff
- Identify areas that may not have been previously targeted for mitigation activities and projects
- Identify structures that could benefit from 406 mitigation
- Support disaster recovery planning by overlaying emergency routes and identifying barriers to at-risk areas
- Highlight areas to include when updating the risk assessment section of a local hazard mitigation plan

Engineering and Technical Staff
- Inform land use planning by identifying areas where limiting development through zoning regulations could steer development away from high-hazard areas
- Identify areas that may benefit from higher development standards in high hazard areas, such as controlling or reducing runoff through more stringent building codes, flood resistant designs and construction techniques
- Prioritize capital improvement projects and/or mitigation projects
- Adopt and enforce hazard resistant building codes in areas of moderate to high risk

Elected Officials and Community Staff
- Identify vulnerable infrastructure or facilities that could adversely affect continuity of operations plans or emergency preparedness plans
- Target high risk areas within the community for flood risk outreach and education

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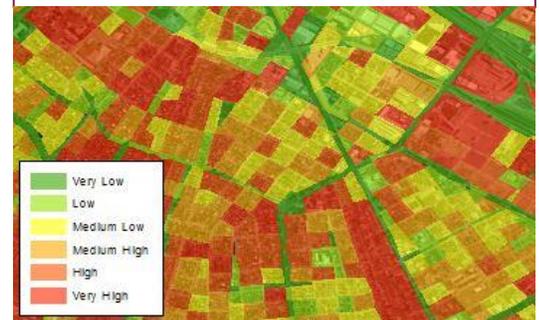- Target high risk areas within the community for flood risk outreach and education

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Legend: Very Low, Low, Medium Low, Medium High, High, Very High

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