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## CHAPTER 6

# Economics

Under **Economics** you perform data entry and computations to produce stage-damage functions with uncertainty for flood damage reduction. First, definition of **Study Damage Categories** for analysis and reports is required. You may then enter the stage-damage functions with uncertainty directly by damage category and damage reach. However, for most studies, the functions are generated using the compute stage-damage uncertainty option. This option requires conventional development of structure inventories of structure attributes and specification of uncertainties associated with key data. Water surface profiles, specified under **HydEng**, are required to produce the stage damage uncertainty functions by damage categories at the damage reach index locations. This is performed by aggregating individual structure stage-damage functions to the index location by adjusting for the slope in water surface profiles. A detailed description of the methods described in this chapter are found in Appendix E.

Structure information is entered under **Structure Occupancy Type** and Structure Inventory. **Structure Occupancy Type** is a subcategory of a **Study Damage Category** and provides common information for similar structures. Included are depth-percent damage and uncertainty functions for the structure, contents and structure/content value ratios, and uncertainties for first floor stage, structure value, content value and structure/content value ratio. A structure is assigned to a Structure Occupancy type. Structure inventory information includes the structure name, description, stream, stream bank, stream station, structure stages, structure and content values, addresses, coordinates, and other data.

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## Study Damage Categories

Damage Categories are required and defined for the study. Damage Categories are used to consolidate large numbers of structures into specific categories with similar characteristics for analysis and reports. Typical damage categories include: residential, commercial, industrial, open space, and public facilities. Several structure occupancy types, discussed later, may be assigned to a study damage category. For examples, single family residential and apartments are structure occupancy types (sub categories) assigned to the residential damage category. Figure 6.1 shows the Study Damage Category data entry form. The price index is used to update the monetary values of the structures assigned to the damage category. It overwrites the global price index value entered under **File/Study Info**. The default is the global index value.

Figure 6.1 Study Damage Category

### Data Entry for Damage Categories

- # Enter Damage Category Name and Description.

**HINT:** We recommend that the number of damage categories be reasonable for computation and display considerations.

- # Enter the price index for this category. Default is the global price index found under **File/Study Info** of the main program menu..

- # **Save/Update** - to store Damage Category Names to the data base.  
CANCEL leaves screen without changes.

## Data Entry Variables

**Damage Category Name:** Name for the defined damage category, which is used for subsequent data entry pick lists. Also used on reports and plots. A new damage category name can be added to the database. An existing damage category name can be selected, updated, or deleted. The maximum length is 16 characters.

**Damage Category Description:** Description of the defined damage category. The maximum length is 64 characters.

**Price Index:** Price index adjustment to damage values for this category. The global price index defined under File Menu - Study Information is the default value.

## Study Structure Occupancy Types

### General

Structure occupancy types are defined for the study. They are a subcategories of individual study damage categories. A structure occupancy type is used to define depth-percent damage functions, the first floor, structure value, and content/structure ratio uncertainty, and “other” (damage)/structure ratio uncertainty for similar structures in the occupancy type. Each structure in the structure inventory is assigned to a structure occupancy type. Several structure occupancy types might be assigned to a study damage category. For example, single-story structures with no basements, single-story structures with basements, mobile homes, and duplex apartments are different structure occupancy types assigned to a residential damage category. Each occupancy type would have unique depth-damage function and uncertainty parameters. Figure 6.2 shows the opening data entry screen for Study Structure Occupancy Types. Figure 6.3 shows the table entry screen for depth-percent damage uncertainty functions.

Uncertainty or error distributions associated with estimating the depth-damage functions, structure values, content ratios, and first flood stage are used to develop the total aggregated stage-damage-uncertainty function by damage categories for the damage reach. The uncertainty of each parameter may be defined using none (no uncertainty), normal, triangular or log normal probability density functions.

Figure 6.2 Study Structure Occupancy Type Data Entry Screen

	Depth (ft.)	Damage (Percent)	Standard Deviation of Error
1	-2.00	0.0	0.000
2	-1.00	1.0	0.200
3	0.00	15.0	3.000
4	1.00	15.0	3.000
5	2.00	24.0	4.800
6	3.00	27.0	5.400
7	4.00	30.0	6.000
8	5.00	31.0	6.200
9	6.00	40.0	8.000
10	7.00	43.0	8.600
11	8.00	44.0	8.800
12	9.00	45.0	9.000
13	10.00	46.0	9.200

Figure 6.3 Depth-Percent Damage Entry Screen

## Data Entry for Study Structure Occupancy Types

# Specify (assign) previously defined **Study Damage Category** associated with this **Structure Occupancy Type**

**HINT:** You may review list of Structure Occupancy Types and Assignments under **View**.

# Enter Structure Occupancy Type Name and Description.

# Enter Structure and Content Depth-percent Damage-uncertainty Functions for this Structure Occupancy Type.

# Enter Content to Structure Value Ratio for this Structure Occupancy Type.

# Enter “Other” to Structure Value Ratio (if applicable) for this Structure Occupancy Type.

# Enter Uncertainty values for First Floor Stage, Structure Value, and Content/Structure Ratio for this Structure Occupancy Type.

# Click Save/Add to store information to the database. Click Cancel to leave screen without storing edited data.

## Description of Structure Occupancy Type Data Entry Variables

**Damage Category Name:** Select a previously defined damage category name.

**Structure Occupancy Type:** Name given to a similar set of structures that is used to define the depth-percent damage function and first floor, structure value, and content/structure value ratio uncertainty of the type of structures. An existing structure occupancy type can be selected, updated, or deleted. The maximum length is 16 characters.

**Structure Occupancy Description:** Description of the defined structure occupancy type, up to 64 characters.

**Depth-percent Damage Function:** Depth-percent damage functions define the percent of the structure damaged for a range of flood stages at a structure. The percent-damage is multiplied by the structure value to get a unique depth-damage function at the structure. The zero depth is assumed to coincide with

stage (elevation) of the first floor. A separate depth-percent damage function for contents may be developed in a similar manner. Contents damage may also be based on the content to structure value ratio. The uncertainty associated with the depth-percent damage function is entered by ordinates based on the type of distribution specified.

**Content to Structure Value Ratio:** The numeric value in percent that represents the maximum content value divided by the maximum structure value for a particular structure occupancy type. Used to proportion the contents depth-percent damage function from the structure function.

**“Other” to Structure Value Ratio:** The numeric value in percent that represents “other” (damage to landscape, etc) damage.

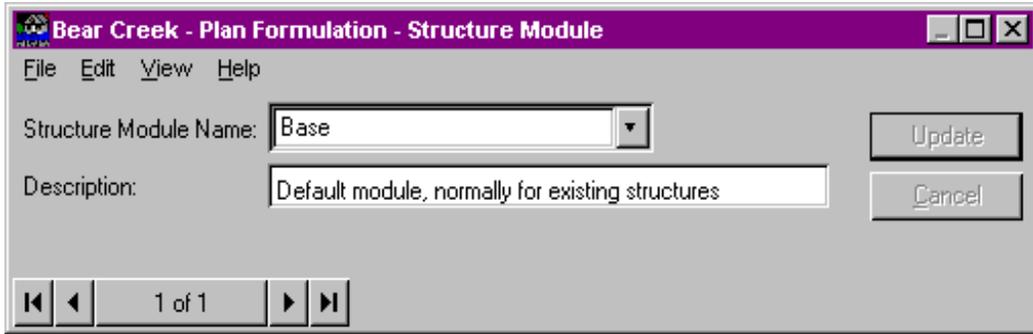
**First Floor Stage Uncertainty:** The standard deviation in feet (meters) of the uncertainty in the first floor stage estimate of a particular structure occupancy type. Based on the procedures/type of surveys used to estimate the first floor stage.

**Structure Value:** The standard deviation in percent of structure value associated with the uncertainty in the structure value estimate for a particular structure occupancy type.

**Content/Structure Value Ratio Survey Error:** The standard deviation is a percent of the content to structure value ratio. It is associated with the error in estimating the ratio. For example, for a content to structure value ratio of fifty percent, an entered standard deviation of ten (10) percent would mean that the plus/minus one standard deviation range is forty-five to fifty-five percent.

## Structure Module

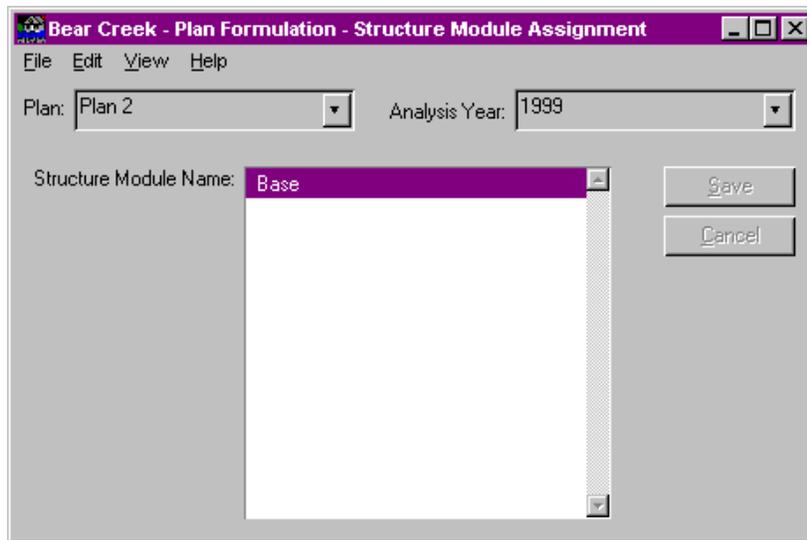
Structure inventories are grouped by structure modules to facilitate analysis of structures associated with various plans and conditions. Figure 6.4 shows the basic data entry screen for **Structure Module**. The structure modules are required if structure inventories are to be performed. The definition of the structure modules must be defined prior to development of the structure inventories. The default module is the base module normally containing existing structures or structures associated with the without-project base year condition. Plans associated with various future conditions will normally have different modules for the future year structures. This enables analysis of alternative future development, such as those considering the Federal Emergency Management Association’s regulatory program. Table 6.1 shows an example of possible structure modules used for perhaps thousands of structures. Figure 6.5 shows the structure module assignments for the **Base Module** without-project conditions for the 1999 Analysis Year.



**Figure 6.4 Structure Module Data Entry Screen**

**Table 6.1  
Structure Inventory Module Concepts**

Plan Description	Base Year 2000	Most Likely Future 2030
Without Project	BASE MODULE	BASE MODULE + FUTURE A MODULE (Adjusted for Regulation program w/o project.)
Levee Project	BASE MODULE	BASE MODULE + FUTURE B MODULE (Adjusted for Regulatory program development w/Levee.)
Channel Project	BASE MODULE	BASE MODULE + FUTURE C MODULE (Adjusted by Regulatory program development w/channel.)



**Figure 6.5 Structure Module Assignment**

## Data Entry for Structure Module

- # Enter Structure Module Name and Description. Must be defined prior to entering structure inventory data.
- # **Save/Update** - to store structure modules to the database. CANCEL leaves screen without changes.

## Data Entry Variables for Structure Module

**Structure Module Name:** Name for the defined structure module, which is required for structure inventories. A new structure module (name) can be added to the database. An existing structure module name can be selected, updated, or deleted. The maximum length is 16 characters.

**Structure Module Description:** Description of defined structure module. The maximum length is 64 characters.

# Structure Inventory Data

## General

Structure inventories are performed to develop a record of the attributes of unique or groups of structures relevant to flood damage analysis. The information is used to compute an aggregated stage-damage function by damage category at the damage reach index location station. The damage categories, stream, and structure occupancy types must be previously specified. Required structure attributes include: the name for the structure; stream station; stream; bank designation; structure value; content value; and structure stages associated with ground or first floor. Optional attributes include: address; coordinates (highly recommended); notes; an image; and additional structure stages for basement type flooding. You may enter data by form or table format. See Appendix E. You may also import the data from ASCII (\*.TXT) files or SID (USACE 1989) data files. (See USACE reports by Institute for Water Resources: "Natural Economic Development Procedure Manual - Urban Flood Damage", March 1988, 88-R-2; "Natural Economic Development Procedure Manual - Urban Flood Damage - Volume II: Primer on Surveying Flood Damage for Residential Structures and Contents", October 1991, 91-R-10; "Catalog of Residential Depth-Damage Functions", May 1992, 92-R-3; and, "Analysis of Non-Residential Content Value and Depth-Damage Data for Flood Damage Reduction Studies", April 1996, 96-R-12.

Structure damage data may also be entered directly for a specified structure occupancy type instead of using the general depth-damage functions. Examples would be for unique inventory surveys of commercial and industrial structures, and special damage functions for traffic or infrastructure. The "direct" method is chosen from the structure occupancy type pick list. The first flood survey error in feet (meters) is entered along with the stage-direct damage uncertainty values for the structure. Content stage-direct damage uncertainty is then similarly entered.

The structure inventory is stored in the data base file. The structures are assigned to a specific Damage Category, Occupancy Type, Stream, and Structure Module. The module is used to specify which Plans and Analysis Years the structure will be used for damage analysis. Please see the previous section on structure modules.

## Data Entry for Structure Inventory

Enter structure inventory data manually into HEC-FDA using the form or table format. For large groups of structures the table format, similar to a spreadsheet, is normally preferred. You select the form or table entry under **Economics/Structure Inventory/View**. You may also import structure inventories from old HEC-Structure Inventory for Damage (HEC-SID) or ASCII Tab delimited files such as those developed using commercial spreadsheets under Economics/Import. Please see Appendix E.

## Form Entry

Several screens are used to enter structure inventory data via the forms. Figure 6.6 illustrates the opening menu screen. You first specify the Damage Category, Occupancy Type, Stream, and Structure Module associated with the structure. Then enter the individual structure Identification, Stream Station, the value of the structure, content, and other, and the stream bank (looking downstream) where the structure is located. Structure stage values are specified, as shown in Figure 6.7, by pressing the Structure Stage button. The Optional Data button brings up the screen shown in Figure 6.8

Figure 6.6 Structure Inventory Opening Screen

## Define Direct Structure Inventory Information

The dialog box at the bottom of the Structure Inventory screen (Figure 6.6) becomes activated by selecting “direct” under the **Structure Occupancy Type** pick list. You then enter the direct-dollar damage versus stage functions and associated uncertainty for the structure, contents, and other as shown in Figure 6.9. The direct-dollar functions are normally used to define unique damage potential such as some commercial, industries, infrastructure, and public facilities.

**Bear Creek - Plan Formulation - Structure Stages**

First Floor     Ground Stage

First Floor Stage:

Beginning Damage Depth:

OK    Cancel    Help

Figure 6.7 Structure Inventory Entry of Stages

**Bear Creek - Plan Formulation - Optional Structure Inform...**

Street:

City:

State:

ZIP:

Structure Coordinates

Northing:

Easting:

Zone:

Number of Structures:

Year in Service:

SID Compatible Data

Damage Reach Name:

Reference Flood Elevation:

Notes...     Image...

OK    Cancel    Help

Figure 6.8 Structure Inventory Optional Data

Bear Creek - Plan Formulation - Depth-Direct Dollar Damage Function

File Edit View Help

Structure Occupancy Type: Auto 10.124 - STRUCTURE

Define Uncertainty

None  Normal  Triangular  Log Normal

Depth (ft.)	Damage (\$1,000's)	Standard Deviation of Error
476.86	0	0
477.77	2.1	0.4
479.19	19.2	3.8
480.24	73.8	14.7
480.81	123.4	24.7
481.56	236.2	47.2
482.13	292.9	58.6
484.17	372.2	74.4

Plot...  
Tabulate...  
Save  
Cancel

**Figure 6.9 Structure Inventory Direct Dollar Data Entry**

**Table Entry.** You may enter or view the structure inventory data in a Table Format similar to a spreadsheet as shown in Table 6.10. Note the Table is not a spreadsheet and has limited capabilities for manipulating data. Certain cells of the table are activated by pressing the left mouse button. For example, by left clicking the damage category cell a drop-down pick list of the available selections is activated.

**Note:** For Table Entry of direct structure values a list of data entry screens is activated by pressing the right mouse button.

**Utilities.** Under Utilities option you may sort and filter the structure inventory data set. Filter enables you to view a selected set of structures. Filtering options include **Damage Category**, **Occupancy Type**, **Stream**, and **Module**. Figure 6.11 shows the Structure Inventory Filters. You may sort Structure Inventory Data by specifying attributes as shown on the Sort Menu in Figure 6.12.

	Stream Station	Structure Value (\$1,000's)	Content Value (\$1,000's)	Other Value (\$1,000's)	First Floor Stage (ft.)	Beginning Damage Depth (ft.)	Ground Stage (ft.)	Found. Heig. (ft.)
399	9.900	73700.00	36850.00		476.99			
402	9.750	241.50	120.75		476.50			
403	9.730	237.40	118.70		476.50			
404	9.710	344.40	172.20		477.00			
405	9.690	232.30	116.15		476.75			
406	9.660	232.30	116.15		476.81			
407	9.640	344.40	172.20		475.50			
408	9.620	232.30	116.15		475.63			
409	9.600	294.50	147.25		475.50			
410	9.580	232.30	116.15		476.50			
411	9.565	237.40	118.70		476.50			
412	9.500	240.50	120.25		476.50			
413	9.475	355.60	177.80		474.50			
414	9.450	281.20	140.60		472.00			
415	9.420	303.70	151.85		472.25			
416	9.380	470.80	235.40		472.50			
417	9.360	233.40	116.70		473.00			
418	9.335	240.50	120.25		473.00			
419	9.320	242.50	121.25		473.25			
420	9.300	221.10	110.55		472.00			

Figure 6.10 Structure Inventory Table Entry Screen

Filter by Damage Category / Occupancy Type

APT Direct  
APT A-OSNB  
APT A-TSNB  
APT A-TSWB  
AUTO Direct  
COMM Direct  
COMM 11S\_11C\_  
COMM 13S\_13C\_  
COMM 30S\_30C

Filter by Stream

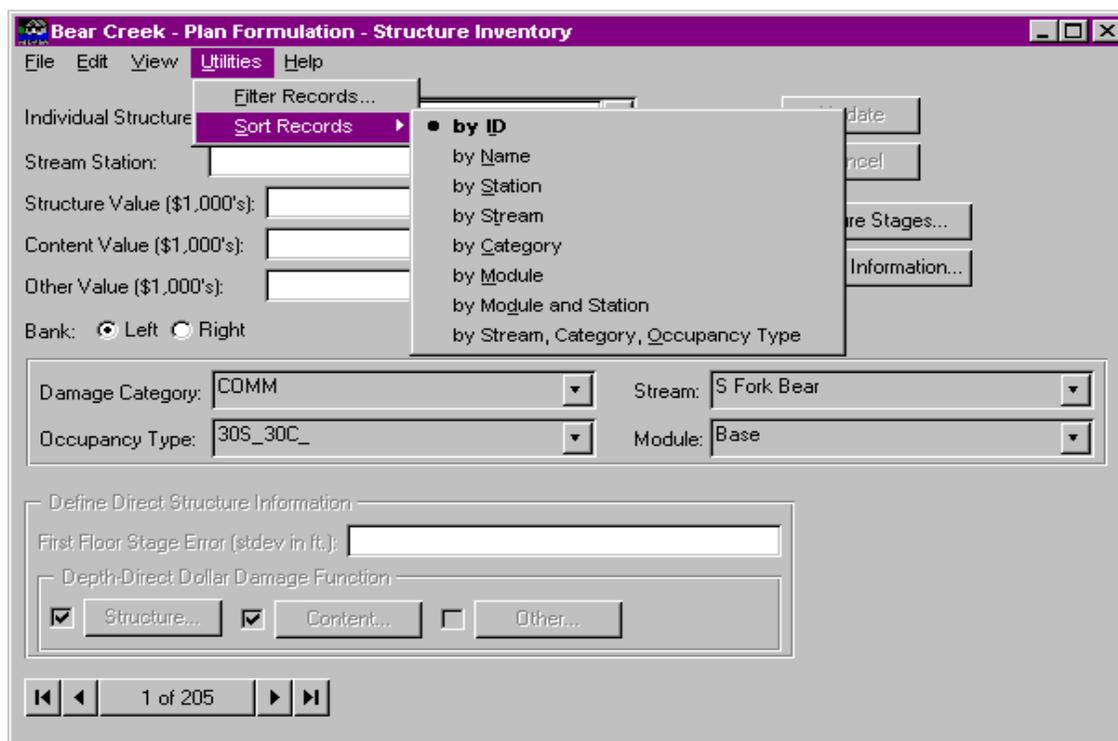
S Fork Bear

Filter by Module

Base

OK Cancel Help

Figure 6.11 Structure Inventory Filter Screen



**Figure 6.12 Structure Inventory Screen with Sort Menu Option**

## Data Variable Description For Structure Inventory

**Damage Category Name:** Select a previously defined damage category name. For table entry, pick list is displayed by pressing the left mouse button.

**Stream Name:** Select a previously defined stream name. For table entry, a pick list is displayed by pressing the left mouse button.

**Structure Occupancy Type:** Select a previously defined structure occupancy type. For table entry, a pick list is displayed by pressing the left mouse button.

**Structure Name:** Name for the defined structure, which is used on reports and plots. A new structure can be added to the database. An existing structure can be selected, updated, or deleted. The maximum length is 16 characters.

**Stream Station:** Study adopted stations along the stream normally denoted as miles (kilometers) above the mouth of the stream. Must be consistent between damage reach boundaries, damage reach index location, water surface profiles, and structure location. The range of allowable values is from -9,999,999.99 to 9,999,999.99.

**Bank:** Stream bank (looking downstream) where the damage reach or structure is located. The delineation of the bank should consider potential local protection flood damage reduction measures and jurisdictional boundaries. Some measures are typically implemented on only one bank, these include levees and walls, and various nonstructural actions. Channels and upstream storage projects reduce flooding for both banks. There are three hardwired choices (Left, Right, Both), with Both being the default. For table entry, a pick list is displayed by pressing the left mouse button.

**Structure Value:** The value of the structure. It does not include the content value. A numeric value ranging from 0 to 999,999,999.

**Content Value:** The value of the contents associated with the structure. It does not include the structure (building) value. Numeric value ranging from 0 to 999,999,999.

**Ground Stage:** The stage or elevation of the ground at the structure. Numeric value ranging from -300 to 30,000.

**Foundation Height:** The vertical distance between the ground stage and first floor stage at the structure.

**Beginning Damage Depth:** Optional depth in feet (meters) where damage begins. Normally used in analysis of structures with basements where flood waters enter above basement floor. Truncates damage function at below specified depth (stage).

**First Floor Stage:** The stage or elevation of the first floor of the structure. Numeric value ranging from -300 to 30,000.

**Structure Address:** The Street, City, State, and Zip Code associated with the structure.

**Structure Coordinate:** The UTM or other study adopted coordinates associated with the structure location.

**Number of Structures:** The number of structures assumed to have identical attributes associated with this structure.

**Structure Image:** Digital image (picture of the structure)

## Enter/Edit/View Reach Stage-Damage Functions with Uncertainty

**Economics/Enter/Edit/View Reach Stage-Damage Function with Uncertainty** is where you (1) enter known functions and uncertainty directly, (2) edit existing functions including those generated by computations, and (3) view existing entered or computed stage-damage functions. The stage-damage with uncertain functions are entered/computed by Plan, Analysis Year, Stream, Damage Reach, and Damage Category. Figure 6-13 shows the data entry screen. The uncertainty is defined by none, normal, triangular or log Normal probability density functions.

Bear Creek - Plan Formulation - Stage-Damage Function at Index Location with Unce...

File Edit View Help

Plan: Plan 2 Stream: S Fork Bear

Analysis Year: 1999 Damage Reach: SF-9

Damage Category: COMM

Function: AggDmg000719 Use An Existing Function

Description:

Define Uncertainty

None  Normal  Triangular  Log Normal

	Stage (ft.)	Damage (\$1,000's)	Standard Deviation of Error
1	474.00	0.00	0.00
2	474.50	0.00	0.00
3	475.00	0.00	0.00
4	475.50	0.00	0.00
5	476.00	0.00	0.00
6	476.50	0.00	0.00
7	477.00	0.00	0.00
8	477.50	0.00	0.00
9	478.00	0.00	0.00
10	478.50	0.00	0.00

Plot...  
Tabulate...  
Save  
Cancel

**Figure 6.13** Damage Reach Stage-Damage with Uncertainty Data Entry Screen

The same functions may be used for several plans and analysis years but not different streams or damage reaches. A complete set of stage-damage functions for all categories, damage reaches, and streams must be entered to analyze a specific plan for an analysis year.

## Data Entry For Enter/Edit/View Reach Stage-Damage Functions with Uncertainty

# Specify (assign) previously defined Plan, Analysis Year, Stream, Damage Reach, and Damage Category for this index location stage-damage-uncertainty.

**HINT:** (1) You may view previous assignments under **VIEW**. You may also list the stage-damage functions. Table 6.2 is an example of the stage-damage assignment screen.

(2) You may copy a stage-damage function for a damage category at an index location of one plan to another plan using the **Use an Existing Function** button. You may copy the stage-damage functions of one plan to another plan using **Economics/Edit/Global Assignment Copy**.

**Table 6.2**  
**Chester Creek**  
**Stage-Damage Function Assignments**

Plan Name	Year	Stream Name	Damage Reach Name	Damage Category Name	Stage-Damage Name
Without	1996	Chester Creek	Reach 1 RM 10-275	RESIDENTIAL	RESIDENTIAL
				COMMERCIAL	COMMERCIAL
	2020	Chester Creek	Reach 1 RM 10-275	RESIDENTIAL	RESIDENTIAL
				COMMERCIAL	COMMERCIAL
Plan 1	1996	Chester Creek	Reach 1 RM 10-275	* RESIDENTIAL	* RESIDENTIAL
				* COMMERCIAL	* COMMERCIAL
	2020	Chester Creek	Reach 1 RM 10-275	****	****
				****	****
* Assignment made but required data missing.					
**** No Assignment					

- # Specify type of uncertainty distribution for analysis.
- # Enter stage-damage-uncertainty function ordinates.
- # **Save** - to store function after review (Tabulate and Plot) for accuracy and completeness. CANCEL leaves screen without changes.

## Description of Data Entry Variables for Enter/Edit/View Stage-Damage with Uncertainty

**Plan Name:** Select a previously defined plan name.

**Stream Name:** Select a previously defined stream name.

**Analysis Year:** Select a previously defined analysis year.

**Damage Reach:** Select a previously defined damage reach.

**Damage Category:** Select a previously defined damage category.

**Stage-Damage Function Name:** Name for the defined stage-damage function, which is used for reports and plots. This name associates a stage-damage function with a plan, stream, year, damage reach, and damage category. We recommend the name be descriptive of the related information. For example, the name "DR1 RESIDENT" conveys the stage-damage function is Damage Reach 1 and the damage category Residential. A new stage-damage function can be added to the database. An existing stage-damage function can be selected, updated, or deleted. The maximum length is 16 characters.

**Stage-Damage Function Description:** Description of the defined stage-damage function. The maximum length is 64 characters.

**Stage-Damage Uncertainty:** You may select to define the uncertainty as none (no uncertainty) or by using a normal, triangular, or log normal probability distribution function.

## Compute Reach Stage-Damage Function with Uncertainty

Under the **Compute Reach Stage-damage Function with Uncertainty** menu you specify the plan and analysis year for the program to compute the stage-damage function with uncertainty at the damage reach index location stations

by study damage categories. The program requires the uncertainty of depth-percent damage functions, first floor, and structure and content values be defined and a complete set (eight profiles) of water surface profiles be available (see **HydEng**). All streams, damage reaches, and damage category functions are computed for the specified plan and analysis year during a single program execution. The results will overwrite previous results including any entered using the direct entry method. Figure 6.14 shows the data entry screen used to highlight plans for computation. You may specify to perform the analysis with or without risk. For studies using previous applied HEC-SID analyses, you may import the SID data (**Economics/Import**) and use the data for the HEC-FDA analysis. This is done by checking the Use SID Reaches and Use SID Reference Floods boxes on the compute box shown in Figure 6.14. Appendix E describes the damage reach stage-damage function aggregation procedures in detail. Results are viewed under previously described **Enter/Edit/View Reach Stage-damage Functions with Uncertainty**.

A check mark is placed in the execute column by the plan if that plan has previously been executed. The date of the execution is also shown.

Execute	Plan Name	Analysis Year	Compute With Risk	Use SID Reaches	Use SID Ref Flood	Plan Description	Date of Execution
✓	Without	1999	✓			Without project condition	Tue Dec 3, 1996 4:58:43 PM Pac
✓	Without	2020	✓			Without project condition	Tue Dec 3, 1996 4:58:43 PM Pac
✓	Plan 1	1999	✓			Detention + Channel Imp.	Thu Nov 6, 1997 8:04:08 AM Pac
✓	Plan 1	2020	✓			Detention + Channel Imp.	Thu Nov 6, 1997 8:04:08 AM Pac
✓	Plan 2	1999				Floodwall Only	Tue Dec 3, 1996 4:58:43 PM Pac
✓	Plan 2	2020				Floodwall Only	Tue Dec 3, 1996 4:58:43 PM Pac
✓	Plan 3	1999				Detention, Channel Imp., and Floodwall	Thu Nov 6, 1997 8:04:08 AM Pac
✓	Plan 3	2020				Detention, Channel Imp., and Floodwall	Thu Nov 6, 1997 8:04:08 AM Pac

Figure 6.14 Compute Reach Stage-Damage Function Screen

## Data Entry for Computing Reach Stage-Damage Function

- # Highlight plan (s) and analysis year and other options to compute stage-damage-uncertainty functions by damage reach and damage categories.

**HINT:** (1) Analyses are computationally intense. We recommend initially running one plan/analysis year at a time.

(2) You may drag cursor for highlighting multiple entries in sequence or depress and hold CONTROL and click on specific entries.

# Press Compute to perform computations.

## Description of Data Entry Variables for Stage-Damage Function

**Plan Name:** Select a previously defined plan name.

**Stream Name:** Select a previously defined stream name.

**Analysis Year:** Select a previously defined analysis year.

**Damage Reach:** Select a previously defined damage reach.

**Damage Category:** Select a previously defined damage category.

**Stage-Damage Function Name:** Name for the defined stage-damage function, which is used for reports and plots. This name associates a stage-damage function with a plan, stream, year, damage reach, and damage category. We recommend the name be descriptive of the related information. For example, the name "DR1 RESIDENT" conveys the stage-damage function is Damage Reach 1 and the damage category Residential. A new stage-damage function can be added to the database. An existing stage-damage function can be selected, updated, or deleted. The maximum length is 16 characters.

**Stage-Damage Function Description:** Description of the defined stage-damage function. The maximum length is 64 characters.

**Stage-Damage Uncertainty:** You may select to define the uncertainty as none (no certainty) or by using a normal, triangular, or log normal probability distribution function.

## Import

You may import old HEC-SID structure inventory information into HEC-FDA using the **Economic/Import** menu. You may also import ASCII \*.TXT files from commercial spreadsheets and databases. Please see Appendix E for more detailed description of the procedures.