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APPENDIX B - ECONOMICS

I. Introduction

A. Purpose

Existing flood damages analyses were conducted to quantify single event and average annual flood damages under without-project conditions within the study area. Future increases in flood damages resulting from additional development within the watershed, manifesting itself either as an increase in precipitation run-off and increased flood depths, and/or an increase in the number of damageable property, are neither anticipated nor accounted for in the analysis of flood damages.

B. Study Area

Each county within the study area is further segmented into reaches based upon hydraulic, economic, and physical characteristics of the study area for the purpose of simplifying the assessment of existing and future conditions. Table B-1 displays the reach descriptions by county.

Table B-1. Economic Reaches

County/Reach	Upstream Limit / Station	Downstream Limit / Station
Llano County		
Lake Buchanan	Upper Llano County Line / 2317000.00	Buchanan Dam / 2211301.00
Inks Lake	Buchanan Dam / 2211300.00	Inks Dam / 2189501.00
Lake LBJ	Inks Dam / 2189500.00	Wirtz Dam / 2077001.00
Burnet County		
Above Burnet	Extremities of the Hydraulics / 2543026.00	Upper Burnet County Line / 2379351.00
Upper Burnet	Upper Burnet County Line / 2379350.00	Upper Llano County Line / 2317001.00
Lake Buchanan	Upper Llano County Line / 2317000.00	Buchanan Dam / 2211301.00
Inks Lake	Buchanan Dam / 2211300.00	Inks Dam / 2189501.00
Lake LBJ	Inks Dam / 2189500.00	Wirtz Dam / 2077001.00
Lake Marble Falls	Wirtz Dam / 2077000.00	Starcke Dam / 2042001.00
Lower Burnet	Starcke Dam / 2042000.00	Upper Travis County Line / 1921467.00
Travis County		
Lake Travis	Upper Travis County Line / 19488000.00	Mansfield Dam / 1699551.00
Lake Austin	Mansfield Dam / 1699550.00	Tom Miller Dam / 1590480.00
Town Lake	Tom Miller Dam / 1590479.00	Longhorn Dam / 1558755.00
Lower Austin	Longhorn Dam / 1558755.00	Lower Edge of City 1475977.00
Lower Travis	Lower Edge of City / 1475976.00	Lower Travis County Line / 1407151.00
Three County Area (B/C/F)		
Upper Bastrop	Lower Travis County Line / 1407150.00	Upper Edge of City / 1267039.00
Bastrop	Upper Edge of City / 1267038.00	Lower Edge of City / 1246273.00
Middle Bastrop	Lower Edge of City / 1246272.00	Upper Smithville Line / 1127755.00
Smithville	Upper Smithville Line / 1127754.00	Lower Smithville Line / 1110143.00

Table B-1. (continued)

County/Reach	Upstream Limit / Station	Downstream Limit / Station
Three County Area (B/C/F) *(continued)*		
Upper Fayette	Lower Smithville Line / 1110142.00	SH 71 Bypass – LaGrange / 939102.00
LaGrange	SH 71 Bypass – LaGrange / 939101.00	Lower Edge of LaGrange / 919294.00
Lower Fayette	Lower Edge of LaGrange / 919293.00	SH 71 at Columbus / 752309.00
Columbus	SH 71 at Columbus / 752308.00	Lower Edge of Columbus / 680355.00
Eagle Lake	Lower Edge of Columbus / 680354.00	9 Miles Above Garwood / 579290.00
Garwood	9 Miles Above Garwood / 579289.00	Colorado County Line / 497801.00
Wharton County		
Upper Wharton	Colorado County Line / 497500.00	6 Miles Above Glen Flora / 425583.00
Glen Flora	6 Miles Above Glen Flora / 425582.00	US 59 / 358245.00
Wharton	US 59 / 358244.00	Lower Edge of City / 325426.00
Lower Wharton	Lower Edge of City / 325425.00	Wharton County Line / 241351.00
Matagorda County		
Upper Matagorda	Wharton County Line / 241350.00	FM 521 / 84477.00
Matagorda	FM 521 / 84476.00	North of the Locks / 38364.00

C. Socio-Economic Overview

The following sections provide a brief overview of the population, employment, and income for each county along the mainstem of the river. Information was obtained from the State of Texas County Information Project database, and the United States Regional Economic Information System.

Llano County covers an area of 935 square miles, and had a 2000 population of 17,044, an increase of 46% over the 1990 population. The 2000 population was ranked 129th in the state (out of a total of 254 counties). Per capita personal income was $21,354, and ranked 118th in the state. The largest industries were services, state and local government, and construction. Between 1990 and 2000, finance, insurance, and real estate were the fastest growing industries.

Burnet County covers an area of 995 square miles, and had a 2000 population of 34,147, an increase of 51% over the 1990 population. The 2000 population was ranked 79th in the state (out of a total of 254 counties). Per capita personal income was $22,244, and ranked 70th in the state. The largest industries were services, state and local government, and retail trade. Between 1990 and 2000, finance, insurance, and real estate were the fastest growing industries.

Travis County covers an area of 989 square miles, and had a 2000 population of 812,280, an increase of 41% over the 1990 population. Travis County is part of the Austin-San Marcos Metropolitan Area. The 2000 population was ranked 5th in the state (out of a total of 254 counties). Per capita personal income was $35,094, and ranked 7th in the state. The largest industries were services, durable goods manufacturing, and state and local government. Between 1990 and 2000, wholesale trade was the fastest growing industry.

Bastrop County covers an area of 888 square miles, and had a 2000 population of 57,733, an increase of 51% over the 1990 population. Bastrop County is part of the Austin-San Marcos Metropolitan Area. The 2000 population was ranked 52nd in the state (out of a total of 254 counties). Per capita personal income was $20,934, and ranked 128th in the state. The largest industries were state and local government, services, and retail trade. Between 1990 and 2000, construction was the fastest growing industry.

Fayette County covers an area of 963 square miles, and had a 2000 population of 21,804, an increase of 11% over the 1990 population. The 2000 population was ranked 114th in the state (out of a total of 254 counties). Per capita personal income was $22,849, and ranked 81st in the state. The largest industries were services, state and local government, and retail trade. Between 1990 and 2000, finance, insurance, and real estate were the fastest growing industries.

Colorado County covers an area of 950 square miles, and had a 2000 population of 20,390, an increase of 9% over the 1990 population. The 2000 population was ranked 109th in the state (out of a total of 254 counties). Per capita personal income was $23,539, and ranked 94th in the state. The largest industries were services, state and local government, and retail trade. Between 1990 and 2000, construction was the fastest growing industry.

Wharton County covers an area of 1,090 square miles, and had a 2000 population of 41,188, an increase of 3% over the 1990 population. The 2000 population was ranked 68th in the state (out of a total of 254 counties). Per capita personal income was $23,212, and ranked 64th in the state. The largest industries were services, state and local government, and farming. Between 1990 and 2000, durable goods manufacturing was the fastest growing industry.

Matagorda County covers an area of 1,114 square miles, and had a 2000 population of 37,957, an increase of 3% over the 1990 population. The 2000 population was ranked 72nd in the state (out of a total of 254 counties). Per capita personal income was $20,630, and ranked 140th in the state. The largest industries were transportation and public utilities, services, and state and local government. Between 1990 and 2000, farming was the fastest growing industry.

Table B-2 provides current and projected populations in counties along the mainstem of the Colorado River. By 2040, the population is expected to increase by 68%.

Table B-2. Projected Population 2010 – 2040 (Mainstem)

County	2000	2010	2020	2030	2040
Bastrop	57,733	75,386	97,601	123,734	153,392
Burnet	34,147	41,924	51,044	60,382	69,271
Colorado	20,390	21,101	22,032	22,550	22,760
Fayette	21,804	22,869	24,766	26,279	27,523
Llano	17,044	16,040	15,249	14,565	14,266
Matagorda	37,957	40,506	43,295	44,991	45,925
Travis	812,280	963,120	1,105,551	1,245,654	1,371,840

Table B-2. (continued)

County	2000	2010	2020	2030	2040
Wharton	41,188	43,560	46,045	47,647	48,567
Totals	1,042,543	1,224,506	1,405,583	1,585,802	1,753,544

Source: Texas State Data Center and Office of the State Demographer

D. **Historic Flooding**

Marble Falls:
Marble Falls is located in Burnet County. Flooding was reported four times between 1980 and 1986. The most flood prone areas are within the FEMA 100-year floodplain delineation. Of the four floods, the most serious was in September 1981. More than 300 structures throughout the county were affected. Damage estimates exceeded $500,000.

Burnet:
Burnet is the county seat of Burnet County. The city flooded 6 times between 1980 and 1985. The most damaging event occurred in May of 1982 with property damages as high as $500,000.

Austin:
October 17, 1998. In Austin, 454 homes were damaged, with most of the damages incurred to houses along Onion Creek, Walnut Creek, and Williamson Creek. Statewide, this storm caused property damages and losses of almost $1 billion.

May 24, 1981. This storm event will always be remembered as the "Memorial Day Flood" which drowned 13 people and caused $36 million in damages. This short-duration storm with intense rainfall hit many of Austin's urban creeks: Shoal, Walnut, Little Walnut, Bee, and Waller. Shoal Creek normally flows at 90 gallons per minute, but peaked during this flood at 6 million gallons per minute! Some areas received over 10" of rain in four hours.

City of Wharton:
The entire city of Wharton is situated within the 500-year floodplain, and much of it is within the 100-year floodplain of the Colorado River. The construction of Mansfield Dam (Lake Travis) in 1940 decreased the peak flows of the Colorado River through the city of Wharton, but it did not eliminate flooding. Recent significant flooding events occurred in 1991 and 1998.

In October of 1998, 8”-20” of rain fell within the Colorado River watershed along the Wharton/Colorado county line. Minimal rainfall occurred within the City of Wharton; however, citywide approximately 800 homes were damaged. Over 500 residences in the West End neighborhood were filled with 2’-4’ of floodwaters and 3’ of water flooded nearby Dawson Elementary School.

Local flooding created by Peach Creek, Baughman Slough, and Caney Creek has caused damage throughout the city, which is in addition to the events caused mainly by the Colorado River. The most recent of these events was Tropical Storm Fay, in

September of 2002. Up to 22 inches of rainfall fell over some portions of Wharton County, with approximately 100 homes in Wharton sustaining damage.

II. Structural and Vehicular Flood Damage Computation Procedure

A. Methodology

The computation of flood damages is based upon the depth of flooding for various flood events (exceedence probabilities), and a relationship between the depth of flooding and the estimated damages based upon a percentage of the structure and content, or vehicle value. Damages to the various structures, accumulated by frequency, produce a frequency-damage function. An integration process, using these frequency-damage data, calculates estimates of expected annual damages. This involves aggregating the multiplication of the mean damage between each pair of flood events by the difference in exceedence probabilities. This is then repeated for the range of flood events in each damage category. The nomenclature used in this appendix to describe the relative risk reflects the actual probability, rather than the average recurrence interval, of flood events. For example, the commonly used term "100-year frequency flood", meaning that flood which stands a one percent chance of being equaled or exceeded in any given year, will hereafter be known as the “1 percent annual chance exceedance (ACE) flood.”

B. Hydrologic Engineering Center-Flood Damage Assessment (FDA) Program

The Hydrologic Engineering Center-Flood Damage Assessment (FDA) Program is used to compute flood damages under without- and with-project conditions. The program integrates hydrologic, hydraulic, and characteristics through application of a Monte Carlo simulation, and computes single event and expected annual damages while accounting for risk and uncertainty in the basic values. Damage susceptibility factors used by the program to estimate flood damages include the number and type of structures, structure and content values, the elevation where the structure begins to sustain measurable damages, and a flood depth-damage relationship.

Geographic Information System (GIS) technology was used extensively in the storing and manipulation of structure data used in conjunction with the FDA program. Aerial photographs of the study area were digitized using the state plane coordinate system to create a base map of the study area. The base map displays structure footprints and major physical features of the study area such as bodies of water, roads, bridges, and other physical characteristics. Overlaid on the base map were “layers” of information including topographical contours and elevations, river cross-sections, and property parcel lines using a common coordinate system to assure the overlays were properly oriented. The use of this technology facilitated efforts to enter structure specific data into a spreadsheet format for inputting directly into the FDA program. This approach allowed for a more efficient storing and manipulation of large amounts of structure data (approximately 80,000 structures) while adding a level of accuracy achieved by having the ability to visually verify the input data as well as corroborate the results generated by FDA.

Inputs to the model can be described in two major categories: an inventory of property and the hydrologic/hydraulic characteristics of the study area. Each of these inputs is described below.

C. Inventory of Property

An inventory of property was conducted to determine the number and type of structures, structure and content values, and ground and first floor elevations (elevation where water enters the structure). Associated with the inventory is the identification of an applicable flood depth-percent damage relationship for each structure type. Lastly, the privately owned vehicles susceptible to flood were estimated. Each is described in detail in the following paragraphs.

1. Number and Types of Structures

Structure types are defined as residential, residential outbuildings (garages, sheds, and other buildings near the main residence), commercial, industrial, public, and agricultural buildings (barns, sheds, and other agricultural use buildings). Residential structures are broken down as single-family, multi-family, or mobile units. Each of these categories is further sub-divided by the number of stories, split level, and with- or without-basements.

The total number of structures in the study area was determined using aerial photography overlaid with flood plain delineations. A visual survey was conducted to verify the number and type of structures. All structures in the study area within the 1-percent ACE flood plain were observed and structure types recorded. Structures beyond the 1-percent ACE flood plain were observed and recorded for Travis County, Marble Falls (Burnet County), and Wharton (Wharton County). For the remaining counties, the types of structures beyond the 1-percent ACE flood plain were determined using the assumption that certain types of buildings fall within square footage ranges. Square footage figures were taken from the digitized aerial photographs. A summary of those square footage assumptions are presented in Table B-3.

Table B-3. Structure Type Based on Square Footage

Area (sq. ft.)	Type of Structure
Less than 300	Shed
300 to 600	Garage
600 to 900	Mobile Home
900 to 4000	Residential – Single Family
4000+	Commercial/Industrial/Public

During the visual survey, when structures were observed to be new or under construction, they were photographed and their data added. Some information about structure address, type of construction material (stone, brick, wood siding, etc), and size was collected when tax records were attached.

2. **Structure Value**

Structure values used in the analysis reflect the replacement cost less depreciation to the existing (pre-flood) structure. Replacement cost is the cost of physically replacing (reconstructing) the structure. Depreciation accounts for deterioration occurring prior to flooding, and variations in remaining useful life of the structure.

Residential, commercial, and industrial structure values were obtained from county appraisal districts. Property parcel maps were overlaid on the aerial photography resulting in each property having a corresponding identification number. This identification number allowed the parcel to be linked to the appraisal district data. In some instances, the appraisal district data listed a single structure value for property on which several structures were located requiring an apportionment of the total value to several structures. Structure values for public structures could not be obtained from the appraisal district. Owners of public structures (churches, schools, municipalities, etc.) were contacted directly to obtain structure values, which were based on the structures insured value. In instances where the appraisal district had no record of a particular structure, values were determined using the 2001 Marshall and Swift construction cost manual or the average square foot price of similar type structures.

3. **Content Value**

Content values for one- and two-story, no basement, residential structures are correlated to the structure value and embedded within depth-percent damage relationships based on data collected at the national level. Commercial and industrial content values were obtained from the appraisal districts. Public content values were obtained directly from the entities involved. In the absence of commercial, industrial, and public contents value data from the appraisal district or directly from the owner, estimates of content values were based on the proportion of content value to structure value for similar structures in the study area with known structure and content values. These proportions were developed for specific structure types, sizes, business or activity, and applied to the structure value to estimate a specific content value for each structure.

4. **Ground and First Floor Elevations**

The elevation at which water first enters an opening (door, window, etc.) in the structure is typically referred to as the first floor elevation. This elevation can be obtained in two ways. The first is to conduct a structure specific survey to determine this elevation. The second is to measure, estimate, or assume ground elevation at the structures and either measure, estimate, or assume the vertical distance to the first floor (a first floor correction.)

First floor elevations were determined by estimating the ground elevation at each structure from topographic mapping. A visual estimate of the vertical distance to the first floor was then made. Prior to incorporating this technique for the entire study

area, a pilot study was done in the City of Marble Falls to determine the accuracy and efficiency of this method. More precise measurements of the ground elevation and first floor correction were performed by field survey on a sample of structures, and compared with the first floor corrections estimated with a visual survey. The conclusion reached was that the visual survey produced results sufficiently accurate for this investigation. Consequently, first floor corrections were estimated using this technique for the study area within the 1-percent ACE flood plain. Outside of the 1-percent ACE flood plain, a sample of elevations was taken.

Maximum and minimum ground elevations were determined for each structure, and compared to the estimated first floor correction. First floor corrections observed from the high side had few problems. However, in most cases where a floor correction was observed from the low side, the recorded figure was less than the difference between the maximum and minimum. In those cases, adding the recorded floor correction to the recorded side of the building gave an artificially low start to damages. The only reasonable method to correct this without a new survey was to make a few basic assumptions. They were:

- The low side ground elevation plus the recorded floor correction had to total at least as much as the maximum ground elevation. If this was not true, the floor correction needed adjusting. Further assumptions were based on types of structures and use. Assumptions made would give the lowest realistic floor correction for the type and use of each structure.
- All sheds and barns that did not have floor corrections higher than the maximum ground elevation were assumed to have zero floor corrections on the high side.
- Slab houses in central Texas have an average foundation thickness of approximately 6 inches above the ground. Six inches was added to all high side elevations unless there was already an estimate from the field that was in excess of or reasonably close to 6 inches.
- Detached garages were assumed to have similar support requirements as a single-family house.
- In reaches where the average recorded high side floor correction exceeded the minimum (for any type of structure), that average was used.
- Certain types of commercial buildings and most warehouses generally have some kind of a loading dock on the low side of the building. The back opening of a truck is at least 3 feet off the ground, so 3 feet was used as the floor correction on the low side for structures that could be identified as needing a loading dock.
- Mobile homes in the State of Texas are required by law to have a minimum of 30 inches of clearance on some side of the structure. It is unlikely that any other side sits directly on the ground, so mobile homes were given a minimum of three feet on the low side. It was also assumed that any low side measurement had to equal at least the maximum minus the minimum elevations plus 6 to eight inches to raise the structure off the ground on the maximum side.

- Averages were taken by reach for the remaining commercial buildings and public buildings and applied to the high side of structures where data was missing. If no data was available, figures from reaches with similar ground elevation features were applied.

5. **Depth-Percent Damage Relationships**

Depth-percent damage relationships relate the depth of flooding relative to the structure first floor, contents, and vehicle damages, as a percent of the estimated value. Depth-percent damage relationships can be based on specific data regarding the structure, contents, and expected damages; however, in most cases generalized relationships are used. For this analysis, generalized curves for one and two-story (without basement) residential structures were developed from the Corps studies completed on actual major flood events that occurred in various parts of the United States in 1996, 1997, and 1998. For the remaining structure types, the relationships used in this study are based upon generalized curves compiled by the U.S. Federal Emergency Management Agency, Flood Insurance Administration. Table B-4 displays the depth-percent damage relationship for the most prevalent structure type (single story residential – no basement) in the study area. Table B-5 displays the depth-percent damage relationship for privately owned vehicles.

Table B-4. Depth-Percent Damage Relationship for Residential Structure

	Percent Damage			Percent Damage	
Stage	Structure	Contents[(1)]	Stage	Structure	Contents[(1)]
-2	0.0	0.0	9	70.5	37.2
-1	2.5	2.4	10	73.2	38.4
0	13.4	8.1	11	75.4	39.2
1	23.3	13.3	12	77.2	39.7
2	32.1	17.9	13	78.5	40.0
3	40.1	22.0	14	79.5	40.0
4	47.1	25.7	15	80.2	40.0
5	53.2	28.8	16	80.7	40.0
6	58.6	31.5	20	85.0	50.0
7	63.2	33.8	30	85.0	60.0
8	67.2	35.7	40	85.0	70.0

[(1)]As a percent of the structure value.

Table B-5. Depth-Percent Damage Relationship for Vehicles

Stage	Percent Damage
0[(1)]	20
1	50
2	80
3	100
5	100

[(1)]Zero stage relates to the elevation at which water first begins to impact the vehicle, and is assumed to be 1-foot above the ground elevation.

6. **Privately Owned Vehicles**

Damages for automobiles were estimated based on the average number of vehicles per residence characteristic of the study area, and the probability of their being present at the time of a flood. An analysis was made of registered motor vehicles per occupied housing unit for counties within Metropolitan Statistical Areas (MSA) in Texas, using data from the U.S. Census and the Texas State Department of Highways and Public Transportation. The number of registered vehicles per occupied housing unit in a MSA clusters around a mean value of 2.48. Given that not all registered motor vehicles are associated with private residences, and some housing units are unoccupied, an average of 2.0 vehicles per residence is assumed for this analysis. It is anticipated that 1.5 of these would be present during non-work hours (128 hours per week) and 0.5 present during work hours (40 hours per week). The expected number of vehicles present at any given time that a flood might occur would therefore be:

$$((128/168)*1.5)+((40/168))\,0.5$$

or 1.26 expected vehicles per residence. The exact number would vary depending on the assumptions made, but for further simplicity, and conservatism, it is assumed that one vehicle per residence would be present at the time of a flood. This vehicle is assumed to be at the same location, stream station and ground elevation as the structure with which it is associated. Damages start when flooding reaches one foot above the ground elevation.

Calculation of the expected number of vehicles present at the time of a flood is irrelevant to the amount of warning time residents receive since a flood affects all vehicles present. A vehicle is usually the single most valuable item of personal property, and the most mobile. However, the majority of urban areas experience flooding with little or no warning time, because of either a steep flood hydrograph, a lack of a warning system, or both. Consequently, substantial vehicle damages are typically observed. In any case, the effects of increased flood warning time would take the expected number of vehicles as its baseline.

Field observations suggest a positive correlation between the value of a residential structure and the value of the associated vehicle. However, the relationship is not proportional, since low-valued structures can be associated with vehicles worth as much as the structure itself. Likewise, the most affluent residence can be associated with a vehicle worth a tenth of the value of the structure. A plausible average value for a vehicle results by assuming the following relationship for detached single-family residences:

$$V = (0.15*S)+1000$$

where V is the vehicle value and S is the value of the residential structure. The typical residence, with a structure value in the range of $40,000 to $60,000, would have a vehicle worth $7,000 to $10,000. This is consonant with field observations

and consideration of the average age of the private vehicle stock (five years), the corresponding depreciation (about fifty percent), and the average vehicle cost when new (about $15,000 to $25,000). An exception to this general formula results with mobile homes due to the lower structure value relative to the economic status of the residents, (which is the basic determinant of the value of their personal property, including vehicles). The assumed relationship for mobile homes is:

$$V = (0.2*S)+1000.$$

While all of these values are assumed rather than empirical, varying them does not greatly affect the resulting assumed average vehicle value or the vehicular flood damages that result from using them. The foregoing set of assumed relationships, although hypothetical is considered realistic and a sufficient basis for planning purposes.

III. Structural & Vehicular Flood Damage Results

A. Flood Profiles and Probability of Flood Events

A full range of without-project water surface profiles were developed. They include the 50-, 20-, 10-, 4-, 2-, 1-, 0.2-, and 0.1 percent annual chance exceedance (ACE) flood events (or the 2-, 5-, 10-, 25-, 50- 100- 500-, and 1000 year, or SPF flood, respectively.) These water surface profiles were generated with the hydrologic and hydraulic analysis discussed in Chapter III and Appendix A of this report.

The profiles were used to delineate the flood limits, and determine the relationship of damageable properties to both elevation and frequency of flood occurrence. Satisfactory development of the hydraulics model is a multi-stage iterative process in which the reasonableness of the resulting economic effects assists in the refinement of the hydrology and hydraulics models. For example, if the initial results of the FDA analysis indicate frequent damage to many structures in a given reach, when in fact, there is no such history, then adjustments to the hydrology and/or hydraulics models may be in order. The initial results may also serve to highlight potential errors in structure elevations.

B. Flood Profile Stationing

Flood profile stationing occurs at specific river “cross-sections” and connects water surface elevations of various flood events to specific structures. For the lower Colorado, a TINing process was used which attached stationing directly to each structure. This interfaced with the water surface data to provide a depth of flooding relative to the first floor.

C. Value of Flood Plain Investment

There are over 12,400 and 33,800 structures within the 1- and 0.1-percent ACE mainstem floodplain, with an estimated value (structures and contents) of $845 million and $4.08 billion, respectively. The total value of the 0.1-percent ACE flood plain

inventory (including structures, contents, and privately owned vehicles) is estimated at over $4.3 billion. Table B-6 (A through F) displays a summary of the number and value of the flood plain properties for the 1- and 0.1-percent ACE flood plain. Table B-7 displays a summary of the number and value of privately owned vehicles for the 0.1-percent ACE flood plain.

D. **Single Event and Expected Annual Damages**

The Flood Damage Analysis (FDA) computer program first computes stage-aggregated damages (single event damages) for each plan, year, reach, and damage category. Stage-aggregated damage functions are one of three primary functions used to construct a damage-probability function. The other two functions are discharge-exceedance probability and stage-discharge.

The computation of expected annual damages utilizes only the stage-total aggregated damage function, and not the individual components such as structure damage. The expected annual damage is the mean damage obtained by integrating the damage-exceedance probability curve for the damage reach. The damage-exceedance probability function is obtained from the discharge-exceedance probability, stage-discharge, and damage-stage functions derived at a damage reach index location. The inclusion of uncertainty for these variables requires a numerical integration approach (Monte Carlo) be applied. Monte Carlo relies on an exceedance probability analysis of samples of the contributing random variables obtained from the generation of random numbers.

Uncertainty is the estimated amount or percentage by which an observed or calculated value may differ from the true value. The uncertainty distribution is a statistical relationship of possible outcomes that defines the dispersion or variance of errors about the median or “best estimate” of values along a function. Uncertainty distributions are used to quantify errors probabilistically when using risk-based analysis. Within FDA, uncertainty for the inventory of property is defined for the first-floor elevation, structure value, content-to-structure value ratio, and damage in the depth-percent damage function. (The uncertainty involved in the estimation of the exceedance-probability and stage-discharge functions is defined by the hydrologic and hydraulic analyses.)

In this analysis, the uncertainty (normal distribution – standard deviation) for first floor elevations on all structures was estimated to be 0.2-feet. This uncertainty was based on actual observations taken as discussed in the previous discussion of ground and first floor elevations, and is consistent with Corps’ guidance. For the residential structures using the Corps’ generalized depth-percent curves, uncertainty in structure values and the content-to-structure value ratio is not quantified as these uncertainties are already accounted for in the curves. For all other structure types, uncertainties for structure values and the content-to-structure value ratios, based on professional judgment and previous studies, are between 5- and 10%. Uncertainty in the damage in the depth-percent damage relationship, developed as part of the generalized depth-percent damage curves (for each stage), was used.

Table B-8 (A through F) displays a summary of the number of structures and amount of flood damages within each ACE flood plain (single event damages). Table B-9 displays a summary of the number of privately owned vehicles and damages within each ACE

flood plain. Table B-10 displays a summary of the expected annual damages, by category and reach. A brief discussion of damages within each county is discussed below.

Table B-6. Total Structural and Contents Value within Floodplains
(Damage Values in 1000's of Dollars)

(A) LLANO COUNTY	*Number*		*Structure Value*		*Content Value*		*Total Value*	
Lake LBJ	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Single Family	524	2,410	34,514	214,948	17,257	107,474	51,771	322,422
Multifamily	19	126	1,759	18,366	880	9,183	2,639	27,550
Public	0	2	0	285	0	271	0	556
Commercial	37	89	1,565	9,096	1,819	5,174	3,384	14,270
Residential Outbuildings	528	1,353	5,968	14,558	5,968	15,109	11,936	29,667
Total Lake LBJ	**1,108**	**3,980**	**43,806**	**257,253**	**25,924**	**137,211**	**69,730**	**394,465**
Lake Buchanan								
Single Family	0	544	359	48,668	180	24,334	539	73,002
Commercial	2	23	34	806	25	220	59	1,026
Residential Outbuildings	50	629	584	5,929	584	7,005	1,168	12,934
Total Lake Buchanan	**52**	**1,196**	**977**	**55,403**	**789**	**31,559**	**1,766**	**86,962**
Inks Lake								
Single Family	44	98	1,996	7,175	998	3,587	2,994	10,762
Commercial	1	1	1,115	1,115	1,571	1,571	2,686	2,686
Residential Outbuildings	60	89	577	918	721	1,149	1,298	2,067
Total Inks Lake	**105**	**188**	**3,688**	**9,208**	**3,290**	**6,307**	**6,978**	**15,515**
Total Llano County	**1,265**	**5,364**	**48,471**	**321,864**	**30,003**	**175,077**	**78,474**	**496,942**

Table B- 6. *(continued)*

(B) BURNET COUNTY	Number		Structure Value		Content Value		Total Value	
Lower Burnet	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Single Family	96	181	5,073	10,101	2,537	5,050	7,610	15,151
Multifamily	2	2	120	120	60	60	180	180
Agricultural	1	2	254	277	130	150	384	427
Public	9	9	169	169	169	0	338	169
Commercial	1	1	22	22	22	0	44	22
Residential Outbuildings	73	113	435	606	435	700	870	1,306
Total Lower Burnet	**182**	**308**	**6,072**	**11,295**	**3,353**	**5,960**	**9,425**	**17,255**
Inks Lake								
Single Family	54	115	4,229	8,762	2,114	4,381	6,343	13,143
Agricultural	0	1	0	22	0	22	0	44
Public	17	20	170	235	41	235	211	470
Residential Outbuildings	58	93	301	823	451	1,053	751	1,876
Total Inks Lake	**129**	**229**	**4,700**	**9,842**	**2,606**	**5,691**	**7,306**	**15,533**
Lake Marble Falls								
Single Family	213	941	17,544	55,036	8,772	27,518	26,316	82,554
Multifamily	0	15	0	2,244	0	1,122	0	3,366
Public	13	13	610	610	106	106	716	716
Agricultural	0	1	0	26	0	26	0	52
Commercial	14	35	671	5,050	6,013	17,375	6,684	22,425
Residential Outbuildings	93	279	242	1,223	303	1,610	545	2,833
Total Lake Marble Falls	**333**	**1,284**	**19,067**	**64,189**	**15,194**	**47,757**	**34,261**	**111,946**

Table B- 6. *(continued)*

(B) BURNET COUNTY	*Number*		*Structure Value*		*Content Value*		*Total Value*	
Lake LBJ	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Single Family	184	1,598	15,744	146,177	7,872	73,088	23,616	219,265
Multifamily	3	9	1,133	2,368	567	1,184	1,700	3,552
Public	1	9	3	278	0	115	3	393
Agricultural	0	2	0	1	0	1	0	2
Commercial	16	92	414	4,227	450	4,525	864	8,752
Residential Outbuildings	258	1,111	1,462	5,670	2,215	3,299	3,677	8,969
Total Lake LBJ	**462**	**2,821**	**18,756**	**158,721**	**11,104**	**82,212**	**29,860**	**240,933**
Lake Buchanan								
Single Family	0	239	0	15,912	0	7,956	0	23,868
Public	0	1	0	3	0	0	0	3
Residential Outbuildings	32	227	159	958	198	1,176	357	2,134
Total Lake Buchanan	**32**	**467**	**159**	**16,873**	**198**	**9,132**	**357**	**26,005**
Above Burnet								
Single Family	4	4	57	57	57	57	114	114
Total Above Burnet	**4**	**4**	**57**	**57**	**57**	**57**	**114**	**114**
Upper Burnet								
Single Family	4	4	30	157	30	157	60	314
Residential Outbuildings	3	5	14	29	7	35	21	64
Total Upper Burnet	**7**	**9**	**44**	**186**	**37**	**192**	**82**	**378**
Total Burnet County	**1,149**	**5,122**	**48,856**	**261,163**	**32,549**	**151,001**	**81,404**	**412,164**

Table B- 6. *(continued)*

(C) TRAVIS COUNTY	Number		Structure Value		Content Value		Total Value	
Town Lake	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Single Family	3	176	1,483	46,946	741	23,473	2,224	70,419
Multifamily	1	61	19	39,265	10	19,633	29	58,898
Commercial	1	71	764	153,186	26,000	49,011	26,764	202,197
Public	3	80	54	259,548	27	32,145	81	291,693
Residential Outbuildings	1	119	8	564	8	611	16	1,175
Total Town Lake	**9**	**507**	**2,328**	**499,509**	**26,786**	**124,873**	**29,114**	**624,382**
Lower Travis								
Single Family	78	443	2,286	29,311	1,143	19,321	3,429	48,632
Agricultural	27	62	165	951	165	951	330	1,902
Commercial	2	10	46	301	111	464	157	765
Public	1	3	22	179	29	30	51	209
Residential Outbuildings	79	359	311	1,482	367	1,763	678	3,245
Total Lower Travis	**187**	**877**	**2,830**	**32,224**	**1,815**	**22,529**	**4,645**	**54,753**
Lower Austin								
Single Family	15	238	10,615	87,433	5,308	43,717	15,923	131,150
Multifamily	0	13	0	4,560	0	2,280	0	6,840
Agricultural	0	23	0	466	0	141	0	607
Commercial	3	54	72	18,012	72	19,261	144	37,273
Public	7	34	5,186	20,666	2,740	8,407	7,926	29,073
Residential Outbuildings	25	191	592	2,887	888	3,787	1,481	6,674
Total Lower Austin	**50**	**553**	**16,465**	**134,024**	**9,008**	**77,593**	**25,473**	**211,617**

Table B- 6. *(continued)*

(C) TRAVIS COUNTY	*Number*		*Structure Value*		*Content Value*		*Total Value*	
Lake Travis	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Single Family	1,212	2,135	160,661	378,892	80,330	189,446	240,991	568,338
Multifamily	15	57	11,417	20,964	5,708	10,482	17,125	31,446
Agricultural	0	3	0	77	0	77	0	154
Commercial	58	82	5,489	17,525	2,975	7,648	8,464	25,173
Public	55	73	1,910	2,889	650	1,028	2,560	3,917
Residential Outbuildings	358	588	2,449	7,422	5,567	6,340	8,015	13,762
Total Lake Travis	**1,698**	**2,938**	**181,925**	**427,769**	**95,230**	**215,021**	**277,155**	**642,790**
Lake Austin								
Single Family	49	694	10,957	226,411	5,479	113,206	16,436	339,617
Multifamily	2	32	77	6,498	38	3,249	115	9,747
Agricultural	0	1	56	26	0	26	56	52
Commercial	3	31	1,696	14,540	965	6,210	2,661	20,750
Public	2	6	11	488	11	176	22	664
Residential Outbuildings	32	212	390	2,558	434	2,419	824	4,977
Total Lake Austin	**88**	**976**	**13,188**	**250,521**	**6,927**	**125,286**	**20,115**	**375,807**
Total Travis County	**2,032**	**5,851**	**216,736**	**1,344,047**	**139,766**	**565,302**	**356,502**	**1,909,349**

Table B- 6. *(continued)*

(D) BASTROP/FAYETTE/COLORADO COUNTY								
	Number		*Structure Value*		*Content Value*		*Total Value*	
Upper Fayette	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Single Family	59	193	2,093	8,022	1,046	4,011	3,139	12,033
Agricultural	39	163	747	5,547	673	5,518	1,420	11,065
Commercial	5	11	358	382	80	92	438	473
Public	0	2	0	147	0	74	0	221
Residential Outbuildings	9	76	64	1,069	1,028	1,285	1,092	2,354
Total Upper Fayette	**112**	**445**	**3,263**	**15,167**	**2,827**	**10,980**	**6,090**	**26,147**
Upper Bastrop								
Single Family	41	236	773	7,603	386	3,801	1,159	11,404
Agricultural	11	59	149	1,041	149	1,041	298	2,082
Commercial	0	13	0	34	0	10	0	44
Residential Outbuildings	25	103	58	621	52	621	111	1,242
Total Upper Bastrop	**77**	**411**	**980**	**9,299**	**588**	**5,473**	**1,568**	**14,772**
Smithville								
Single Family	15	49	493	2,057	247	1,028	740	3,085
Agricultural	4	20	87	422	45	201	132	623
Commercial	4	10	400	1,134	1	875	401	2,009
Public	7	10	732	1,009	15	27	747	1,036
Residential Outbuildings	6	21	46	2,704	35	1,273	81	3,977
Total Smithville	**36**	**110**	**1,759**	**7,326**	**342**	**3,404**	**2,101**	**10,730**

Table B- 6. *(continued)*

(D) BASTROP/FAYETTE/COLORADO COUNTY	*Number*		*Structure Value*		*Content Value*		*Total Value*	
Middle Bastrop	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Single Family	61	190	2,641	11,538	1,320	5,769	3,961	17,306
Agricultural	11	82	132	1,796	66	887	198	2,683
Commercial	3	4	1,258	1,326	500	556	1,758	1,882
Residential Outbuildings	35	100	197	729	168	1,093	365	1,823
Total Middle Bastrop	**110**	**376**	**4,228**	**15,389**	**2,054**	**8,305**	**6,282**	**23,694**
Lower Fayette								
Single Family	21	129	955	9,085	477	4,542	1,432	13,627
Agricultural	96	251	1,454	5,815	1,400	5,818	2,854	11,633
Commercial	4	11	57	442	57	624	114	1,066
Residential Outbuildings	23	97	210	7,163	6,447	7,583	6,657	14,746
Total Lower Fayette	**144**	**488**	**2,676**	**22,505**	**8,381**	**18,567**	**11,057**	**41,072**
Lagrange								
Single Family	159	980	728	89,713	887	44,858	1,615	134,571
Agricultural	16	39	996	3,126	1,012	2,384	2,009	5,510
Commercial	49	99	5,551	8,350	5,600	16,445	11,151	24,795
Public	11	23	781	2,695	792	1,422	1,573	4,117
Residential Outbuildings	144	478	1,643	5,260	1,787	5,260	3,429	10,520
Total Lagrange	**379**	**1,619**	**9,699**	**109,144**	**10,078**	**70,369**	**19,777**	**179,513**
Garwood								
Single Family	7	15	62	232	31	116	92	348
Agricultural	68	124	485	1,079	485	1,079	970	2,158
Residential Outbuildings	4	8	13	43	19	63	32	106
Total Garwood	**79**	**147**	**560**	**1,354**	**535**	**1,258**	**1,094**	**2,612**

Table B- 6. *(continued)*

(D) BASTROP/FAYETTE/COLORADO COUNTY								
	Number		*Structure Value*		*Content Value*		*Total Value*	
Eagle Lake	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Single Family	170	520	2,570	21,816	1,285	10,908	3,855	32,724
Multi Family	2	8	117	445	59	223	176	668
Agricultural	110	341	1,236	3,878	1,236	3,878	2,472	7,756
Commercial	20	134	714	20,180	11,101	11,780	11,815	31,960
Public	20	30	344	1,040	295	620	639	1,660
Residential Outbuildings	105	241	845	1,804	700	900	1,545	2,704
Total Eagle Lake	**427**	**1,274**	**5,828**	**49,163**	**14,676**	**28,309**	**20,503**	**77,472**
Columbus								
Single Family	125	748	3,080	13,015	1,540	6,008	4,621	19,023
Multi Family	0	21	0	111	0	56	0	167
Agricultural	100	307	1,159	2,768	1,159	2,768	2,318	5,536
Commercial	40	214	1,594	12,709	1,347	14,416	2,941	27,125
Public	13	51	383	735	254	1,229	637	1,964
Residential Outbuildings	159	598	604	1,397	604	1,397	1,208	2,794
Total Columbus	**437**	**1,939**	**6,821**	**30,735**	**4,904**	**25,874**	**11,725**	**56,609**
Bastrop								
Single Family	88	415	3,374	18,656	1,687	9,328	5,061	27,984
Multi Family	0	5	0	592	0	296	0	888
Agricultural	2	10	21	265	32	368	53	633
Commercial	1	44	111	4,259	10	8,727	121	12,986
Public	1	8	38	347	0	203	38	550
Residential Outbuildings	35	152	324	1,165	486	1,934	810	3,099
Total Bastrop	**127**	**634**	**3,868**	**25,284**	**2,215**	**20,856**	**6,083**	**46,140**
Total Three County	**1,928**	**7,443**	**39,682**	**285,366**	**46,600**	**193,395**	**86,281**	**478,761**

Table B- 6. *(continued)*

(E) WHARTON COUNTY	Number		Structure Value		Content Value		Total Value	
Wharton	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Residential	1620	3,101	53,879	126,151	26,939	63,050	80,818	189,201
Multifamily	21	66	4,061	24,061	2,031	12,031	6,092	36,092
Public	55	111	5,394	105,365	9,170	27,117	14,564	132,482
Agricultural	205	262	6,570	8,210	6,600	8,214	13,170	16,424
Commercial	248	401	14,820	36,487	10,100	29,713	24,920	66,200
Residential Outbuildings	1669	2,382	4,155	7,022	7,430	14,009	11,585	21,031
Total Wharton	**3,818**	**6,323**	**88,880**	**307,296**	**62,270**	**154,134**	**151,150**	**461,430**
Upper Wharton								
Single Family	40	179	877	7,361	438	3,681	1,315	11,042
Public	1	1	20	261	-	119	20	380
Agricultural	102	182	185	4,592	185	4,592	370	9,184
Commercial	3	8	1,769	261	66	119	1,835	380
Residential Outbuildings	78	128	218	400	227	526	445	926
Total Upper Wharton	**224**	**498**	**3,069**	**12,875**	**916**	**9,037**	**3,985**	**21,912**
Lower Wharton								
Single Family	139	357	206	23,996	103	11,988	309	35,984
Agricultural	115	205	1,500	10,415	1,500	10,325	3,000	20,740
Commercial	2	3	64	2,209	2,500	3,500	2,564	5,709
Residential Outbuildings	250	377	858	1,364	1,603	2,400	2,461	3,764
Total Lower Wharton	**506**	**942**	**2,628**	**37,984**	**5,706**	**28,213**	**8,334**	**66,197**

Table B- 6. *(continued)*

(E) WHARTON COUNTY	*Number*		*Structure Value*		*Content Value*		*Total Value*	
	1% ACE	.1% ACE	1% ACE	.1% ACE	1% ACE	.1% ACE	1% ACE	.1% ACE
Glen Flora								
Single Family	212	485	6,687	13,285	3,344	6,643	10,031	19,928
Public	2	6	49	599	5	833	54	1,432
Agricultural	227	338	4,690	8,200	4,690	8,200	9,380	16,400
Commercial	7	22	239	1,552	317	1,234	556	2,786
Residential Outbuildings	294	451	758	1,656	995	2,116	1,753	3,772
Total Glen Flora	**742**	**1,302**	**12,423**	**25,292**	**9,351**	**19,026**	**21,773**	**44,318**
Total Wharton County	**5,290**	**9,065**	**106,999**	**383,447**	**78,243**	**210,410**	**185,242**	**593,857**

Table B- 6. *(continued)*

(F) MATAGORDA COUNTY								
	Number		*Structure Value*		*Content Value*		*Total Value*	
Matagorda	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**	**1% ACE**	**.1% ACE**
Single Family	250	306	11,957	15,122	5,979	7,561	17,936	22,683
Agricultural	61	62	836	849	836	849	1,672	1,698
Commercial	42	45	1,563	1,631	2,329	2,387	3,892	4,018
Public	21	21	2,336	2,336	1,671	1,671	4,007	4,007
Residential Outbuildings	183	207	1,953	2,213	1,663	2,125	3,616	4,338
Total Matagorda	**557**	**641**	**18,645**	**22,151**	**12,478**	**14,593**	**31,123**	**36,744**
Upper Matagorda								
Single Family	99	247	15,251	15,244	7,626	97	22,877	15,341
Agricultural	35	56	442	595	442	595	884	1,190
Commercial	19	62	351	92,582	1,478	43,662	1,829	136,244
Public	4	13	244	625	77	648	321	1,273
Residential Outbuildings	22	44	26	533	87	97	113	630
Total Upper Matagorda	**179**	**422**	**16,314**	**109,579**	**9,710**	**45,099**	**26,024**	**154,678**
Total Matagorda County	**736**	**1,063**	**34,959**	**131,730**	**22,187**	**59,692**	**57,146**	**191,422**
TOTAL STUDY AREA	**12,400**	**33,908**	**495,702**	**2,727,617**	**349,347**	**1,354,877**	**845,049**	**4,082,494**

Table B-7. Total Vehicle Value within 1000-Year (.1%) Floodplain (Damage Values in 1000's of Dollars)

Llano County	Number	Value
Lake LBJ	2,506	38,470
Lake Buchanan	460	6,240
Inks Lake	97	1,235
Total Llano County	**3,063**	**45,945**
Burnet County		
Lower Burnet	184	1,562
Lake Marble Falls	975	9,489
Lake LBJ	1,606	23,475
Lake Buchanan	226	2,536
Inks Lake	109	1,368
Above Burnet	3	12
Upper Burnet	6	30
Total Burnet County	**3,109**	**38,472**
Travis County		
Town Lake	243	14,894
Lower Travis	457	4,833
Lower Austin	240	9,912
Lake Travis	2,158	57,302
Lake Austin	751	34,814
Total Travis County	**3,849**	**121,755**

Three County Area	Number	Value
Upper Fayette	191	1,226
Upper Bastrop	238	1,391
Smithville	50	357
Middle Bastrop	192	1,848
Lower Fayette	123	1,338
Lagrange	945	13,050
Garwood	16	45
Eagle Lake	549	3,584
Columbus	852	6,201
Bastrop	431	3,088
Total Three County	**3,587**	**32,128**
Wharton County		
Wharton	126	1,256
Upper Wharton	18	143
Lower Wharton	0	51
Glen Flora	76	329
Total Wharton County	**220**	**1,779**
Matagorda County		
Matagorda	321	2,656
Upper Matagorda	250	2,474
Total Matagorda County	**571**	**5,130**
TOTAL STUDY AREA	**15,779**	**245,209**

Table B-8. Single Event Structural Damage
(Damage Values in 1000's of Dollars)

(A) LLANO COUNTY	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Lake LBJ																
Single Family	0	0	3	36	17	290	97	2,449	274	9,319	524	22,917	1,975	161,205	2,410	222,130
Multifamily	0	0	0	0	0	0	2	35	5	189	19	640	118	12,313	126	16,111
Public	0	0	0	0	0	0	0	0	0	0	0	0	2	7	2	26
Commercial	0	0	1	1	2	3	11	52	23	237	37	601	80	2,992	89	5,471
Residential Outbuildings	2	1	33	28	68	98	172	395	308	1,115	528	2,466	1,149	12,791	1,353	18,988
Total Lake LBJ	**2**	**1**	**37**	**66**	**87**	**391**	**282**	**2,931**	**610**	**10,860**	**1,108**	**26,625**	**3,324**	**189,309**	**3,980**	**262,727**
Lake Buchanan																
Single Family	0	0	0	0	0	0	0	0	0	0	0	0	71	2,694	544	17,220
Commercial	0	0	0	0	1	1	1	1	1	1	2	3	8	86	23	379
Residential Outbuildings	0	0	0	0	15	5	16	6	16	6	50	35	238	271	629	1,533
Total Lake Buchanan	**0**	**0**	**0**	**0**	**16**	**6**	**17**	**7**	**17**	**7**	**52**	**38**	**317**	**3,051**	**1,196**	**19,132**
Inks Lake																
Residential	0	0	4	56	9	199	16	379	36	868	44	1,296	84	4,065	98	6,019
Commercial	0	0	0	0	0	0	0	0	0	0	1	38	1	160	1	169
Residential Outbuildings	0	0	43	55	49	105	51	170	55	315	60	400	88	818	89	970
Total Inks Lake	**0**	**0**	**47**	**111**	**58**	**304**	**67**	**549**	**91**	**1,183**	**105**	**1,735**	**173**	**5,043**	**188**	**7,159**
Total Llano County	**2**	**1**	**84**	**177**	**161**	**701**	**366**	**3,487**	**718**	**12,050**	**1,265**	**28,398**	**3,814**	**197,403**	**5,364**	**289,017**

Table B-8. ***(continued)***

(B) BURNET COUNTY	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Lower Burnet																
Single Family	0	0	0	0	8	97	41	1,586	53	2,069	96	3,789	169	8,594	181	9,759
Multifamily	0	0	0	0	0	0	1	15	1	30	2	78	2	131	2	136
Agricultural	0	0	0	0	0	0	0	0	1	68	1	253	2	355	2	360
Public	0	0	0	0	7	16	8	19	9	37	9	57	9	126	9	127
Commercial	0	0	0	0	0	0	1	0	1	3	1	6	1	16	1	17
Residential Outbuildings	0	0	0	0	12	21	30	117	43	144	73	254	109	687	113	749
Total Lower Burnet	**0**	**0**	**0**	**0**	**27**	**133**	**81**	**1,738**	**108**	**2,350**	**182**	**4,438**	**292**	**9,908**	**308**	**11,148**
Inks Lake																
Single Family	0	0	4	150	5	309	7	537	43	1,850	54	2,772	98	6,972	115	8,668
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	7
Public	0	0	2	2	4	7	10	16	15	44	17	69	20	163	20	203
Residential Outbuildings	0	0	20	14	29	31	37	58	50	125	58	170	89	597	93	865
Total Inks Lake	**0**	**0**	**26**	**166**	**38**	**348**	**54**	**612**	**108**	**2,018**	**129**	**3,011**	**207**	**7,732**	**229**	**9,743**
Lake Marble Falls																
Single Family	0	0	0	0	1	36	14	605	111	5,441	213	11,152	622	38,942	941	64,911
Multifamily	0	0	0	0	0	0	0	0	0	0	0	0	1	219	15	1,621
Public	0	0	0	0	5	16	6	28	10	50	13	102	13	418	13	441
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	37
Commercial	0	0	0	0	0	0	0	0	10	300	14	2,687	20	11,087	35	15,938
Residential Outbuildings	0	0	0	0	3	4	6	11	48	45	93	89	205	688	279	2,065
Total Lake Marble Falls	**0**	**0**	**0**	**0**	**9**	**56**	**6**	**644**	**179**	**5,836**	**333**	**14,030**	**862**	**51,357**	**1,284**	**85,013**

Table B-8. ***(continued)***

	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Lake LBJ																
Single Family	0	0	0	0	4	129	38	1,139	100	4,328	184	9,909	1,303	101,488	1,598	143,399
Multifamily	0	0	0	0	0	0	0	0	0	0	3	280	7	1,854	9	2,160
Public	0	0	0	0	0	0	0	0	0	0	1	1	8	19	9	80
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1
Commercial	0	0	0	0	0	0	2	89	7	150	16	290	86	3,377	92	4,512
Residential Outbuildings	0	0	6	1	20	3	56	23	130	138	258	422	936	3,976	1,111	6,794
Total Lake LBJ	**0**	**0**	**6**	**1**	**24**	**132**	**96**	**1,252**	**237**	**4,616**	**462**	**10,901**	**2,340**	**110,715**	**2,821**	**156,947**
Lake Buchanan																
Single Family	0	0	0	0	0	0	0	0	0	0	0	0	50	1,597	239	8,198
Public	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Residential Outbuildings	0	0	0	0	9	1	9	2	9	3	32	10	113	67	227	278
Total Lake Buchanan	**0**	**0**	**0**	**0**	**9**	**1**	**9**	**2**	**9**	**3**	**32**	**10**	**163**	**1,664**	**467**	**8,477**
Above Burnet																
Single Family	0	0	0	0	0	0	2	18	4	69	4	91	4	104	4	104
Total Above Burnet	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**18**	**4**	**69**	**4**	**91**	**4**	**104**	**4**	**104**
Upper Burnet																
Single Family	0	0	0	0	1	8	3	58	3	111	4	157	4	213	4	224
Residential Outbuildings	0	0	0	0	0	0	0	0	1	2	3	10	4	31	5	37
Total Upper Burnet	**0**	**0**	**0**	**0**	**1**	**8**	**3**	**58**	**4**	**113**	**7**	**167**	**8**	**245**	**9**	**261**
Total Burnet County	**0**	**0**	**32**	**167**	**108**	**678**	**271**	**4,324**	**649**	**15,005**	**1,149**	**32,648**	**3,876**	**181,725**	**5,122**	**271,692**

Table B-8. ***(continued)***

(C) TRAVIS COUNTY	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Town Lake																
Single Family	0	0	0	0	0	0	0	0	2	702	3	713	143	26,998	176	33,840
Multifamily	0	0	0	0	0	0	0	0	1	17	1	18	55	24,553	61	27,878
Commercial	0	0	0	0	0	0	0	0	1	448	1	452	62	91,771	71	111,836
Public	0	0	0	0	0	0	2	15	3	46	3	47	75	99,901	80	133,092
Residential Outbuildings	0	0	0	0	0	0	0	0	1	4	1	4	110	462	119	567
Total Town lake	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**15**	**8**	**1,217**	**9**	**1,234**	**445**	**243,685**	**507**	**307,213**
Lower Travis																
Single Family	0	0	0	0	1	9	17	161	44	558	78	1,196	418	22,634	443	26,485
Agricultural	0	0	0	0	0	0	8	17	17	31	27	47	62	266	62	308
Commercial	0	0	0	0	0	0	0	0	0	0	2	7	10	178	10	203
Public	0	0	0	0	0	0	0	0	0	0	1	5	3	105	3	118
Residential Outbuildings	0	0	0	0	0	0	12	19	50	52	79	105	342	1,369	359	1,567
Total Lower Travis	**0**	**0**	**0**	**0**	**1**	**9**	**37**	**197**	**111**	**641**	**187**	**1,360**	**835**	**24,552**	**877**	**28,681**
Lower Austin																
Single Family	0	0	0	0	0	0	2	42	15	5,195	15	5,221	200	57,101	238	62,277
Multifamily	0	0	0	0	0	0	0	0	0	0	0	0	8	253	13	591
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0	21	214	23	226
Commercial	0	0	0	0	0	0	0	0	3	14	3	14	47	17,621	54	19,698
Public	0	0	0	0	0	0	0	0	6	152	7	157	32	8,163	34	9,399
Residential Outbuildings	1	2	1	4	1	6	2	13	25	90	25	90	167	2,155	191	2,319
Total Lower Austin	**1**	**2**	**1**	**4**	**1**	**6**	**4**	**55**	**49**	**5,451**	**50**	**5,482**	**475**	**85,508**	**553**	**94,509**

Table B-8. ***(continued)***

	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
Lake Travis	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**
Single Family	1	10	10	309	88	3,834	596	51,585	769	71,331	1,212	134,336	2,020	316,350	2,135	352,542
Multifamily	0	0	0	0	0	0	3	4,640	3	5,456	15	8,801	51	16,522	57	18,334
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0	3	22	3	37
Commercial	0	0	2	230	14	490	49	2,872	51	3,498	58	4,893	80	8,402	82	9,289
Public	1	1	2	6	5	38	31	777	39	969	55	1,586	73	3,055	73	3,146
Residential Outbuildings	5	6	19	44	67	165	248	1,674	284	2,118	358	3,090	570	6,227	588	6,905
Total Lake Travis	**7**	**17**	**33**	**588**	**174**	**4,527**	**927**	**61,548**	**1,146**	**83,372**	**1,698**	**152,706**	**2,797**	**350,579**	**2,938**	**390,254**
Lake Austin																
Single Family	0	0	1	432	1	613	19	2,018	49	6,343	49	6,366	670	222,072	694	239,244
Multifamily	0	0	0	0	1	17	2	51	2	86	2	87	31	3,918	32	4,529
Agricultural	0	0	0	0	0	0	0	0	0	0	0	0	1	17	1	25
Commercial	0	0	0	0	0	0	1	4	3	250	3	251	29	10,092	31	11,570
Public	0	0	0	0	0	0	0	0	2	1	2	1	6	138	6	144
Residential Outbuildings	2	2	5	3	7	7	15	24	32	98	32	99	204	3,264	212	3,555
Total Lake Austin	**2**	**2**	**6**	**435**	**9**	**637**	**37**	**2,097**	**88**	**6,778**	**88**	**6,803**	**941**	**239,502**	**976**	**259,068**
Total Travis County	**10**	**21**	**40**	**1,027**	**185**	**5,179**	**1,007**	**63,912**	**1,402**	**97,458**	**2,032**	**167,585**	**5,493**	**943,825**	**5,851**	**1,079,724**

Table B-8. ***(continued)***

(D) BASTROP/FAYETTE/COLORADO COUNTY	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Upper Fayette																
Single Family	0	0	4	12	18	213	33	802	42	1,117	59	1,480	184	5,922	193	6,553
Agricultural	0	0	2	21	9	77	25	186	29	299	39	426	141	2,988	163	3,695
Commercial	0	0	0	0	2	25	4	131	5	174	5	218	9	376	11	380
Public	0	0	0	0	0	0	0	0	0	0	0	0	1	35	2	43
Residential Outbuildings	0	0	1	1	7	10	7	33	7	46	9	58	68	577	76	748
Total Upper Fayette	**0**	**0**	**7**	**34**	**36**	**325**	**69**	**1,152**	**83**	**1,636**	**112**	**2,182**	**403**	**9,898**	**445**	**11,419**
Upper Bastrop																
Single Family	0	0	1	1	3	6	6	36	20	116	41	281	227	4,610	236	4,973
Agricultural	0	0	0	0	0	0	2	2	8	9	11	22	57	936	59	1,033
Commercial	0	0	0	0	0	0	0	0	0	0	0	0	3	29	13	30
Residential Outbuildings	0	0	0	0	0	0	4	3	12	12	25	37	100	789	103	858
Total Upper Bastrop	**0**	**0**	**1**	**1**	**3**	**6**	**12**	**41**	**40**	**137**	**77**	**340**	**387**	**6,364**	**411**	**6,894**
Smithville																
Single Family	0	0	0	0	4	55	14	210	15	266	15	315	48	943	49	1,066
Agricultural	0	0	1	2	1	6	2	14	3	20	4	28	20	144	20	179
Commercial	0	0	0	0	0	0	0	0	1	1	4	2	9	418	10	614
Public	0	0	0	0	4	16	7	87	7	113	7	163	10	638	10	655
Residential Outbuildings	0	0	0	0	0	0	6	15	6	24	6	36	19	122	21	133
Total Smithville	**0**	**0**	**1**	**2**	**9**	**77**	**29**	**326**	**32**	**424**	**36**	**544**	**106**	**2,265**	**110**	**2,647**
Middle Bastrop																
Single Family	0	0	0	0	16	113	34	435	52	779	61	1,199	178	6,371	190	7,077
Agricultural	0	0	0	0	7	7	8	23	11	35	11	51	54	394	82	548

Table B-8. *(continued)*

	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Commercial	0	0	0	0	0	0	3	110	3	226	3	241	4	1,173	4	1,182
Residential Outbuildings	1	2	2	6	10	23	31	80	33	115	35	157	90	550	100	636
Total Middle Bastrop	**1**	**2**	**2**	**6**	**33**	**143**	**76**	**648**	**99**	**1,155**	**110**	**1,648**	**326**	**8,488**	**376**	**9,443**
Lower Fayette																
Single Family	0	0	1	1	4	42	10	212	13	326	21	645	124	6,095	129	6,791
Agricultural	0	0	2	1	33	41	63	223	74	379	96	639	239	3,619	251	4,179
Commercial	0	0	0	0	0	0	0	0	0	0	4	4	11	196	11	235
Residential Outbuildings	0	0	0	0	1	5	10	73	14	54	23	83	90	562	97	651
Total Lower Fayette	**0**	**0**	**3**	**2**	**38**	**88**	**83**	**508**	**101**	**759**	**144**	**1,371**	**464**	**10,472**	**488**	**11,856**
Lagrange																
Single Family	0	0	0	0	3	198	16	1,411	128	4,079	159	11,028	926	64,158	980	74,789
Agricultural	0	0	0	0	0	0	1	4	4	19	16	115	36	2,397	39	2,756
Commercial	0	0	0	0	0	0	2	9	29	304	49	2,236	84	17,369	99	20,725
Public	0	0	0	0	0	0	1	3	5	110	11	284	23	1,564	23	1,768
Residential Outbuildings	0	0	0	0	2	2	13	243	70	795	144	2,656	461	15,251	478	17,699
Total Lagrange	**0**	**0**	**0**	**0**	**5**	**200**	**33**	**1,670**	**236**	**5,307**	**379**	**16,319**	**1,530**	**100,739**	**1,619**	**117,737**
Garwood																
Single Family	0	0	1	1	2	2	2	3	4	7	7	15	14	56	15	68
Agricultural	0	0	18	7	25	12	34	31	45	57	68	86	116	365	124	439
Residential Outbuildings	0	0	0	0	0	0	0	0	0	0	4	1	7	11	8	13
Total Garwood	**0**	**0**	**19**	**8**	**27**	**14**	**36**	**34**	**49**	**64**	**79**	**102**	**137**	**432**	**147**	**520**
Eagle Lake																
Single Family	0	0	2	15	14	137	55	723	103	1,517	170	2,546	331	10,103	520	11,368
Multi Family	0	0	0	0	0	0	0	0	0	0	2	25	8	227	8	258

Table B-8. *(continued)*

	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Agricultural	0	0	18	8	33	41	48	122	80	254	110	445	313	2,223	341	2,754
Commercial	0	0	0	0	1	342	8	645	12	712	20	825	113	6,227	134	8,364
Public	0	0	0	0	1	1	11	24	16	59	20	108	29	567	30	652
Residential Outbuildings	0	0	7	18	15	40	41	131	65	240	105	364	234	1,290	241	1,509
Total Eagle Lake	**0**	**0**	**27**	**41**	**64**	**561**	**163**	**1,645**	**276**	**2,782**	**427**	**4,313**	**1,028**	**20,637**	**1,274**	**24,905**
Columbus																
Single Family	0	0	0	0	0	0	6	29	31	179	125	1,070	640	10,231	748	13,015
Multi Family	0	0	0	0	0	0	0	0	0	0	0	0	16	80	21	111
Agricultural	0	0	0	0	7	2	22	22	49	59	100	209	290	2,227	307	2,768
Commercial	0	0	0	0	0	0	3	1	12	6	40	282	192	10,179	214	12,709
Public	0	0	0	0	0	0	2	3	3	7	13	85	49	593	51	735
Residential Outbuildings	0	0	0	0	0	0	11	4	46	17	159	93	510	1,103	598	1,397
Total Columbus	**0**	**0**	**0**	**0**	**7**	**2**	**44**	**59**	**141**	**268**	**437**	**1,739**	**1,697**	**24,413**	**1,939**	**30,735**
Bastrop																
Single Family	2	2	4	10	27	283	69	1,054	79	1,533	88	2,040	387	9,847	415	10,951
Multi Family	0	0	0	0	0	0	0	0	0	0	0	0	5	293	5	339
Agricultural	0	0	0	0	2	4	2	12	2	17	2	23	10	255	10	317
Commercial	0	0	0	0	0	0	0	0	0	0	1	3	40	6,364	44	8,230
Public	0	0	0	0	1	3	1	9	1	16	1	27	7	180	8	210
Residential Outbuildings	0	0	0	0	19	45	30	168	32	258	35	317	143	1,078	152	1,209
Total Bastrop	**2**	**2**	**4**	**10**	**49**	**335**	**102**	**1,243**	**114**	**1,824**	**127**	**2,410**	**592**	**18,017**	**634**	**21,256**
Total Three County	**3**	**4**	**64**	**104**	**271**	**1,751**	**647**	**7,326**	**1,171**	**14,356**	**1,928**	**30,968**	**6,670**	**201,725**	**7,443**	**237,412**

Table B-8. ***(continued)***

(E) WHARTON COUNTY	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Wharton																
Single Family	0	0	0	0	119	2142	835	14924	1230	24382	1620	32508	2790	52988	3101	60185
Multifamily	0	0	0	0	0	0	12	786	16	1532	21	2468	58	5162	66	6383
Public	0	0	0	0	6	3	34	2620	47	4487	55	5646	96	8222	111	9413
Agricultural Buildings	0	0	0	0	49	704	123	2764	167	3757	205	4459	260	6254	262	6749
Commercial	0	0	0	0	3	6	97	1168	207	2431	248	4242	373	10883	401	12931
Residential Outbuildings	0	0	6	1	214	90	937	800	1300	1284	1669	1721	2283	3194	2382	3700
Total Wharton	**0**	**0**	**6**	**1**	**391**	**2,945**	**2,038**	**23,062**	**2,967**	**37,874**	**3,818**	**51,044**	**5,860**	**86,703**	**6,323**	**99,360**
Upper Wharton																
Single Family	0	0	0	0	15	177	26	365	38	500	40	661	100	1,538	179	1,724
Public	0	0	0	0	0	0	0	0	0	0	1	4	1	8	1	9
Agricultural Buildings	0	0	4	14	23	69	57	254	85	450	102	619	172	1,386	182	1,564
Commercial	0	0	0	0	1	14	2	69	2	87	3	99	6	119	8	122
Residential Outbuildings	0	0	9	2	37	19	58	43	64	60	78	78	124	159	128	181
Total Upper Wharton	**0**	**0**	**13**	**16**	**76**	**279**	**143**	**732**	**189**	**1,098**	**224**	**1,462**	**403**	**3,210**	**498**	**3,600**
Lower Wharton																
Single Family	0	0	0	0	0	0	5	120	61	736	139	1,725	331	4,428	357	5,127
Agricultural Buildings	0	0	0	0	0	0	10	32	92	241	115	417	193	1,153	205	1,384
Commercial	0	0	0	0	0	0	0	0	1	2	2	11	2	26	3	27
Residential Outbuildings	0	0	0	0	0	0	24	9	146	60	250	184	362	642	377	746
Total Lower Wharton	**0**	**0**	**0**	**0**	**0**	**0**	**39**	**161**	**300**	**1,040**	**506**	**2,337**	**888**	**6,250**	**942**	**7,284**

Table B-8. ***(continued)***

	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Glen Flora																
Single Family	0	0	2	180	52	1,241	94	2,805	164	3,838	212	4,705	461	8,478	485	9,139
Public	0	0	0	0	0	0	1	4	2	5	2	9	6	20	6	22
Agricultural Buildings	0	0	18	50	27	464	110	1,300	157	1,725	227	2,072	325	3,505	338	3,752
Commercial	0	0	0	0	0	0	0	2	5	61	7	130	22	395	22	454
Residential Outbuildings	0	0	20	5	49	39	142	146	236	229	294	295	439	814	451	1,041
Total Glen Flora	**0**	**0**	**40**	**235**	**128**	**1,744**	**347**	**4,257**	**564**	**5,858**	**742**	**7,211**	**1,253**	**13,212**	**1,302**	**14,408**
Total Wharton County	**0**	**0**	**59**	**252**	**595**	**4,968**	**2,567**	**28,213**	**4,020**	**45,869**	**5,290**	**62,054**	**8,404**	**109,375**	**9,065**	**124,651**

Table B-8. ***(continued)***

(F) Matagorda County	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		.2% ACE		.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Matagorda																
Single Family	1	27	60	1,211	116	2,564	176	4,061	209	5,142	250	6,959	301	10,867	306	11,217
Agricultural	0	0	18	33	43	64	57	108	59	136	61	201	62	343	62	354
Commercial	0	0	10	147	23	581	38	995	41	1,256	42	1,618	45	2,227	45	2,239
Public	1	2	11	84	13	196	17	557	21	720	21	966	21	1,441	21	1,462
Residential Outbuildings	1	1	56	33	108	99	161	205	171	294	183	461	206	901	207	940
Total	**3**	**30**	**155**	**1,507**	**303**	**3,502**	**449**	**5,926**	**501**	**7,548**	**557**	**10,204**	**635**	**15,778**	**641**	**16,211**
Upper Matagorda																
Single Family	0	0	3	29	8	97	19	408	40	983	99	3,403	247	13,561	247	14,950
Agricultural	0	0	0	0	1	1	7	7	16	10	35	36	56	197	56	252
Commercial	0	0	1	7	2	79	2	100	7	154	19	336	60	25,223	62	33,856
Public	0	0	0	0	0	0	2	42	2	64	4	86	13	423	13	533
Residential Outbuildings	0	0	0	0	3	3	4	9	7	15	22	32	44	177	44	236
Total	**0**	**0**	**4**	**36**	**14**	**180**	**34**	**566**	**72**	**1,225**	**179**	**3,894**	**420**	**39,580**	**422**	**49,827**
Total Matagorda County	**3**	**30**	**159**	**1,543**	**317**	**3,682**	**483**	**6,491**	**573**	**8,773**	**736**	**14,098**	**1,055**	**55,359**	**1,063**	**66,038**
TOTAL STUDY AREA	**18**	**56**	**429**	**3,268**	**1,600**	**16,940**	**5,283**	**113,710**	**8,469**	**193,452**	**12,400**	**335,751**	**29,188**	**1,689,252**	**33,908**	**2,068,534**

Table B-9. Single Event Vehicle Damage
(Damage Values in 1000's of Dollars)

	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
Burnet County	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**	**No.**	**Damage**
Lower Burnet	0	0	0	0	8	23	45	356	56	425	103	741	170	1,282	184	1,478
Lake Marble Falls	0	0	0	0	1	8	12	110	105	1,128	197	2,113	617	6,235	975	9,277
Lake LBJ	0	0	0	0	2	6	35	234	98	1,063	175	2,089	1,317	19,195	1,606	22,880
Lake Buchanan	1	2	1	2	3	12	3	17	3	18	6	40	33	210	226	1,798
Inks Lake	2	7	4	43	4	66	8	92	32	278	48	514	99	1,157	109	1,303
AboveBurnet	0	0	0	0	0	0	3	8	3	12	3	12	3	12	3	12
Upper Burnet	0	0	0	0	1	3	4	13	5	25	6	30	6	30	6	30
Total Burnet County	**3**	**9**	**5**	**45**	**19**	**118**	**110**	**830**	**302**	**2,949**	**538**	**5,539**	**2,245**	**28,122**	**3,109**	**36,778**
Llano County																
Lake LBJ	0	0	1	4	13	48	67	320	239	1,621	448	3,724	2,009	29,028	2,506	35,661
Lake Buchanan	0	0	0	0	0	0	0	0	0	0	1	3	41	117	460	2,812
Inks Lake	2	10	5	23	8	44	12	75	28	142	40	218	78	694	97	959
Total Llano County	**2**	**10**	**6**	**27**	**21**	**91**	**79**	**396**	**267**	**1,763**	**489**	**3,945**	**2,128**	**29,840**	**3,063**	**39,433**
Travis County																
Town Lake	0	0	0	0	0	0	0	0	2	4	2	5	207	10,135	243	13,372
Lower Travis	0	0	0	0	0	0	15	30	45	127	87	304	429	3,788	457	4,281
Lower Austin	0	0	0	0	0	0	1	5	14	576	14	577	188	7,767	240	8,589
Lake Travis	0	0	7	17	79	769	579	9,425	735	12,216	1,168	22,719	2,037	48,567	2,158	53,598
Lake Austin	4	89	5	89	5	90	24	414	50	1,045	50	1,048	724	32,399	751	33,880
Total Travis County	**4**	**89**	**12**	**106**	**84**	**859**	**619**	**9,875**	**846**	**13,969**	**1,321**	**24,653**	**3,585**	**102,657**	**3,849**	**113,720**
Three County Area																
Upper Fayette	0	0	8	26	16	68	28	151	36	202	51	277	179	1,075	191	1,154
Upper Bastrop	0	0	0	0	2	2	10	27	22	69	47	143	229	1,254	238	1,322
Smithville	0	0	3	4	7	32	14	82	15	88	15	89	49	313	50	346
Middle Bastrop	0	0	1	1	22	68	50	279	62	399	68	478	181	1,685	192	1,787
Lower Fayette	0	0	1	1	3	4	10	45	14	72	20	127	117	1,137	123	1,241

Table B-9. ***(continued)***

	50% ACE		20% ACE		10% ACE		4% ACE		2% ACE		1% ACE		0.2% ACE		0.1% ACE	
	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage	No.	Damage
Lagrange	0	0	0	0	0	0	17	194	147	588	319	2,005	897	10,417	945	12,240
Garwood	0	0	1	1	2	2	3	3	6	5	9	11	14	32	16	37
Eagle Lake	0	0	2	5	14	50	65	284	121	607	201	974	525	3,315	549	3,448
Columbus	0	0	0	0	1	1	7	9	60	76	206	500	714	4,135	852	5,077
Bastrop	2	2	4	7	30	126	64	344	81	507	94	581	403	2,778	431	2,930
Total Three County	**2**	**2**	**20**	**46**	**97**	**353**	**268**	**1,416**	**564**	**2,613**	**1,030**	**5,185**	**3,308**	**26,140**	**3,587**	**29,581**
Wharton County																
Wharton	0	0	0	0	0	0	2	11	13	72	30	183	103	505	126	619
Upper Wharton	0	0	1	1	3	7	7	17	7	23	10	29	17	49	18	51
Lower Wharton	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Glen Flora	0	0	0	0	10	17	13	32	19	46	28	63	75	172	76	188
Total Wharton County	**0**	**0**	**1**	**1**	**13**	**25**	**22**	**60**	**39**	**141**	**68**	**275**	**195**	**727**	**220**	**858**
Matagorda County																
Matagorda	3	7	28	85	109	421	167	834	202	1,124	254	1,624	316	2,447	321	2,505
Upper Matagorda	1	2	3	6	4	15	12	33	23	101	65	427	250	2,408	250	2,467
Total Matagorda County	**4**	**9**	**31**	**91**	**113**	**436**	**179**	**867**	**225**	**1,225**	**319**	**2,051**	**566**	**4,855**	**571**	**4,971**
TOTAL STUDY AREA	**15**	**119**	**75**	**315**	**347**	**1,881**	**1,277**	**13,444**	**2,243**	**22,659**	**3,765**	**41,648**	**12,027**	**192,341**	**14,399**	**225,341**

Table B-10. Structural and Vehicular Expected Annual Damages (Damage Values in 1000's of Dollars)

	Residential		Commercial/				
	Single Family	Multi-Family	Industrial	Public	Agricultural	Vehicles	Total EAD
Burnet County							
Above Burnet	3	0	0	0	0	1	4
Upper Burnet	9	0	0	0	0	2	11
Lake LBJ	907	16	31	0	0	168	1,121
Inks Lake	182	0	0	4	0	31	216
Lake Buchanan	46	0	0	0	0	9	55
Lake Marble Falls	544	4	127	13	0	89	776
Lower Burnet	232	2	0	5	6	33	280
Total by Burnet County	**1,922**	**22**	**157**	**22**	**6**	**332**	**2,463**
Llano County							
Inks Lake	132	0	2	0	0	20	153
Lake LBJ	1,697	86	42	0	0	285	2,111
Lake Buchanan	74	0	2	0	0	1	78
Total Llano County	**1,903**	**86**	**45**	**0**	**0**	**307**	**2,342**
Travis County							
Lower Travis	160	0	1	20	3	26	211
Lower Austin	446	9	70	53	1	69	647
Town Lake	165	120	398	380	0	51	1,114
Lake Austin	1,665	27	65	1	0	232	1,990
Lake Travis	6,880	412	324	81	0	1,102	8,799
Total Travis County	**9,316**	**568**	**858**	**535**	**5**	**1,479**	**12,761**
Three County Area							
Upper Bastrop	34	0	0	0	5	11	50
Middle Bastrop	100		19	0	5	36	160
Bastrop	169	1	17	2	2	49	239
Smithville	28	0	3	13	3	10	57
Upper Fayette	113	0	14	0	43	28	198
LaGrange	606	0	141	13	25	91	876
Lower Fayette	57	0	2	0	44	9	112
Garwood	2	0	0	0	10	1	13
Eagle Lake	182	2	106	7	34	55	386
Columbus	103	1	70	6	22	38	239
Total Three County	**1,394**	**3**	**372**	**41**	**193**	**327**	**2,330**

Table B-10. (continued)

	Residential		Commercial/				
	Single Family	Multi-Family	Industrial	Public	Agricultural	Vehicles	Total EAD
Wharton County							
Lower Wharton	69	0	0	0	18	11	98
Wharton	1,721	107	195	288	287	358	2,957
Glen Flora	387	0	5	0	159	73	624
Upper Wharton	57	0	6	0	39	11	114
Total by Wharton County	**2,234**	**107**	**206**	**289**	**503**	**453**	**3,793**
Matagorda County							
Upper Matagorda	152	0	172	6	2	23	354
Matagorda	764	0	153	85	23	120	1,145
Total by Matagorda County	**916**	**0**	**325**	**91**	**24**	**143**	**1,499**
TOTAL STUDY AREA	**17,684**	**787**	**1,964**	**978**	**732**	**3,040**	**25,188**

1. **Llano County**

Within the Lake LBJ reach, damages begin before the 50-percent ACE flood event. Significant damages start between the 10- and 4-percent ACE flood event. The 4-percent ACE flood event affects 282 structures and results in approximately $2.9 million in damages. The 1-percent ACE flood event affects 1,108 structures and results in approximately $26.6 million in damages. Expected annual damages are estimated at $2.1 million, of which 84-percent are attributed to residential structures and contents.

Within the Lake Buchanan reach, damages begin before the 10-percent ACE flood event. Significant damages start between the 1- and 0.2-percent ACE flood event. The 1-percent ACE flood event affects 52 structures and results in approximately $38,000 in damages. Expected annual damages are estimated at $78,000, of which 95-percent are attributed to residential structures and contents.

Within the Inks Lake reach of Llano County, damages begin before the 20-percent ACE flood event. Significant damages start between the 4- and 2-percent ACE flood event. The 2-percent ACE flood event affects 91 structures and results in approximately $1.1 million in damages. The 1-percent ACE flood event affects 105 structures and results in approximately $1.7 million in damages. Expected annual damages are estimated at $153,000, of which 86-percent are attributed to residential structures and contents.

2. **Burnet County**

Within the Lower Burnet reach, damages begin before the 10-percent ACE flood event. Significant damages start between the 10- and 4-percent ACE flood event. The 4-percent ACE flood event affects 81 structures and results in approximately $1.7 million in damages. The 1-percent ACE flood event affects 182 structures and results in approximately $4.4 million in damages. Expected annual damages are estimated at $280,000, of which 84-percent are attributed to residential structures and contents.

Within the Inks Lake reach, damages begin before the 20-percent ACE flood event. Significant damages start between the 4- and 2-percent ACE flood event. The 2-percent ACE flood event affects 108 structures and results in approximately $2.0 million in damages. The 1-percent ACE flood event affects 129 structures and results in approximately $3.0 million in damages. Expected annual damages are estimated at $216,000, of which 84-percent are attributed to residential structures and contents.

Within the Lake Marble Falls reach, damages begin between the 20- and 10-percent ACE flood event. Significant damages start between the 4- and 2-percent ACE flood event. The 2-percent ACE flood event affects 179 structures and results in approximately $5.8 million in damages. The 1-percent ACE flood event affects 333 structures and results in approximately $14.0 million in damages. Expected annual damages are estimated at $776,000, of which 71-percent are attributed to residential structures and contents.

Within the Lake LBJ reach, damages begin before the 20-percent ACE flood event. Significant damages start between the 10- and 4-percent ACE flood event. The 4-percent ACE flood event affects 96 structures and results in approximately $1.3 million in damages. The 1-percent ACE flood event affects 462 structures and results in approximately $10.9 million in damages. Expected annual damages are estimated at $1.1 million of which 82-percent are attributed to residential structures and contents.

Within the Lake Buchanan reach, damages begin before the 10-percent ACE flood event. Significant damages start between the 1- and 0.2-percent ACE flood event. The 1-percent ACE flood event affects 32 structures and results in approximately $10,000 in damage. The 0.2-percent ACE flood event affects 163 structures and results in approximately $1.7 million in damages. Expected annual damages are estimated at $55,000 of which 84-percent are attributed to residential structures and contents.

There are 4 structures within the Above Burnet reach; all of them are single-family residences. Damages begin by the 4% ACE flood event. The 1-percent ACE flood event results in estimated damages of $91,000. Expected annual damages are estimated at $4,000.

Within the Upper Burnet reach, damages begin between the 20- and 10-percent ACE flood event. The 1-percent ACE flood event affects 7 structures, and results in

estimated damages of $167,000. Expected annual damages are estimated at $11,000.

3. **Travis County**

Within the Town Lake reach, damages begin between the 10- and 4-percent ACE flood event. Significant damages start between the 4- and 2-percent ACE flood event. The 1-percent ACE flood event affects 9 structures and results in approximately $1.2 million in damages. Expected annual damages are estimated at $1.1 million, of which 70-percent are attributed to commercial and public structures and contents.

Within the Lower Travis reach, damages begin between the 20- and 10-percent ACE flood event. Significant damages start between the 2- and 1-percent ACE flood event. The 2-percent ACE flood event affects 111 structures and results in approximately $640,000 in damages. The 1-percent ACE flood event affects 187 structures and results in approximately $1.4 million in damage. Expected annual damages are estimated at $211,000, of which 76-percent are attributed to residential structures and contents.

Within the Lower Austin reach, damages begin before the 50-percent ACE flood event. Significant damages start between the 4- and 2-percent ACE flood event. The 1-percent ACE flood event affects 50 structures and results in approximately $5.5 million in damages. Expected annual damages are estimated at $647,000 of which 70-percent are attributed to residential structures and contents.

Within the Lake Travis reach, damages begin before the 50-percent ACE flood event. Significant damages start between the 20- and 10-percent ACE flood event. The 10-percent ACE flood event affects 174 structures and results in approximately $4.5 million in damages. The 1-percent ACE flood event affects 1,698 structures and results in approximately $152.7 million in damages. Expected annual damages are estimated at $8.8 million, of which 83-percent are attributed to residential structures and contents.

Within the Lake Austin reach, damages begin before the 50-percent ACE flood event. Significant damages start between the 10- and 4-percent ACE flood event. The 4-percent ACE flood event affects 37 structures and results in approximately $2.1 million in damages. The 1-percent ACE flood event affects 88 structures and results in approximately $6.8 million in damages. Expected annual damages are estimated at $2.0 million of which 85-percent are attributed to residential structures and contents.

4. **Three County Area**

Within the Upper Fayette reach, damages begin before the 20-percent ACE flood event. Significant damages start between the 10- and 4-percent ACE flood event. The 4-percent ACE flood event affects 69 structures and results in approximately $1.2 million in damages. The 1-percent ACE flood event affects 112 structures and

results in approximately $2.2 million in damages. Expected annual damages are estimated at $198,000, of which 57-percent are attributed to residential structures and contents.

Within the Upper Bastrop reach, damages begin between the 50- and 20-percent ACE flood event. Significant damages start between the 1- and 0.2-percent ACE flood event. The 1-percent ACE flood event affects 77 structures and results in approximately $340,000 in damages. The 0.2-precent ACE flood event affects 387 structures and results in approximately $6.4-million in damages. Expected annual damages are estimated at $50,000, of which 68-percent are attributed to residential structures and contents.

Within the Smithville reach, damages begin between the 50- and 20-percent ACE flood event. Significant damages start between the 1- and 0.2-percent ACE flood event. The 1-percent ACE flood event affects 36 structures and results in approximately $540,000 in damages. The 0.2-percent ACE flood event affects 106 structures and results in approximately $2.3-million in damages. Expected annual damages are estimated at $57,000, of which 49-percent are attributed to residential structures and contents.

Within the Middle Bastrop reach, damages begin before the 50-percent ACE flood event. Significant damages start between the 4- and 2-percent ACE flood event. The 2-percent ACE flood event affects 99 structures and results in approximately $1.2 million in damages. The 1-percent ACE flood event affects 110 structures and results in approximately $1.6 million in damages. Expected annual damages are estimated at $160,000, of which 63-percent are attributed to residential structures and contents.

Within the Lower Fayette reach, damages begin between the 50- and 20-percent ACE flood event. Significant damages start between the 2- and 1-percent ACE flood event. The 2-percent ACE flood event affects 101 structures and results in approximately $760,000 in damages. The 1-percent ACE flood event affects 144 structures and results in approximately $1.4 million in damages. Expected annual damages are estimated at $112,000, of which 51-percent are attributed to residential structures and contents.

Within the Lagrange reach, damages begin between the 20- and 10-percent ACE flood event. Significant damages start between the 10- and 4-percent ACE flood event. The 2-percent ACE flood event affects 236 structures and results in approximately $5.3 million in damages. The 1-percent ACE flood event affects 379 structures and results in $16.3 million in damages. Expected annual damages are estimated at $876,000, of which 69-percent are attributed to residential structures and contents.

Within the Garwood reach, damages begin between the 50- and 20-percent ACE flood event. The 1-percent affects 79 structures and results in flood damages of $102,000. Expected annual damages are estimated at $13,000, of which 77-percent are attributed to agricultural buildings and contents.

Within the Eagle Lake reach, damages begin between the 50- and 20-percent ACE flood event. Significant damages start between the 10- and 4-percent ACE flood event. The 4-percent ACE flood event affects 163 structures and results in approximately $1.6 million in damages. The 1-percent ACE flood event affects 427 structures and results in approximately $4.3 million in damages. Expected annual damages are estimated at $386,000, of which 48-percent are attributed to residential structures and contents.

Within the Columbus reach, damages begin between the 20- and 10-percent ACE flood event. Significant damages start between the 2- and 1-percent ACE flood event. The 2-percent ACE flood event affects 141 structures and results in approximately $300,000 in damages. The 1-percent ACE flood event affects 437 structures and results in approximately $1.7 million in damages. Expected annual damages are estimated at $239,000, of which 43-percent are attributed to residential structures and contents.

Within the Bastrop reach, damages begin before the 50-percent ACE flood event. Significant damages start between the 10- and 4-percent ACE flood event. The 4-percent ACE flood event affects 102 structures and results in approximately $1.2 million in damages. The 1-percent ACE flood event affects 127 structures and results in approximately $2.4 million in damages. Expected annual damages are estimated at $239,000, of which 71-percent are attributed to residential structures and contents.

5. **Wharton County**

Within the Wharton reach, damages begin before 20-percent ACE flood event. Significant damages start between the 20- and 10-percent ACE flood event. The 10-percent ACE flood event affects 391 structures and results in approximately $2.9 million in damages. The 1-percent ACE flood event affects 3,818 structures and results in approximately $51.0 million in damages. Expected annual damages are estimated at $3.0 million, of which 62-percent are attributed to residential structures and contents.

Within the Upper Wharton reach, damages begin between the 50- and 20-percent ACE flood event. Significant damages start between the 4- and 2-percent ACE flood event. The 2-percent ACE flood event affects 189 structures and results in approximately $1.1 million in damages. The 1-percent ACE flood event affects 224 structures and results in approximately $1.4 million in damages. Expected annual damages are estimated at $114,000, of which 50-percent are attributed to residential structures and contents.

Within the Lower Wharton reach, damages begin between the 10- and 4-percent ACE flood event. Significant damages start between the 4- and 2-percent ACE flood event. The 2-percent ACE flood event affects 300 structures and results in approximately $1.0 million in damages. The 1-percent ACE flood event affects 506 structures and results in approximately $2.3-million in damages. Expected annual

damages are estimated at $98,000, of which 70-percent are attributed to residential structures and contents.

Within the Glen Flora reach, damages begin between the 50- and 20-percent ACE flood event. Significant damages start between the 20- and 10-percent ACE flood event. The 10-percent ACE flood event affects 128 structures and results in approximately $1.7 million in damages. The 1-percent ACE flood event affects 742 structures and results in approximately $7.2 million in damages. Expected annual damages are estimated at $624,000, of which 62-percent are attributed to residential structures and contents.

6. **Matagorda County**

Within the Matagorda reach, damages begin before the 50-percent ACE flood event. Significant damages start between the 50- and 20-percent ACE flood event. The 20-percent ACE flood event affects 155 structures and results in approximately $1.5 million in damages. The 1-percent ACE flood event affects 557 structures and results in approximately $10.2 million in damages. Expected annual damages are estimated at $1.1 million, of which 67-percent are attributed to residential structures and contents.

Within the Upper Matagorda reach, damages begin before the 20-percent ACE flood event. Significant damages start between the 4- and 2-percent ACE flood event. The 2-percent ACE flood event affects 72 structures and results in approximately $1.2 million in damages. The 1-percent ACE flood event affects 179 structures and results in approximately $3.9-million in damages. Expected annual damages are estimated at $354,000, of which 43-percent are attributed to industrial structures and contents.

IV. Agricultural Flood Damage Procedure

A. Methodology

The analysis below outlines the general concepts and procedures used in the computation of the agricultural damages incurred by assumed flood events within each county within the study area. The results of the analysis are provided in terms of annual average damages for use in the computation of benefit to cost ratios and net benefits.

The discussion below indicates considerations used in the computation of agricultural damages within the lower Colorado River basin study area.

The current land use for the study area was secured from the 1997 Census of Agriculture. Geographic Information System (GIS) is used to summarize the agricultural land area for each flood event. GIS provides a detailed breakdown of land area for each of the ten counties that are part of the study area.

The land/crop uses were categorized into six general categories for analytical and reporting purposes. The six general categories of land/crop use are:

Fruits and Nuts – including predominately pecans
Field Crops – including cotton, sorghum, soybeans, and corn
Pasture – consisting of predominately Coastal Bermuda Grass for pasture
Hay – consisting of predominately Coastal Bermuda Grass for hay
Rice -
Other – including lands that are idle, semi-agricultural, and native vegetation

Every rural acre within each of the study areas' ten counties is categorized within one of the six general categories. For analytical purposes, eight crops were selected as being representative of all the crops that are grown within the study area. The individual crops within each category are identified above. These eight crops comprise the majority of all the rural acreage within the lower Colorado River basin study area.

Agricultural damages due to flooding for each acre is computed by adding four elements:

- The cumulative direct production or annual variable costs incurred prior to flooding.
- The net value of the crop affected by the flood event.
- Depreciated value of perennial crops lost as a direct result of flooding.
- The land clean-up and rehabilitation resulting from flooding.

1. **Direct Production Costs**

   Variable cultural costs are incurred periodically throughout the crop year. Examples of these direct production costs include: seedbed preparation, chemical and fertilizer application, hired labor, seed, planting, and weed and pest control. These individual crop costs for the eight crops are computed on a monthly basis to determine the amount of expended cultural costs at the time of the flood event.

2. **Net Value of Crop & Seasonality**

   The second component represents the net income of the crop plus return to fixed items of production such as land, labor and management, real estate taxes, and fixed costs associated with pre-harvest and harvest activities. The net value of the crop on the flooded acreage is a significant part of agricultural damages.

   Computationally, the season of the year that the flood occurs greatly impacts the amount of flood damage to the agricultural crop. If flooding occurs early within the year, the producer may be able to re-prepare the seedbed, plant, and realize a return on his efforts. Conversely, a flood of substantial proportion occurring at harvest time will most certainly result in complete loss for the entire year.

   The probability of a storm occurrence, and accompanying flood damage, in any particular month was provided by the District Hydrologist for ten separate and distinct counties within the study area and displays the likelihood of a storm occurring for each month throughout the year.

Multiplying the direct production costs and the value of crop at risk for each month times the monthly probability provides the probable damages expected if a flood event occurred in any particular month.

3. **Value of Perennial Crops**

Damage caused by long-term duration flooding may result in permanent loss of perennial crops. The damage to perennials susceptible to flooding is computed based upon the assumption that the crop stands are at various ages, ranging from year 1 throughout their economic useful life. Accordingly, damage caused by long-term duration flooding is computed based upon a stand that is at the mid-point of its economic useful life.

4. **Clean-up and Rehabilitation**

Erosion and deposition of debris and sediment may be caused by floods of any duration or time of year. Additionally, drainage and irrigation ditches may become clogged with silt and debris. Interviews with cooperative extension agents, and local farmers have been conducted over the past several years. Clean-up and rehabilitation of farm acreage is a genuine flood loss and is accordingly accounted for in the computation of agricultural flood damages.

B. **Acreage Estimates by Flood Event**

The floodplains for a variety of flood events (.2%,1%,2%,4%, 10%, 20% and 50% ACE flood event) encompass the geographic area of analysis used in the computation of agricultural damages. Each floodplain associated with differing events has differing numbers of acres. Acreage estimates were computed by the Hydrology Section of the Fort Worth District of the Corps of Engineers. The acreage estimates were adjusted by removing the acreage classified as urban and water body from the original acreage base. The agricultural analysis considered that not all of the acreage classified as "agricultural" was actually available for production of agricultural crops. A reduction in the Hydrology acreage estimates were made to account for roads and farmsteads. Roads were assumed to be 24 feet in width with 10 foot ditches and run on section lines one mile apart. Farmsteads were assumed to be an average of 10 acres. The total number of farmsteads in each county was secured from the 1997 Census of Agriculture and proportionately applied to the flood plain, for each flood event, in each respective county.

Specific crops produced in each county impacted by lower Colorado River flooding were identified using data from the Texas County Extension Program Councils, which computes the estimated value of basic agricultural production and related items for each year by county. The 1997 Census of Agriculture was used in the computation of the proportion of each measured crop by county. Total cropland in each county was used as the basis to proportionately distribute the variety of crops within each floodplain. Adjustments made for roads and uncultivated cropland was made for each flood event to arrive at a computed cropland. An adjustment was also made for cropland and its proximity to the river. As the flood event becomes more frequent, the likelihood of seeing a high percentage of higher value crops decreases. The adjustment was made

in cropland acres based on discussions with local cooperative extension agents in several counties within the study area. The percent of harvested cropland was taken from the 1997 Census of Agriculture for each county and applied proportionately to the flood event. Similarly, the percentage of hay land that was noted in the 1997 Census of Agriculture was proportioned to each flood event by county. The computed cultivated cropland was used as a basis for determining the specific types of crops that were affected in each floodplain in each county.

Table B-11 illustrates the distribution of specific crops for each county. The 1997 Census of Agriculture crop distribution by county was proportioned for each floodplain in each county. Table B-12 provides the annual income per crop per county.

Table B-11. Crop Acres by County Within 500-Year Floodplain

County	Cultivated Cropland	Corn	Sorghum	Wheat-Soybeans	Rice	Cotton	Orchard
Llano	9	0	0	0	0	0	9
Burnet	40	0	0	9	0	0	31
Travis	2,273	582	1,087	245	0	283	76
Bastrop	688	191	172	10	0	76	239
Fayette	1,310	981	176	46	0	0	107
Colorado	6,642	988	263	220	4,830	121	220
Wharton	42,539	4,424	14,420	4,228	10,487	8,685	295
Matagorda	14,962	264	5,409	2,296	3,668	2,942	383
TOTAL	**68,463**	**7,430**	**21,528**	**7,054**	**18,985**	**12,107**	**1,360**

C. **Computation of Damages by Crop by Impact Area**

Three-day and thirty-day flood duration computation sheets were comprised for corn, pecans, cotton, soybeans, sorghum, pasture, rice, and Bermuda hay. Operating costs accumulated during the crop year were taken from Texas A&M Crop Budgets available through the Cooperative Extension Service. The probability of a flood event was computed by taking the probability of a flood event occurring within each month of the year based upon the seasonal distribution of annual peak flows at specific index points along the Lower Colorado River and assigning them to impact areas. Percent damages were computed and indicate the impact on the gross income resulting from a flood event occurring in the specified month. Variable cost probability damage by month is a computation of the accumulated variable costs times the probability of flooding. The net Income Probability Damage by month indicates the amount of net income forgone due to flooding and is calculated by taking the net income at risk times the probability of flooding for a particular month. Total loss per acre per flood event is the summation of variable cost damage by year, net income damage by year, and land clean-up and rehabilitation. Yields and prices were taken from the Agricultural Statistic Service, USDA. The computation of damages to crops for various impact areas along the Colorado River are shown in Table B-13.

Table B-12. Crop Annual Gross Income (Thousands of Dollars)

County	Acres of Cultivated Cropland	Computed Corn ($)	Computed Sorghum ($)	Computed Wht-Sbns ($)	Computed Rice ($)	Computed Cotton ($)	Computed Orchard ($)	Total Gross Income ($)
Llano	9	0	0	0	0	0	4.0	**4.0**
Burnet	40	0	0	1.0	0	0	14.4	**15.4**
Travis	2,273	178.5	159.7	27.7	0	62.2	35.8	**463.9**
Bastrop	688	58.6	25.2	1.1	0	16.8	112.1	**213.8**
Fayette	1,310	301.0	25.9	5.2	0	0	50.4	**382.5**
Colorado	6,642	303.3	38.7	24.9	2,145.7	26.6	103.2	**2,642.4**
Wharton	42,539	1,358.0	2,118.0	479.6	4,658.5	1,910.1	138.6	**10,662.8**
Matagorda	14,962	81.0	794.5	260.4	1,629.1	647.0	179.8	**3,591.8**
Total	**68,463**	**2,280.4**	**3,162.0**	**799.9**	**8,433.3**	**2,662.7**	**638.3**	**17,976.6**

Table B-13. Expected Annual Agricultural Damages by County (Thousands of Dollars)

County	Expected Annual Damages
Llano	$3.9
Burnet	$23.3
Travis	$64.2
Bastrop	$106.8
Fayette	$181.9
Colorado	$301.3
Wharton	$300.2
Matagorda	$212.3
Total	**$1,193.9**