Identify, Interpret, Integrate

Lower Nueces, TX
Base Level Engineering (BLE) Results

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APPROVALS

This document requires the approval of the following persons:

Role	Name	Phone Extension	Title (CLIN/RMC)	Review Date	Approved Date
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CLIENT DISTRIBUTION

Name	Title/Organization	Location
FEMA's MIP	Region VI	See path above
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Executive Summary

FEMA Region VI contracted Compass to complete a Base Level Engineering (BLE) analysis for the HUC-08 watershed Lower Nueces (LN) in South Texas, to support FEMA's Discovery process and validation of effective Zone A Special Flood Hazard Areas (SFHAs). The BLE process involves using best available data and incorporating automated techniques with traditional model development procedures to produce regulatory-quality flood hazard boundaries for the 1-percent annual chance event as well as estimates of flood hazard boundaries for multiple recurrence intervals.

The source digital terrain data used for surface model development in support of hydrologic and hydraulic analysis as well as mapping activities were leveraged from various local, State, and Federal partners. Details regarding the different datasets used are provided below in Section 1.1.

Flood discharges for this study were calculated the United States Geological Survey (USGS) regression equations. Regression equations were obtained from the USGS Scientific Investigations Report (SIR) 2009-5087, *Regression Equations for Estimation of Annual Peak-Streamflow Frequency for Undeveloped Watersheds in Texas Using an L-moment Based, PRESS-Minimized, Residual-Adjusted Approach* (2009).

The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program version 4.1.0 was used to compute water surface elevations on a stream by stream basis. All hydraulic models were computed using 1-D steady state analysis.

The stream mile network that was validated for these watersheds was compiled using FEMA's Community Needs Management Strategy (CNMS) inventory. CNMS is an inventory of flood hazard studies and flood hazard mapping needs for areas where a study is needed. This data is helpful for community officials in analyzing and depicting flood hazards to enhance the understanding of flood risks. Communities may use this information to make informed decisions on their planning and flood mitigation efforts. **Table ES-1** lists the stream miles associated with this validation analysis.

Table ES-1: Summary of Stream Miles

Source	Lower Nueces River Stream Miles
CNMS	478.6

The full inventory of Zone A studies in the watershed were classified in CNMS. Total miles validated in CNMS are summarized in **Table ES-2** and illustrated in **Figure ES-1** below.

Table ES-2: Aggregated Zone A Validation Results

Validation Status	Status Type	Total Miles
Valid	Being Studied	9.2
Unverified	Being Studied	469.4

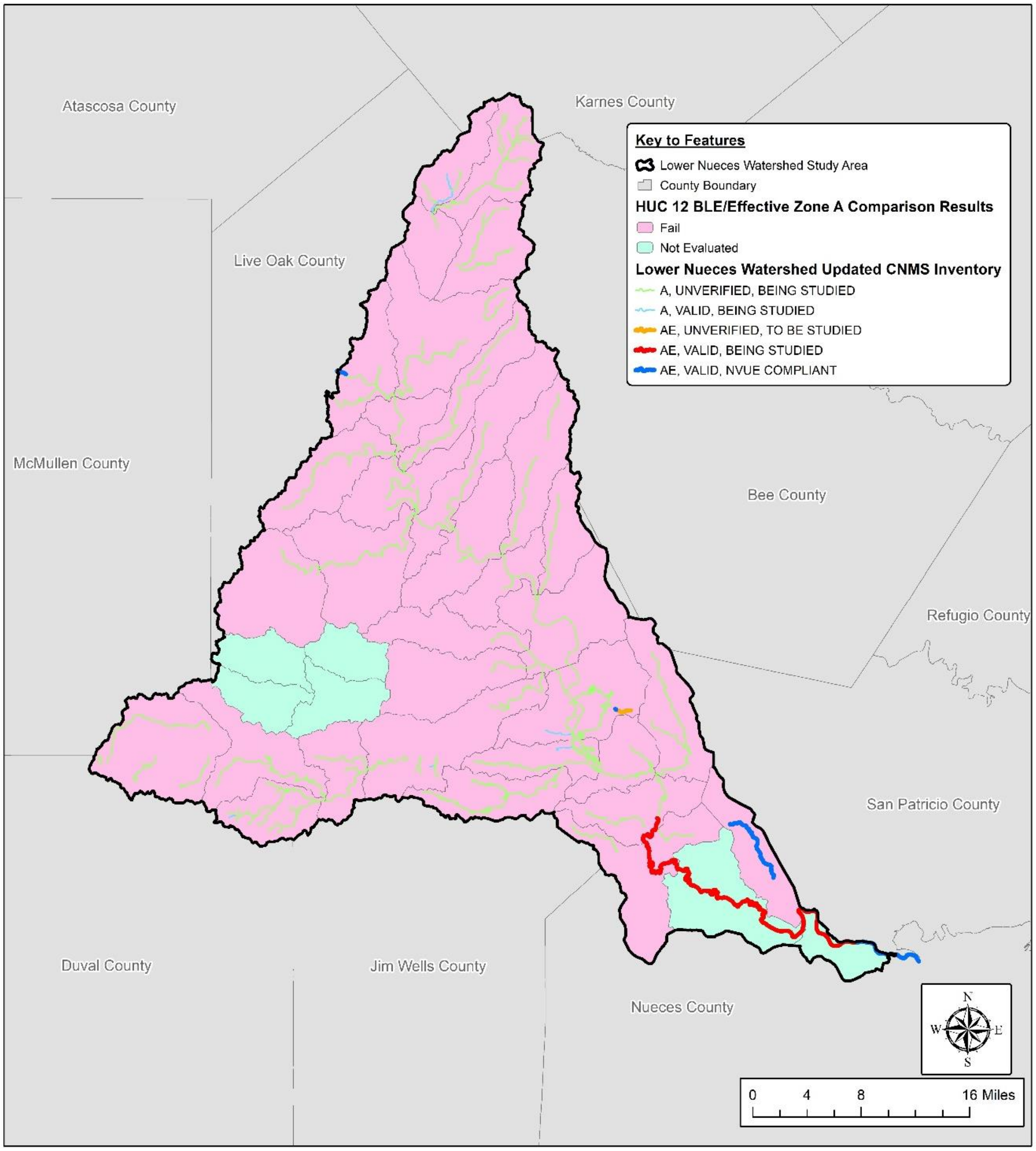

Figure ES-1: Lower Nueces Watershed CNMS Validation Results

An overall risk for each HUC-12 watershed was calculated using the National Flood Risk Percentages Dataset and its proportional area. The weighted risk was multiplied by the percentage of points in the watershed that failed the CNMS comparison to effective to determine the priority score. **Figure ES-2** below shows the range of the Lower Nueces Watershed HUC-08 priority scores which can be used to initiate discussions during the Discovery phase.

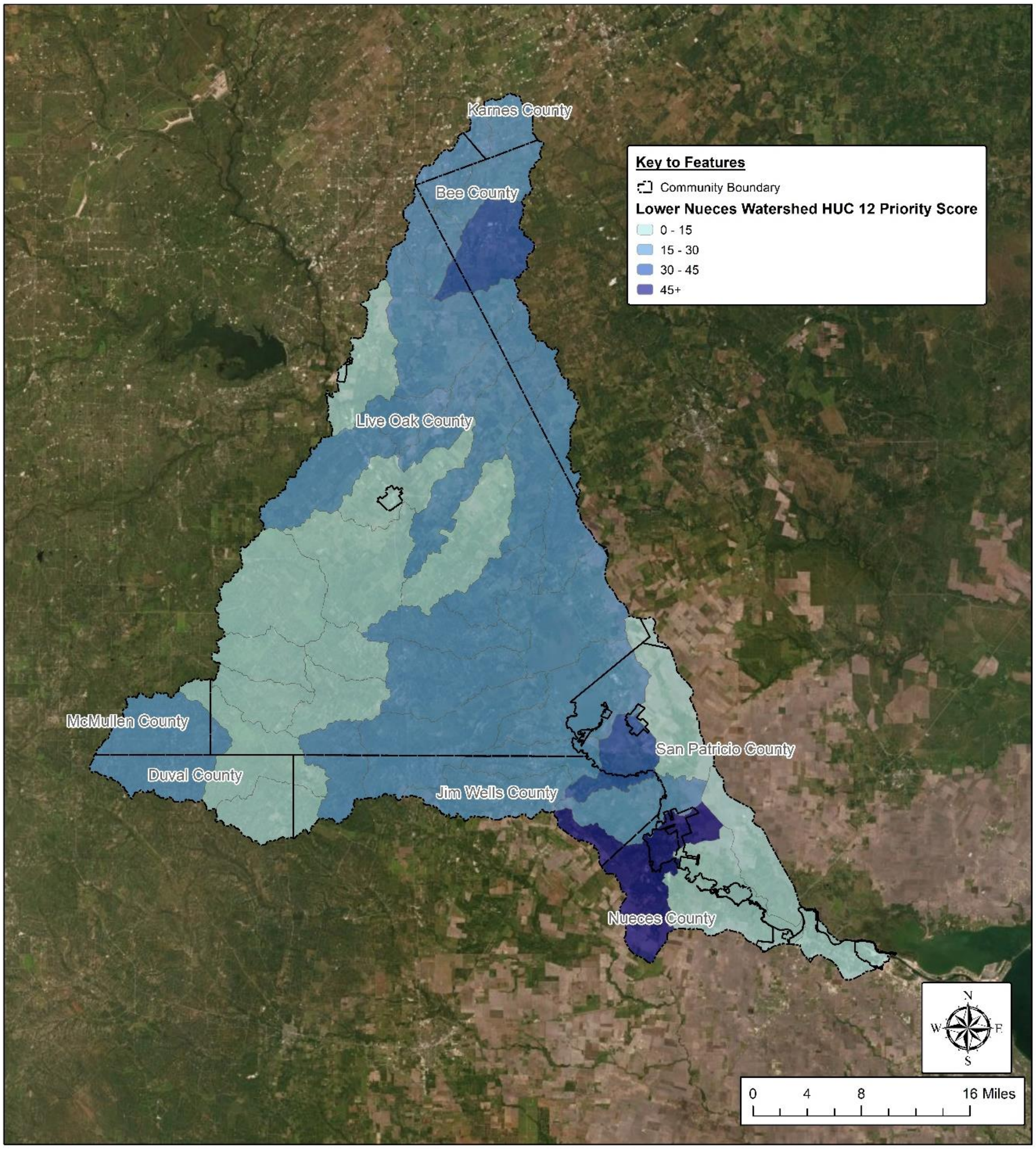

Figure ES-2: Ranking of Lower Nueces Watershed HUC-12

Base Level Engineering (BLE) Methodology

Recent innovations and efficiencies in floodplain mapping have allowed the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) to develop a process called Base Level Engineering (BLE), which can be used to address current program challenges, including the validation of Zone A studies and the availability of flood risk data in the early stages of a Flood Risk Project. The BLE process involves using best available data and incorporating automated techniques with traditional model development procedures to produce regulatory quality flood hazard boundaries for the 1-percent annual chance event as well as estimates of flood hazard boundaries for multiple recurrence intervals. The cost for developing the data and estimates resulting from the BLE process are lower than standard flood production costs. The BLE results may be used for eventual production of regulatory and non-regulatory products.

As described in Title 42 of the Code of Federal Regulations, Chapter III, Section 4101(e), once every five years, FEMA must evaluate whether the information on Flood Insurance Rate Maps (FIRMs) reflects the current risks in flood-prone areas. FEMA makes this determination of flood hazard data validity by examining flood study attributes and change characteristics, as specified in the Validation Checklist of the Coordinated Needs Management Strategy (CNMS) Technical Reference. The CNMS Validation Checklist provides a series of critical and secondary checks to determine the validity of flood hazard areas studied by detailed methods (e.g., Zone AE, AH, or AO). While the critical and secondary elements in CNMS provide a comprehensive method of evaluating the validity of Zone AE studies, a cost-effective approach for evaluating Zone A studies has been lacking.

In addition to the need for Zone A validation guidance, FEMA standards require flood risk data to be provided in the early stages of a Flood Risk Project. FEMA Program Standard SID #29 requires that during Discovery, data must be identified that illustrates potential changes in flood elevation and mapping that may result from the proposed project scope. If available data does not clearly illustrate the likely changes, an analysis is required that estimates the likely changes. This data and any associated analyses should be shared, and results should be discussed with stakeholders.

An important goal of the BLE process is the scalability of the results. Scalability means that the results of a BLE analysis can not only be used for CNMS evaluations of Zone A studies but can also be leveraged throughout the Risk MAP program. The data resulting from a BLE analysis can be updated as needed and used for the eventual production of regulatory and non-regulatory products, outreach and risk communication, and MT-1 processing. Leveraging this data outside the Risk MAP program may also be valuable to external stakeholders.

FEMA Region VI contracted Compass to complete a BLE analysis for the Lower Nueces Watershed in South Texas to support FEMA’s Discovery process and validation of effective Zone A Special Flood Hazard Areas (SFHA). The study extents include portions of Bee, Duval, Jim Wells, Karnes, Live Oak, McMullen, Nueces, and San Patricio Counties, and include the following communities: The Cities of Corpus Christi, George West, Lake City, Lakeside, Mathis, San Patricio, and Three Rivers. The study area consists of 7 HUC-10 basins: Bayou Creek-Nueces River, Lagarto Creek-Lake Corpus Christi, Nueces River-Lake Corpus Christi, Penitas Creek-Lake Corpus Christi, Ramirena Creek-Lake Corpus Christi, Spring Creek-Nueces River, and Sulphur Creek-Nueces River. Figure 1 shows the orientation of the Lower Nueces HUC-10 basins with respect to the counties.

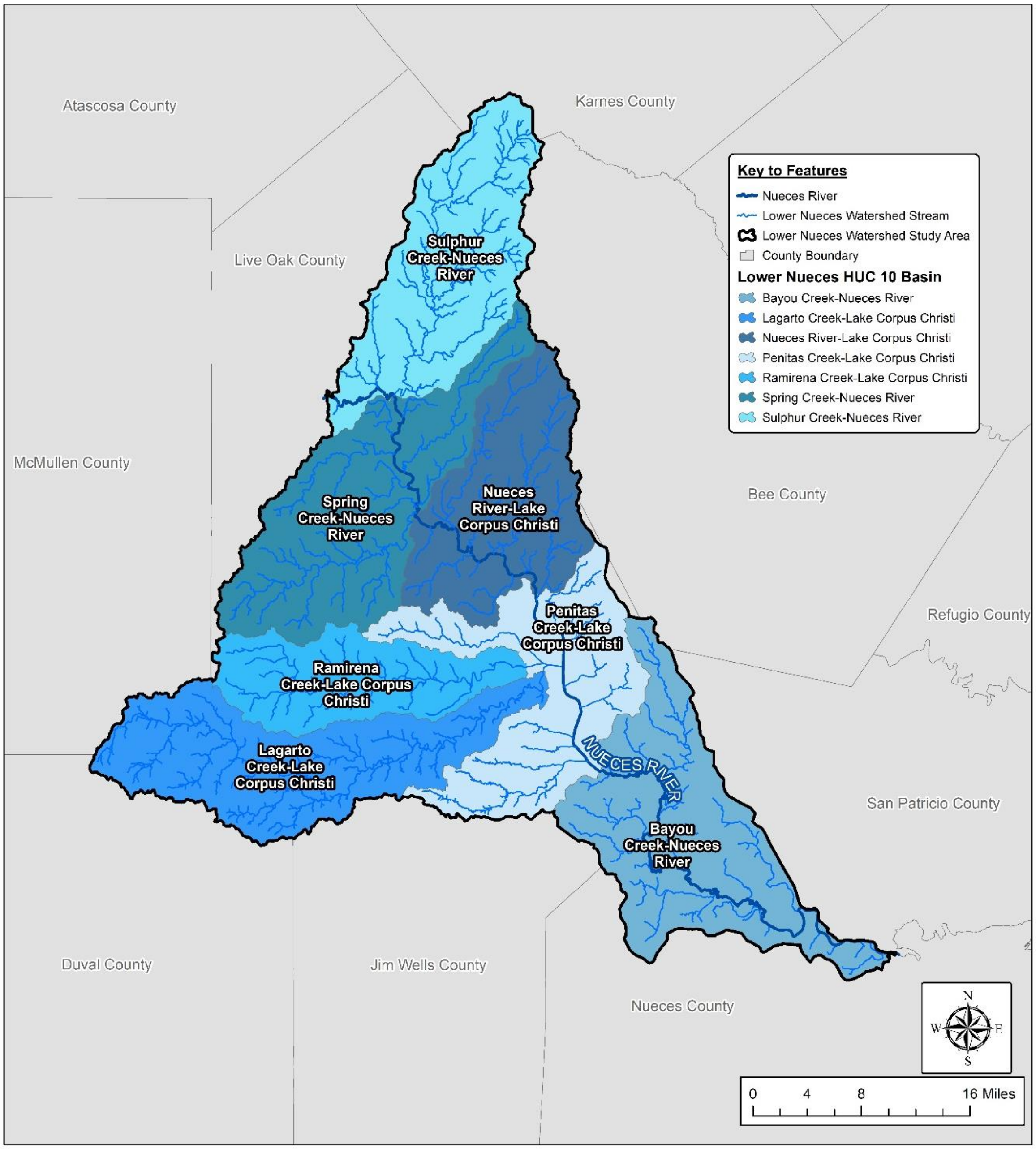

Figure 1: Lower Nueces Watershed HUC-10 Basins

Compass studied approximately 1,218 miles of stream reaches within the Lower Nueces Watershed with a minimum drainage area tolerance of one square mile. The selection and extent of stream reaches studied were based upon the number of stream miles with a minimum drainage area of one square mile and not the number of effective Zone A stream miles. Study reaches were extended above this threshold as appropriate to ensure all effective Zone A flood areas received an updated analysis. Topographic data from multiple sources were used to determine the hydrologic and hydraulic characteristics of the watershed. The following sections summarize the BLE process and discuss the results along with their recommended use.

1.1 Topographic Data

An inventory of existing topographic data was conducted for the Lower Nueces BLE project footprint. Figure 2 depicts the datasets identified and leveraged across the project area. FEMA, TNRIS, and other State and Federal agencies were queried to build the inventory with the most current and available data sources.

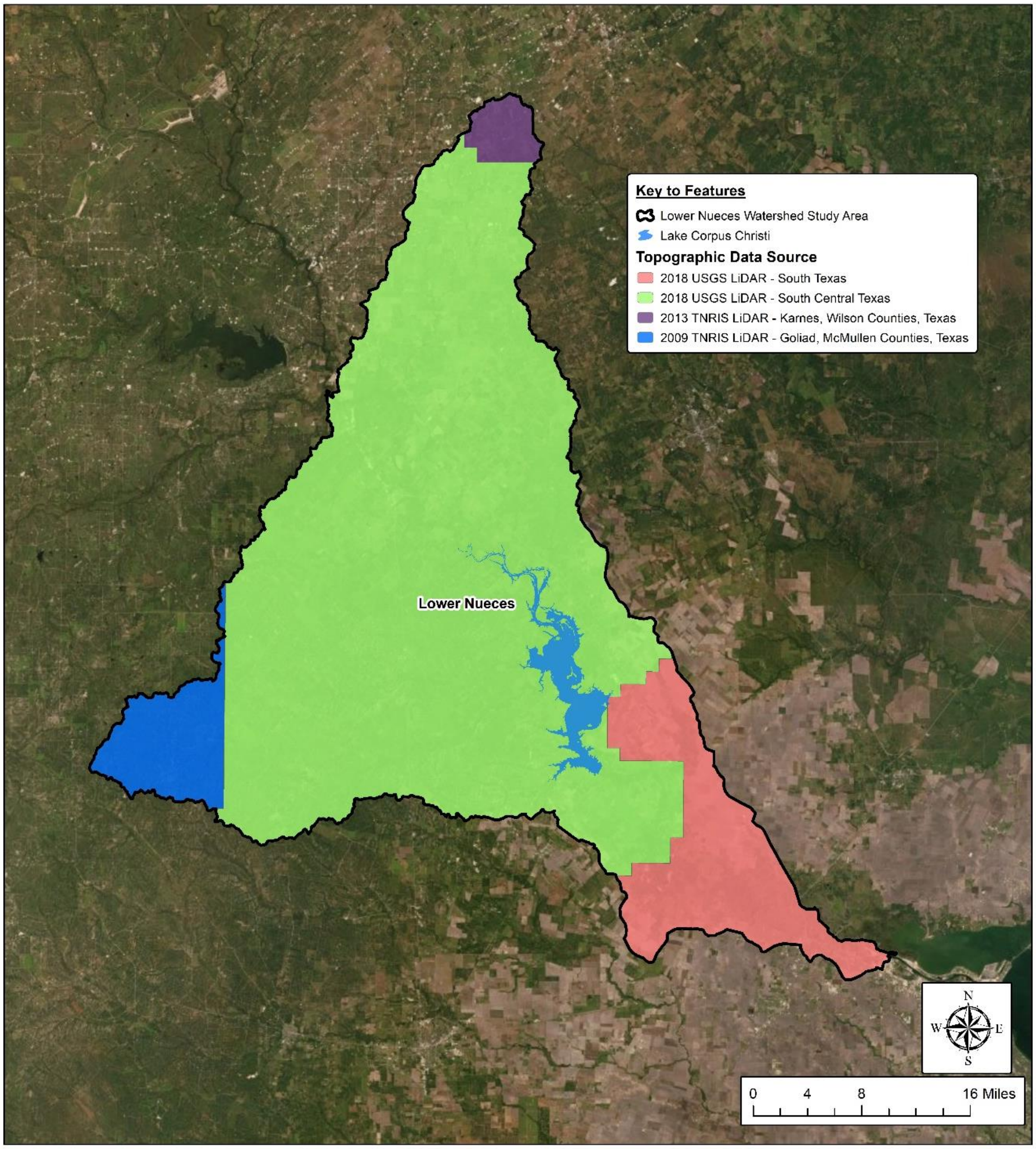

Figure 2: Extent of LiDAR Data for Lower Nueces Watershed

1.1.1 Evaluation

A data coverage assessment was conducted to check for data gaps, extent, accuracy, and completeness. A review of related documentation, reports, indexes, and metadata associated with the leverage datasets ensured each dataset meets FEMA accuracy requirements for topographic data. Decisions to leverage or exclude a dataset (or portion of it), were based generally on the following criteria coupled with engineering judgment:

- Data meet FEMA vertical accuracy standards (Table 1)
- Date of origination
- Data density and coverage

Table 1 depicts the Risk Map SID 43 vertical accuracy requirements based on flood risk and terrain slope within the floodplain being mapped.

Table 1: FEMA Vertical Accuracy Requirements for Leveraged Data

Level of Flood Risk	Typical Slopes	Specification Level	Vertical Accuracy*	LiDAR Nominal Pulse Spacing (NPS)
High (Deciles 1,2,3)	Flattest	Highest	24.5 cm / 36.3 cm	≤ 2 meters
High (Deciles 1,2,3)	Rolling or Hilly	High	49.0 cm / 72.6 cm	≤ 2 meters
High (Deciles 2,3,4,5)	Hilly	Medium	98.0 cm / 145 cm	≤ 3.5 meters
Medium (Deciles 3,4,5,6,7)	Flattest	High	49.0 cm / 72.6 cm	≤ 2 meters
Medium (Deciles 3,4,5,6,7)	Rolling	Medium	98.0 cm / 145 cm	≤ 3.5 meters
Medium (Deciles 3,4,5,6,7)	Hilly	Low	147 cm / 218 cm	≤ 5 meters
Low (Deciles 7,8,9,10)	All	Low	147 cm / 218 cm	≤ 5 meters

***Vertical Accuracy at 95% Confidence Level (FVA or NVA)/(CVA or VVA)**

Table 2 depicts the complete list of source elevation data and attributes leveraged for the Lower Nueces Watershed BLE project. All the Terrain datasets used for hydrology, hydraulic analyses, and mapping meet the highest specification level defined in Table 1. Further explanation of the Table 2 datasets can be referenced in section 1.1.1.1.

Table 2: Source Topographic Data Available for the Lower Nueces Watershed

Year	Description	Data Type	RMSE	Source/Owner
2009	2009 TNRIS LiDAR (McMullen Goliad)	Airborne LiDAR	26.1 - 32.8 cm	TNRIS
2013	2013 TNRIS LiDAR (Karnes, Wilson)	Airborne LiDAR	13.9 – 16.3 cm	TNRIS
2019	2018 USGS South Central Texas LiDAR	Aiborne LiDAR	5.9 – 11.6cm	USGS
2018	2018 USGS South Texas LiDAR	Aiborne LiDAR	<19.6 cm	USGS

1.1.1.1 Lower Nueces Watershed Source Terrain Data

The source elevation data for the Lower Nueces Watershed are DEMs derived from the USGS and TNRIS LiDAR data. Only points classified as “ground” points (i.e., bare earth) were imported from the LiDAR and used for development of the project DEMs. Bare-earth LIDAR data are typically made by filtering non-ground returns (e.g. buildings, vegetation, etc.) from the raw laser returns. Figure 2 depicts the extent of the data defined in Table 2.

2009 TNRIS LiDAR (McMullen, Goliad)- The 2009 TNRIS LiDAR (McMullen, Goliad) was collected with a nominal pulse spacing of 1 meter. The RMSEz reported for the dataset was ranged from 26.1 cm to 32.8 cm at the 95% confidence level which meets project accuracy specifications of the National Standard for Spatial Data Accuracy (NSSDA).

2013 TNRIS LiDAR (Karnes, Wilson) - The 2013 TNRIS LiDAR, TX (Karnes, Wilson) was collected with a nominal pulse spacing of 0.5 meters. The RMSEz reported for the dataset ranged from 13.9 – 16.3 cm at the 95% confidence level which meets project accuracy specifications of the NSSDA.

2018 USGS South Central Texas LiDAR - The 2018 USGS South Central Texas LiDAR was collected with a nominal pulse spacing of 0.63 meters. The RMSEz reported for the dataset ranged from 7 - 14 cm at the 95% confidence level which meets project accuracy specifications of the NSSDA.

2018 USGS South Texas LiDAR - The 2018 USGS South Texas LiDAR was collected with a nominal pulse spacing of 0.6 meters. The RMSEz reported for the dataset ranged from 9 cm at the 95% confidence level which meets project accuracy specifications of the NSSDA.

1.1.1.2 Terrain Data Processing

The LiDAR data were processed in Environmental System Research Institute (ESRI) ArcGIS software to create a composite Digital Elevation Model (DEM) dataset for the project area. The DEM was used to generate hydrologically correct stream centerlines and served as a source for horizontal alignment and vertical elevation during manual revisions.

The Watershed Information System (WISE) Terrain Analyst (WTA) module software platform was utilized in order to create a Hydrologically correct DEM (HDEM) for the project area. WTA is used to identify natural sinks, peaks and flat areas in the DEM surface. The WTA module uses several routines that take localized elevations from the source topographic data and apply them to the streams. This ensures that the streams in the watershed are lower in elevation than any overbank sumps and also descend in height down to an outfall. The final generated streams file is then “burned” into DEMs to force flow through structures while preventing it from jumping out of the channel banks.

During the hydro enforcement of DEM, elevations of the cells were algorithmically calculated and the best path to route flow was determined without filling sinks in the DEM. Once all calculations were completed, the flow was checked confirming that all drainage flowed downstream correctly and routed to outside of the HUC-08 basin. The outputs from the processing described above, which included composite DEMS and HDEMs (10-ft and 50-ft cell-size), were used during the hydrology, hydraulics, and floodplain mapping processes.

In addition to the quantitative assessment of the source digital terrain, a qualitative visual inspection of the composite DEM was performed using a hillshade derived from the 10-foot DEM.

The visual inspection indicated no unusual or non-terrestrial features were observed in the composite DEM, assuring the surface files used for hydrologic, hydraulic analyses, and floodplain mapping activities are sufficient for BLE analysis.

1.2 Hydrology

Flood discharges for this study were calculated using the United States Geological Survey (USGS) regression equations. Regression equations were obtained from the USGS Scientific Investigations Report (SIR) 2009-5087, *Regression Equations for Estimation of Annual Peak-Streamflow Frequency for Undeveloped Watersheds in Texas Using an L-moment Based, PRESS-Minimized, Residual-Adjusted Approach* (2009).

The Watershed Information System (WISE) software was used to delineate drainage basins in shapefile format using the 50-foot DEM. WISE was also used to calculate the main-channel slope for each basin. The basin shapefile attribution was automated by WISE with drainage area, main-channel slope, and precipitation. A contributing drainage area of 15427 square miles is added at the upstream end of mainstem basins and cumulative drainage areas were adjusted.

Table 3 presents the published equations used in this study. In these equations, Q_i represents peak streamflow for i-recurrence interval (annual chance exceedance) in cubic feet per second (cfs), P represents mean annual precipitation in inches, S represents dimensionless main-channel slope, Ω represents the OmegaEM parameter, and A represents cumulative drainage area in square miles.

Table 3: Summary of Regression Equations in Texas (SIR 2009-5087)

Recurrence Interval	Equation
$Q_{10\%}$	$P^{1.203} \times S^{0.403} \times 10^{[0.918\Omega + 13.62 - 11.97A\wedge(-0.0289)]}$
$Q_{4\%}$	$P^{1.140} \times S^{0.446} \times 10^{[0.945\Omega + 11.79 - 9.819A\wedge(-0.0374)]}$
$Q_{2\%}$	$P^{1.105} \times S^{0.476} \times 10^{[0.961\Omega + 11.17 - 8.997A\wedge(-0.0424)]}$
$Q_{1\%}$	$P^{1.071} \times S^{0.507} \times 10^{[0.969\Omega + 10.82 - 8.448A\wedge(-0.0467)]}$
$Q_{0.2\%}$	$P^{0.988} \times S^{0.569} \times 10^{[0.976\Omega + 10.40 - 7.605A\wedge(-0.0554)]}$
Variables: Q_i, peak flow for i recurrence interval annual chance exceedance in cubic feet per second; P, mean annual precipitation, in inches; S, Main-channel slope (dimensionless); Ω, OmegaEM parameter; and A, cumulative drainage area, in square miles.	

Discharges for the 1-percent plus and 1-percent minus annual chance event were calculated as $Q_{1\%+/-} = Q_{1\%} \pm 10^{1.6*0.30}$, where 0.30 is the mean residual standard error for the $Q_{1\%}$ equation.

The mean annual precipitation values for the Texas regression equations were determined based on gridded coverage obtained from the PRISM Climate Group and available for download from the following location: http://prism.oregonstate.edu/normals/. The annual precipitation values reflect data for the climatological period 1981-2010 as recorded by the Natural Resources Conservation Service (NRCS).

Main-channel slope was calculated in WISE. An automated routine determined the longest flowpath from upstream of a reach to the outlet of the sub-basin of interest. The elevations for those endpoints were based on the 10-foot DEM developed from the LiDAR.

From USGS SIR 2009-5087, the OmegaEM parameter is a generalized terrain and climate index that expresses relative differences in peak-streamflow potential. A shapefile was developed and populated with OmegaEM values based on Figure 2 in SIR 2009-5087. This shapefile was used, along with a python script in ArcCatalog, to determine OmegaEM values on a sub-basin basis. For sub-basins spanning more than one OmegaEM grid, the sub-basin's centroid determined its OmegaEM parameter.

Automated basin delineations were performed in WISE. Basin break points were set by the user with a sub-basin target size of one square mile. This criterion was adjusted for the main stem of the Lower Nueces River to avoid excessive and unnecessary discharge breaks. Break points were also set immediately upstream of stream confluences. Cumulative drainage area was determined based on these automated delineations performed by WISE in combination with a stream connectivity routine that defined the stream reach segments with upstream and downstream neighbors.

The sub-basin shapefile was attributed with the computed discharges, and those discharges were incorporated into the HEC-RAS models using an automated routine in WISE. Discharges, as well as water surface elevation results, were associated with the hydraulic cross-sections prior to generation of floodplain boundaries and grid mapping. Those results are available in GIS format as part of this BLE submittal package.

1.2.1 Flood Frequency Analyses

A flood frequency analysis was prepared for the Lower Nueces watershed. Peak annual discharge from ten USGS gages were processed to generate frequency discharges at each gage. Table 4 presents the gages included in the flood frequency analysis including the source of the data, location of the gage, period of record, and stream the gage is located on. **Figure 3** shows the locations of USGS gages utilized in the flood frequency analyses.

Table 4: Flood Frequency Analysis Stream Gages

Gage Number	Flooding Source and Location	Published Drainage Area (mi^2)	Period of Record
USGS 08210000	Nueces Rv nr Three Rivers, Tx	15,427	1916-2010
USGS 08211000	Nueces Rv nr Mathis, Tx	16,450	1919-2017
USGS 08211500	Nueces Rv nr Calallen, Tx	16,715	1942-2016
USGS 08210400	Lagarto Ck nr George West, TX	155	1971-2017

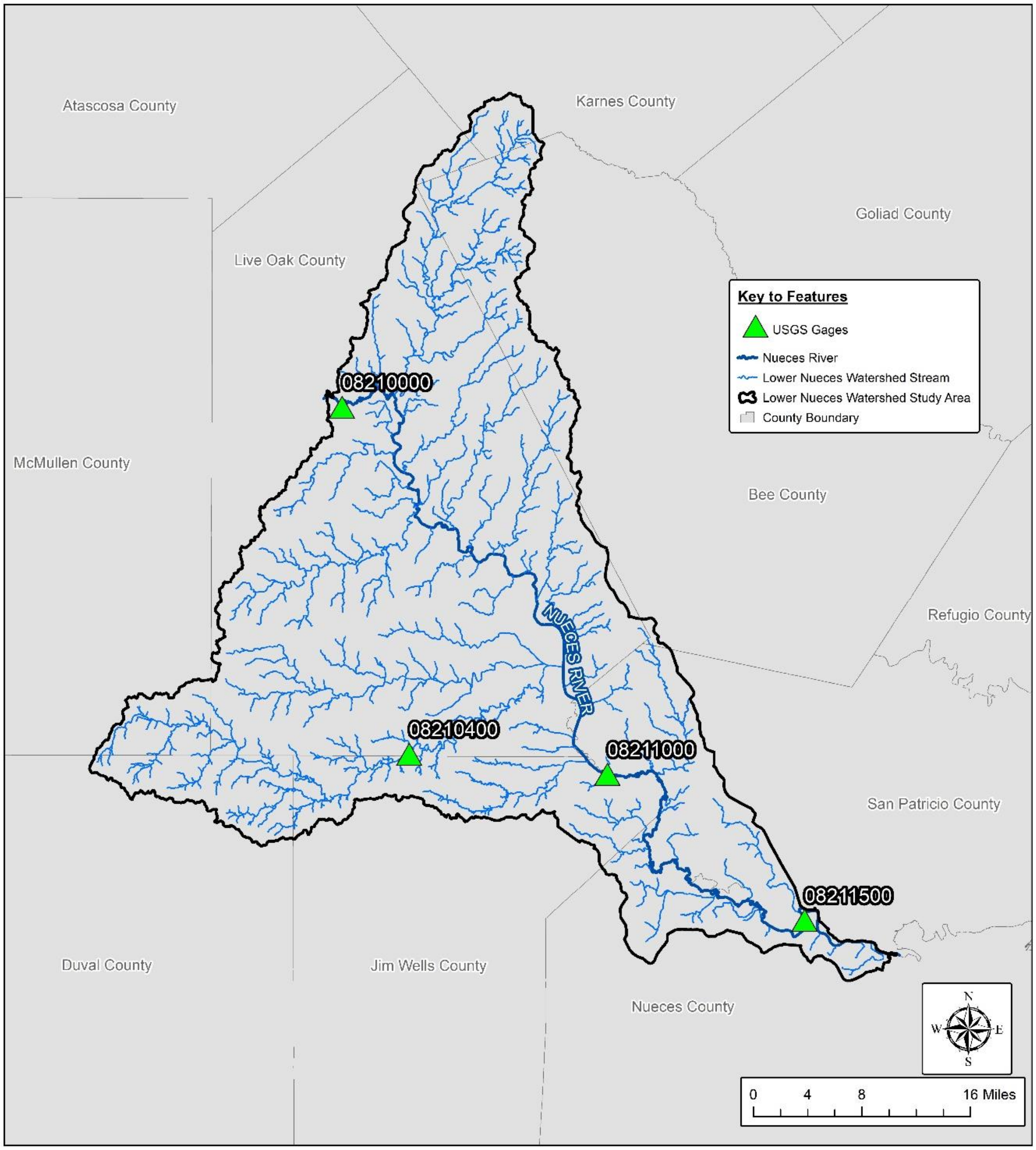

Figure 3: Locations of USGS Gages Utilized in Flood Frequency Analysis

A flood frequency analysis was computed for each USGS gage to determine the peak discharges for the Lower Nueces Watershed using the USGS "Guidelines for Determining Flood Flow Frequency, Bulletin #17B", revised September 1982. The 2009 regression models predict lower 1-percent and 0.2-percent annual chance event streamflow values than the flood frequency analyses on gages located along the Lower Nueces River. Therefore, a frequency adjustment factor is recommended for the 2009 regression equations for the mainstem. USGS gages 08211200 and 08211502 had insufficient data to support the analysis and were excluded from calculations. No adjustment factor was used for the rest of the Lower Nueces HUC-08.

The 1-percent and 0.2-percent annual chance event peak streamflow comparisons as calculated with the 2009 regression model and from gage data for Lower Nueces mainstem is shown in **Figure 4** and **Figure 5**, respectively.

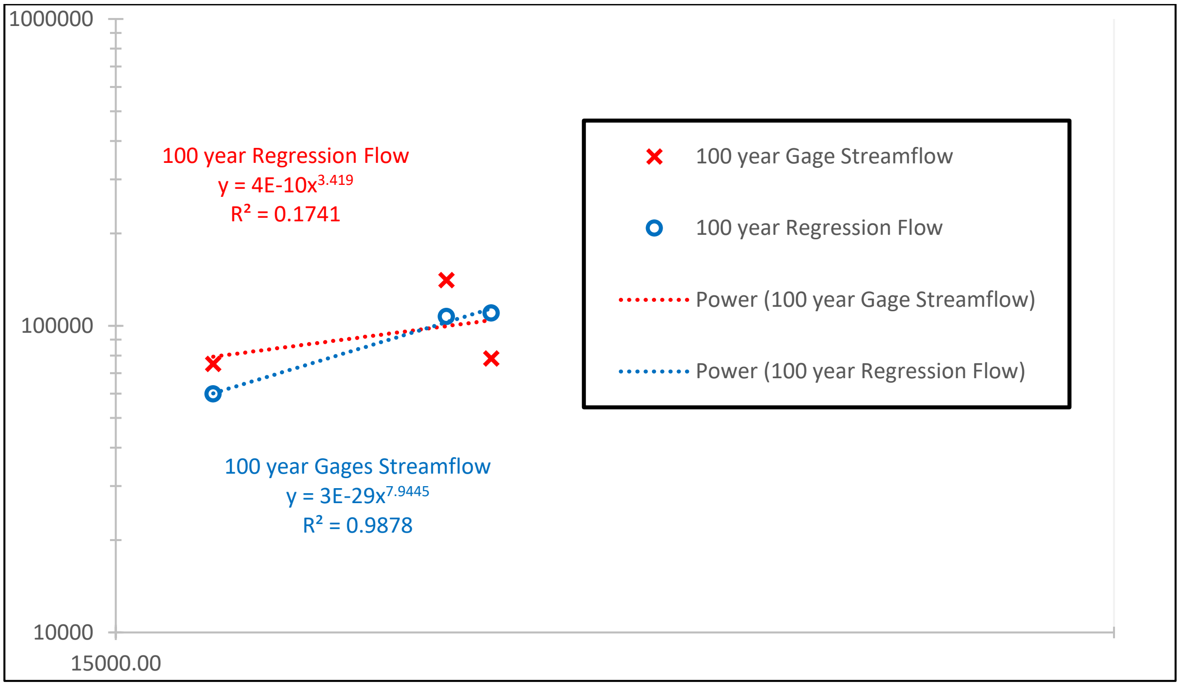

Figure 4: 1-Percent Annual Chance Event Flood Frequency Analysis for Lower Nueces Mainstem

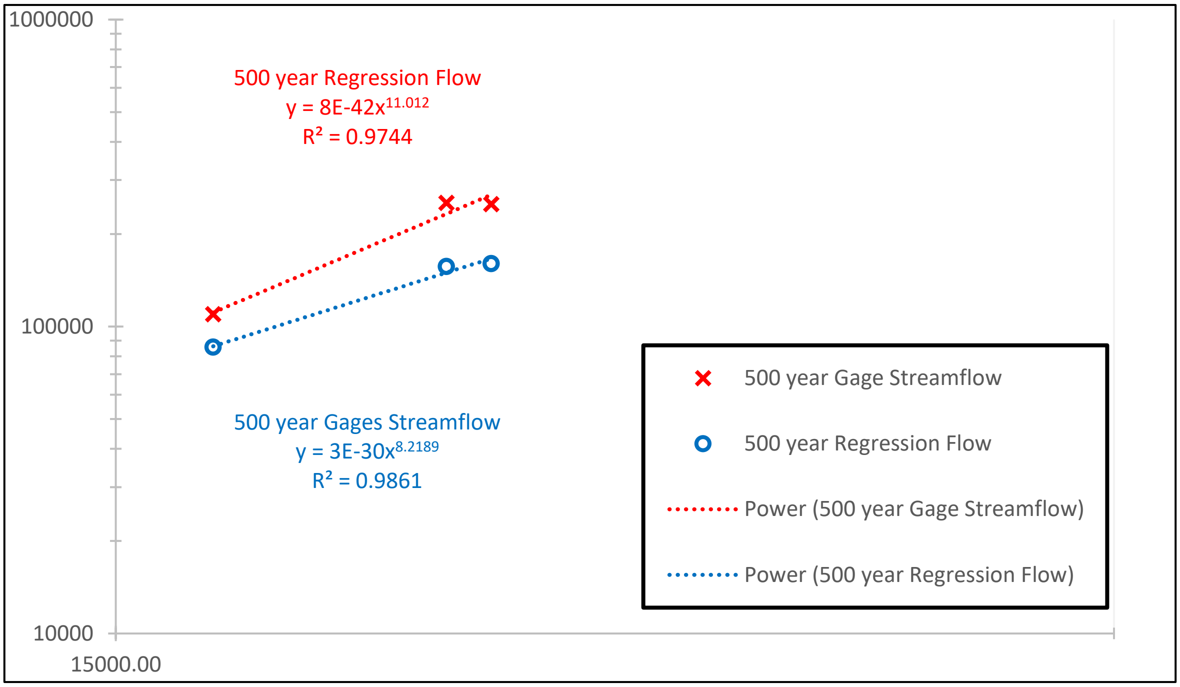

Figure 5: 0.2-Percent Annual Chance Event Flood Frequency Analysis for Lower Nueces River Mainstem

1.3 Hydraulics

The hydraulic approach for this BLE analysis of the Lower Nueces Watershed consisted of using the terrain model described in Section 1.1 in combination with the hydrologic outputs from Section 1.1.1 to establish water surface elevations using 1-D steady state analysis. The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program version 4.1.0 was chosen as the computer model to compute water surface elevations on a stream by stream basis. The WISE software was used to establish model stream orientation, generate initial hydraulic cross-section layout and stationing, assign n-values to cross-sections, and develop all input files for the HEC-RAS program. ESRI's ArcMap program was used to review and refine cross-section layout orientation.

First pass cross-section layout was performed using an automated routine in WISE based on the cumulative drainage area at the cross-section location. A first draft model was created based on this initial cross-section layout, and draft boundaries were developed. At this stage, a second pass inspection for cross-section placement occurred. Significant refinement occurred during this step. To improve the hydraulic models, additional cross-sections were added as needed to better define the BLE floodplain boundary. Cross-sections were extended in locations where overtopping occurred. Orientation of cross-sections was refined to improve on the perpendicular orientation to flow. Additional cross-sections were added at floodplain constrictions and at downstream portions of tributaries to ensure a proper tie-in with receiving streams. Cross-sections were adjusted to remove sections that intersected hydraulic crossings in the floodplain. For some of the largest studied streams, cross-sections were laid out manually to have more reasonable spacing and better capture the constrictions in the floodplain.

Cross-sections were not drawn on top of roadways or railroads but were placed at the upstream and downstream face of major roads and railroads. Ineffective flow stations were placed in the hydraulic models as appropriate to account for flow constrictions and other locations deemed by the engineer to be ineffective at conveying flow downstream.

Cross-sections were drawn on dam tops for significant dams with well-defined spillways to better represent ponded water upstream of the structures. In so doing, it was assumed that most of the flow during a flood event would pass the spillway and that the hydraulic model would reasonably estimate flow across the spillway as represented in the hydraulic cross-section. The elevations used in the modeling were checked against effective Zone A boundaries, and the results were deemed reasonable.

The relationship between cumulative drainage area and assigned channel geometry is shown in **Table 5**. These default values for dimensions and spacing were subject to change based on engineering judgment.

Table 5: Cross-Section Default Parameters

Drainage area (upper limit) (mi^2)	XS Spacing (ft)	Channel Top Width (ft)		Channel Bottom Width (ft)		Channel Depth (ft)
		Minimum	Maximum	Minimum	Maximum	
1	500	5	12	4	11	0.1
2	500	5	14	4	13	0.1
4	500	9	14	8	13	0.3
6	500	11	16	10	15	0.3

Drainage area (upper limit) (mi^2)	XS Spacing (ft)	Channel Top Width (ft)		Channel Bottom Width (ft)		Channel Depth (ft)
		Minimum	Maximum	Minimum	Maximum	
10	500	12	17	11	16	0.5
20	500	14	22	13	21	0.5
30	500	16	24	15	23	0.5
40	500	17	26	16	25	0.5
50	600	17	27	16	26	0.5
75	600	19	30	18	29	0.5
100	750	19	32	18	31	0.5
200	750	22	36	21	35	0.5
300	750	23	38	22	37	0.5

In typical BLE projects, Manning's roughness coefficients (n-values) are determined using the 2016 National Land Cover Data (NLCD) dataset in combination with n-values from Chow (1959) and Calenda et al. (2005). The association between the n-values and the NLCD Classification is shown in **Table 6**. Manning's n-value takeoffs are performed by WISE (default values taken from the "Normal" column). N-values within channel banks are constrained by the automated routine to a range of 0.030 to 0.070. Then, overbank and channel n-values are manually adjusted in certain locations based on engineering judgment. Under the current BLE task order, the n-value assignments were modified in a calibration process detailed in Section 1.1.

Table 6: Manning's "n" Roughness Based on 2016 NLCD Classification (Moore, 2011)

NLCD Classification	Minimum	Normal	Maximum	Source
Open Water	0.025	0.03	0.033	Chow 1959
Developed, Open Space	0.01	0.013	0.016	Calenda et al. 2005
Developed, Low Intensity	0.038	0.05	0.063	Calenda et al. 2005
Developed, Medium Intensity	0.056	0.075	0.094	Calenda et al. 2005
Developed, High Intensity	0.075	0.1	0.125	Calenda et al. 2005
Barren Land	0.025	0.03	0.035	Chow 1959
Deciduous Forest	0.1	0.12	0.16	Chow 1959
Evergreen Forest	0.1	0.12	0.16	Chow 1959
Mixed Forest	0.1	0.12	0.16	Chow 1959
Scrub/Shrub	0.035	0.05	0.07	Chow 1959
Grassland/Herbaceous	0.025	0.03	0.035	Chow 1959
Pasture/Hay	0.03	0.04	0.05	Chow 1959
Cultivated Crops	0.025	0.035	0.045	Chow 1959
Woody Wetlands	0.08	0.1	0.12	Chow 1959
Emergent Herbaceous Wetland	0.075	0.1	0.15	Chow 1959

The boundary condition used for most of the study streams was normal depth with a default value of 0.005 ft/ft. For streams with large drainage areas (generally greater than 8 square miles), the normal depth slope was calculated based on the channel inverts of the downstream cross-sections.

In cases where streams tie into a lake, a normal depth slope was calculated based on the channel inverts of the downstream cross-sections (typically between 0.0001 and 0.001 ft/ft). Several HUC-10s within this watershed are located in urban areas with storm drain systems, which are unaccounted for in the BLE models. Simplifications of these systems may considerably affect perceived risk.

1.4 Quality Control

Following the initial BLE analysis in each watershed, the flood hazard area delineations created by the BLE process were reviewed for areas where the results were not ideal.

Quality Control (QC) results indicated that some of the models should be extended to cover the scope of effective flood hazard data. Those streams were extended farther upstream to match the extents of the SFHA data.

Typical manual editing resulting from reasonability checks included adding cross-sections, adjusting orientation of cross-sections, trimming cross-sections and reduction of the default “V” angle of cross-sections. Examples of default “V” angled cross-sections are shown in **Figure 6**. It is estimated that 75 percent of cross-sections were adjusted in some work areas while other areas did not require as much editing. Other examples of manual editing included the addition of cross-sections at confluence areas (see **Figure 7** below), modifications to improve perpendicular orientation at the channel, adjustment of discharge breaks to better represent flow addition points, revisions to dam spillways and dam tops, additional cross-sections bounding major hydraulic structures, and revisions to n-values.

A major component of the QC process was an automated check that identified locations where the 1-percent and 0.2-percent annual chance event profiles were crossed by any other frequency profile. Significant effort was made to reasonably resolve all of these instances. Another automated check identified locations where there was a drawdown of greater than 0.5 foot on the 1-percent and 0.2-percent annual chance event water surface profiles. This check is particularly useful for identifying errors in the model such as a channel that is too wide, a poorly placed cross-section, or a need for additional cross-sections. Again, significant effort was made to reasonably resolve these drawdown situations.

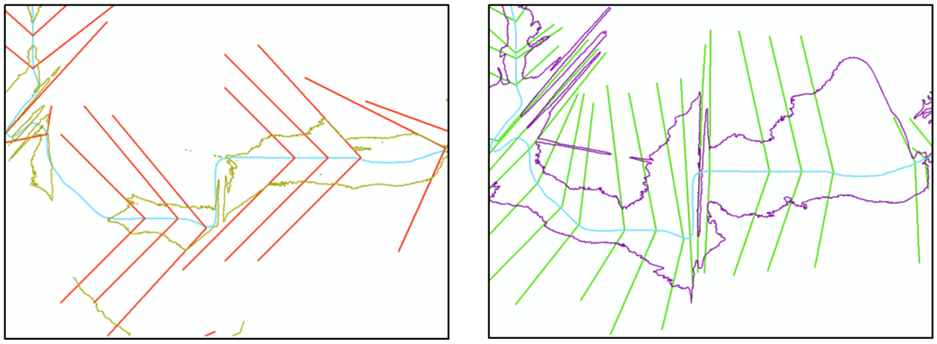

Figure 6: Default "V" angle cross-sections automated by WISE (left). Manually edited cross-sections to more accurately capture terrain (right). Resulting flood boundaries shown in gold (left) or purple (right) for clarity.

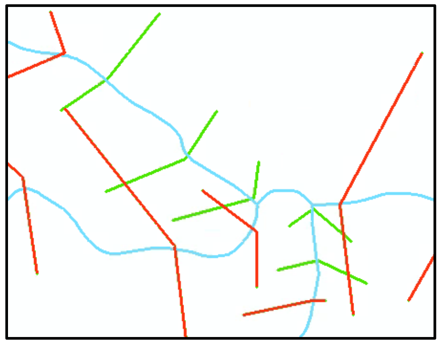

Figure 7: Manually added cross-sections (green) to improve accuracy of tie-ins at confluences.

1.5 One-Percent Special Flood Hazard Area Delineation

The 10-percent, 1-percent and 0.2-percent annual chance event boundaries were mapped using a routine that develops water surface elevation grids based on the 10-foot cell size DEM developed from the LiDAR dataset used for this project (see Section 1.1). This product was converted to a polygon for cleaning. The cleaning routine involved manual inspection of the polygons to identify and remove areas of disconnected flooding. In general, areas with a size of less than 5,000 square feet were removed and all others were investigated to determine whether they should be considered as potentially part of the SFHA. This investigation was aided by the ground DEM and aerial imagery. Manual adjustments to the polygons were made to account for spillways on dams which could not be accurately modeled using HEC-RAS as well as disconnected areas along the flooding source that should reasonably be connected.

Following the removal of disconnected flooding areas and other boundary adjustments, the small islands in the floodplain were filled. Islands with a size between roughly 5,000 and 30,000 square feet were inspected and, in general, islands that were less than 10,000 square feet were filled.

Once the island filling process was complete, the water surface raster mapping routine was run and set to conform to the polygon boundary. This ensures that the water surface raster and the floodplain boundary are consistent with each other. The depth raster product was created at the end of the process by performing a raster subtraction with the water surface elevation raster and the ground DEM.

Challenges

Challenges encountered during BLE analysis vary based on available data on which to run the analysis. The Lower Nueces Watershed presented challenges as summarized in the following paragraphs.

A significant effort was made to improve water surface elevation tie-ins at stream confluences. Bayou Creek – Nueces River HUC-10 was significantly flat and had many spill areas. As a 1D model, the cross sections were extended to contain and multiple iterations were needed to analyze spills for mapping. Cross-sections were manually added on the downstream end of nearly every stream, some of which traverse the receiving stream, so that the water surface elevation of the tributary would be lower than that of the receiving stream. A coverage file named S_AOMI_AR, included in spatial files, identifies several spill area locations. Analysis and projects in the area of these spill will benefit from additional analysis to identify the amount and location of sub-basin interaction and spills within the analysis watershed. An S_AOMI_PT file identifies locations which contribute to flood losses or highlight flood issues and/or associated effects.

There are a significant number of small-sized dams on the tributaries throughout the watershed. Discharges calculated with the regression equations do not consider the impact of these structures. There may be need for further investigation when upgrading these models for detailed studies.

The Three River Levee is located at upstream end of Lower Nueces Mainstem near the City of Three Rivers. This levee is non-accredited as it does not meet the 44 CFR Part 65.10. BLE mapping reflects a natural valley floodplain approach. Further detailed analysis may be required to determine the levee's impact on the flooding. Coordination efforts were made with the Lower Frio BLE study to ensure a tie-in. Incorporating the tie-ins from Lower Frio watershed may result in water surface elevation data within the modeling to be less than what is shown in the grids/floodplain results.

Along the Nueces River mainstem at the downstream end of the Lower Nueces HUC-08, Lake Corpus Christi is situated. Some of the part at the downstream end is coastal VE zone and water surface elevations were reviewed to ensure they were reasonable with the current expected 1-percent annual chance event elevations.

Results and Recommendations

The BLE results for this study produced a SFHA that compares reasonably well with the effective SFHA. These boundaries provide an additional estimated SFHA in areas that do not currently have an SFHA mapped. These results provide context for flood risk communication as part of the Discovery process and should be verified through community work map meetings before being applied to a regulatory product.

A map showing the BLE results is included as **Appendix B**.

1.6 CNMS Validation of Effective Zone A SFHA

The following summarizes the results of the CNMS validation assessments for the effective Zone A studies in the Lower Nueces Watershed.

1.6.1.1 Initial Assessment A1 – Significant Topography Update Check

The significant topography update check determines whether a topographic data source is available that is significantly better than what was used for the effective Zone A modeling and mapping. For most of the study area the effective Zone A topographic data source is unknown, but most likely would have leveraged contours from USGS 24K map products. This caused all reaches to FAIL this element because the elevation data leveraged in the BLE study represents a significant improvement from the USGS 24K map products.

1.6.1.2 Initial Assessment A2 – Check for Significant Hydrology Changes

The significant hydrology changes check determines whether new regression equations have become available from the USGS since the date of the effective Zone A study. If newer regression equations exist for the area of interest, then an engineer must determine whether these regression equations would significantly affect the 1-percent annual chance flow. Most reaches being assessed FAIL this check because the studies did not use regression methods, or the hydrologic methods are unknown/undocumented. The reaches in Live Oak County used the most current regression equations (SIR 2009-5087). Therefore, all reaches in the county PASS this check.

1.6.1.3 Initial Assessment A3 – Check for Significant Development

The significant development check, using the National Urban Change Indicator (NUCI) dataset, assesses increased urbanization in the watershed of the BLE. If the percentage of urban area within the HUC-12 watershed containing the effective Zone A study is 15 percent or more and has increased by 50 percent or more since the effective analysis, the study would fail this check. Although the NUCI data provide year-to-year changes in urbanization, the NLCD also is needed to establish a baseline of urban land cover for this analysis. The check for significant development in the Lower Nueces study area was completed by evaluating percentage of urban change at the HUC-12 level. All of the watershed is classified as rural and, therefore, the reaches PASS this assessment.

Table 7 presents the summarized results of checks A1 through A3.

Table 7: A1-A3 Validation Results

Assessment Checks	Pass / Fail	Notes
A1 - Topography	Fail/Pass	Available LiDAR sources in areas of effective studies that did not utilize LiDAR/Studies within Leon County utilized LiDAR for effective study
A2 - Hydrology	Pass	Regression was not used for effective studies or the most current regression equations were used
A3 - Development	Fail/Pass	>50% increase in urban since effective study in urban HUC-12/Less than 15% of study area is under urban cover

1.6.1.4 Validation Check A4 – Check of Studies Backed by Technical Data

Zone A studies that pass all initial assessment checks described above may be categorized as “Valid” in the CNMS Inventory only if the effective Zone A study is supported by modeling or sound engineering judgment and all regulatory products are in agreement. If the effective Zone A study passes all initial assessment checks, but is not supported by modeling, or if the original engineering method used is unsupported or undocumented, a comparison of the BLE results and effective Zone A’s is performed. Due to lack of documentation of the original engineering methods in the Lower Nueces Watershed, check A4 has been marked as FAIL for all reaches.

1.6.1.5 Validation Check A5 – Comparison of BLE and Effective Zone A

The BLE/effective Zone A comparison method leverages the existing Floodplain Boundary Standard (FBS) certification procedures described in FEMA SID 113, but with a slight modification. This modified FBS comparison approach uses the 1-percent plus and 1-percent minus flood profiles and horizontal and vertical tolerances described in FEMA’s Automated Engineering guidance document dated May 2016. For the comparison of BLE and effective Zone A in the Texas study area, the following vertical and horizontal tolerances were used to conduct the modified FBS procedure. One point was placed every 200 feet along the floodplain boundaries for comparison.

Vertical Tolerance: +/- 10 feet (one-half contour interval of assumed effective topographic source).
Horizontal Tolerance: +/- 75 feet (standard horizontal tolerance for BLE comparison testing).

Of the 459 modeled BLE streams in the study area, 307 were found to correspond (within the tolerance limits) with effective Zone A flood zones. Comparison results for these streams were grouped at the HUC-12 level and are summarized in Table 8 to better understand the general health of the HUC-12 watershed, but the validation check was performed at the stream level. Streams where the percentage of passing FBS sample points is greater than or equal to 85% are marked as "Pass", otherwise marked as "Fail".

Table 8: HUC-12 Zone A Validation Results

HUC-12 Watershed		Total FBS points	Fail	Pass	%Pass	BLE Comparison Pass? (>85%)	Priority Score
Watershed Name	Watershed Number						
Lower Nueces	**All Streams**	**31,406**	**14,365**	**17,041**	**54%**	**Fail**	
Rock Quarry Branch-Nueces River	121101110101	668	187	481	72%	Fail	14.1
Upper Sulphur Creek	121101110102	1,758	602	1,156	66%	Fail	27.4
121101110103-Elm Creek	121101110103	462	122	340	74%	Fail	21.1
Middle Sulphur Creek	121101110104	101	26	75	74%	Fail	23.9
East Fork Salt Creek-Salt Creek	121101110105	1,297	532	765	59%	Fail	31.9
Lower Sulphur Creek	121101110106	1,465	623	842	57%	Fail	23.4
Sand Hollow-Nueces River	121101110201	728	352	376	512%	Fail	24.2
Salt Branch	121101110202	991	532	459	46%	Fail	21.5
Waller Gully	121101110203	1,367	672	695	51%	Fail	27.4
Timon Creek-Nueces River	121101110204	571	209	362	63%	Fail	14.6
Upper Spring Creek	121101110205	307	140	167	54%	Fail	11.4
Lower Spring Creek	121101110206	824	410	414	50%	Fail	13.8
Ramie Hollow-Nueces River	121101110301	1,352	704	648	48%	Fail	26.0
Gilden Creek-Lake Corpus Christi	121101110302	522	79	443	85%	Fail	7.6
La Para Creek-Lake Corpus Christi	121101110303	1,110	442	668	60%	Fail	19.9
Paisano Creek-Lake Corpus Christi	121101110304	525	274	251	48%	Fail	25.2
Mustang Creek-Lake Corpus Christi	121101110305	786	466	320	41%	Fail	27.3
Buck Ridge-Lake Corpus Christi	121101110405	374	155	219	59%	Fail	20.6
Headwaters Lagarto Creek	121101110501	2,133	864	1,269	59%	Fail	15.4
Tepecate Creek-Lagarto Creek	121101110502	1,001	331	670	67%	Fail	9.3
Botello Creek	121101110503	1,398	540	858	61%	Fail	11.9
Kentuck Creek-Lagarto Creek	121101110504	799	312	487	61%	Fail	19.5
Julian Creek-Lagarto Creek	121101110505	1,389	502	887	64%	Fail	18.0
Long Hollow-Lake Corpus Christi	121101110601	347	166	181	52%	Fail	23.3

HUC-12 Watershed		Total FBS	Fail	Pass	%Pass	BLE	Priority
Rufe Williams Hollow-Lake Corpus Christi	121101110602	1,312	825	487	37%	Fail	16.7
Beldon Hollow-Lake Corpus Christi	121101110603	1,879	1,221	658	35%	Fail	24.1
Hobbs Hollow-Lake Corpus Christi	121101110604	1,335	451	884	66%	Fail	16.9
Barbone Creek-Lake Corpus Christi	121101110605	1,444	626	818	57%	Fail	21.7
Sixmile Creek-Nueces River	121101110701	810	653	157	19%	Fail	32.3
Bayou Creek	121101110702	1,338	753	585	44%	Fail	14.4
Javelin Creek-Nueces River	121101110703	661	430	231	35%	Fail	27.8
Sandy Hollow Creek-Nueces River	121101110704	311	150	161	52%	Fail	51.0
Hondo Creek	121101110706	41	14	27	66%	Fail	8.5

VALIDATION RESULTS

Based on the validation assessments and BLE comparison results described above, the CNMS inventory of Zone A studies in the Lower Nueces Watershed has been updated as summarized in **Table 9** and illustrated in **Figure 8** below. The priority scores are illustrated in **Figure 9**.

Table 9: Aggregated Zone A Validation Results

Validation Status	Status Type	Total Miles
Valid	Being Studied	9.2
Unverified	Being Studied	469.4

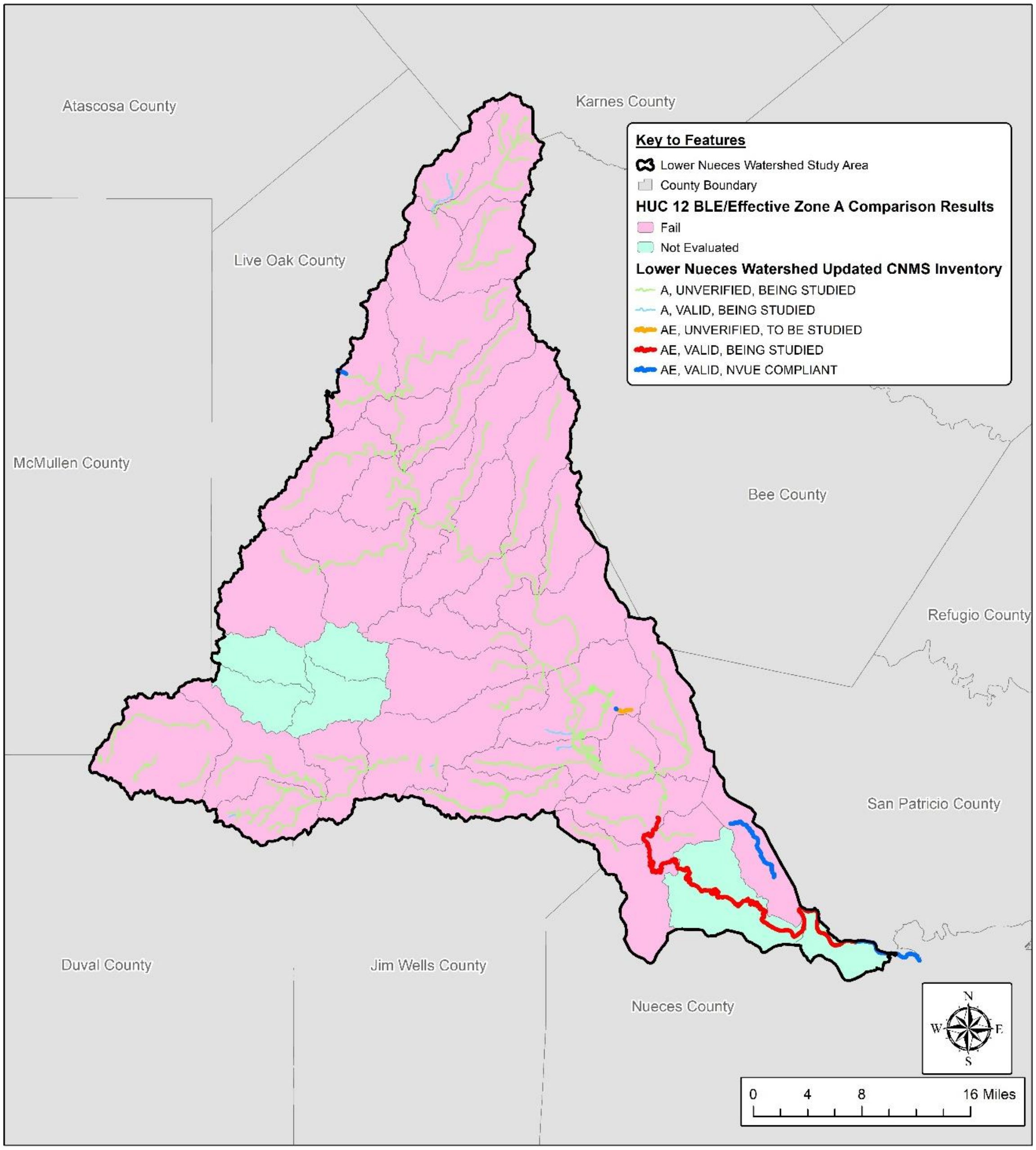

Figure 8: Lower Nueces Watershed CNMS Validation Result

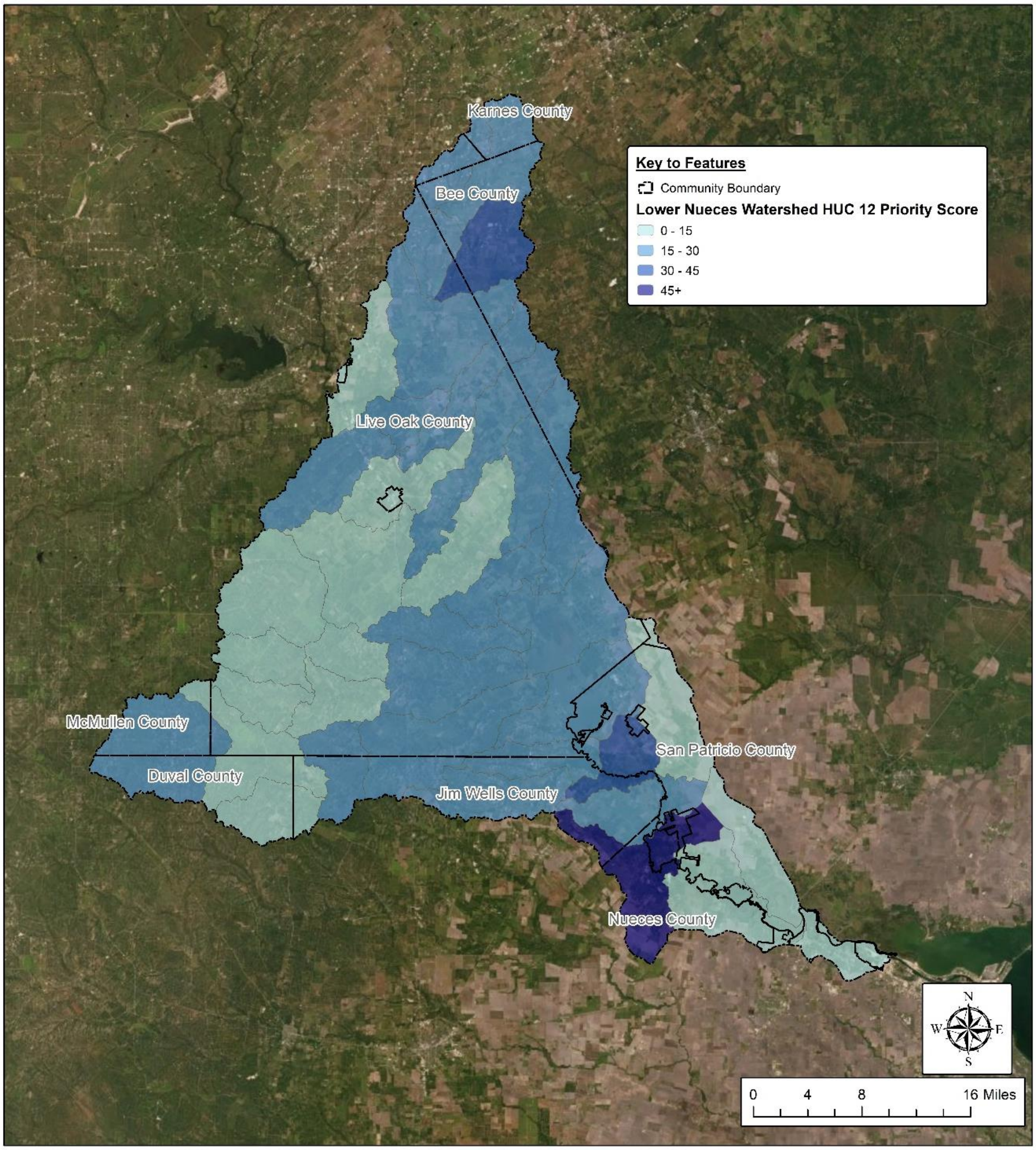

Figure 9: Ranking of Lower Nueces Watershed HUC-12s

1.7 Flood Risk Analysis

A flood risk analysis was performed for this project. The updated 1-percent annual chance grid (known as the 'refined' grid) was used to perform the flood risk analysis to produce the flood losses. The refined grid loss results are stored in the S_FRAC_Ar feature class.

Hazus version 4.2 was used for the basic and refined loss analysis.

The losses are reported via census blocks. It is important to note that Hazus version 4.2 uses dasymetric census blocks. Dasymetric mapping removes undeveloped areas (such as areas covered by other bodies of water, wetlands, or forests) from the Census blocks, changing their shape and reducing their size in these areas. For more information on dasymetric data visit FEMA's Media Library for the Hazus-MH Data Inventories: Dasymetric vs. Homogenous, or Hazus 3.0 Dasymetric Data Overview.

Hazus analysis was performed on a watershed level for the study area extents to ensure proper model processing. A summary of results per county for the 1-percent annual chance event scenarios are shown in **Table 10**.

Table 10: Hazus 4.2 Results for 1-Percent Annual Chance Scenario for Lower Nueces

County	Full Replacement - Total Loss	Dollar Exposure (Replacement Value) - Buildings	Dollar Exposure (Replacement Value) - Contents
Bee	$577,000	$48,402,000	$28,296,000
Duval	$3,000	$1,908,000	$955,000
Jim Wells	$7,533,000	$197,722,000	$104,687,000
Karnes	$45,000	$10,463,000	$5,289,000
Live Oak	$115,926,000	$953,802,000	$550,034,000
McMullen	$0	$1,048,000	$524,000
Nueces	$59,297,000	$2,947,803,000	$1,693,287,000
San Patricio	$48,405,000	$608,786,000	$355,655,000
Total	**$231,786,000**	**$4,769,934,000**	**$2,738,727,000**

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Appendix A Summary of Peak Qs

Table A-1: Summary of Hydrology

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
BAYOU CREEK – NUECES RIVER (BACR)				
BAYOU CREEK	1.01728	712	527	964
BAYOU CREEK	1.85735	1137	841	1537
BAYOU CREEK	2.02666	1253	927	1695
BAYOU CREEK	2.13606	1330	983	1798
BAYOU CREEK	3.41689	1975	1460	2670
BAYOU CREEK	5.59743	2844	2103	3846
BAYOU CREEK	9.33877	4141	3062	5601
BAYOU CREEK	10.54741	4494	3323	6078
BAYOU CREEK	10.95499	4685	3464	6336
BAYOU CREEK	11.81748	4977	3680	6731
BAYOU CREEK	12.09377	4778	3533	6462
BAYOU CREEK	12.41409	5309	3925	7179
BAYOU CREEK	13.53028	5698	4213	7705
BAYOU CREEK	15.15521	6108	4516	8260
BAYOU CREEK	21.19145	7958	5884	10762
BAYOU CREEK	23.77593	8571	6338	11591
BAYOU CREEK	30.67473	10558	7807	14279
BAYOU CREEK	31.23789	10709	7919	14483
BAYOU CREEK	31.49921	10570	7816	14295
BAYOU CREEK	33.03014	11043	8166	14935
BAYOU CREEK	34.7172	11091	8201	14999
BAYOU CREEK	37.44763	12040	8903	16283
BAYOU CREEK	37.8552	12106	8952	16372
BAYOU CREEK	38.55763	12369	9146	16728
BAYOU CREEK TRIB 1	0.96742	634	469	857
BAYOU CREEK TRIB 1	1.74696	1144	846	1547
BAYOU CREEK TRIB 1	1.97913	1258	930	1701
BAYOU CREEK TRIB 1	2.73715	1613	1193	2182
BAYOU CREEK TRIB 2	1.01952	752	556	1017
BAYOU CREEK TRIB 2	1.1882	994	735	1344
BAYOU CREEK TRIB 3	1.52564	655	485	886
BAYOU CREEK TRIB 3	2.30627	1027	759	1389
BAYOU CREEK TRIB 3	2.90108	1256	929	1699
BAYOU CREEK TRIB 3	4.10129	1850	1368	2502

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
BAYOU CREEK TRIB 3	5.04163	2418	1788	3270
BAYOU CREEK TRIB 3	5.61922	2625	1941	3550
BAYOU CREEK TRIB 4	1.00284	589	435	796
BAYOU CREEK TRIB 4	1.97088	1280	947	1731
BAYOU CREEK TRIB 4	2.15974	1481	1095	2003
CAYAMON CREEK	0.82788	158	117	214
CAYAMON CREEK	6.68869	2285	1690	3091
CAYAMON CREEK	8.18148	2694	1992	3644
CAYAMON CREEK	8.37589	2532	1872	3424
CAYAMON CREEK	21.01189	3529	2609	4772
CAYAMON CREEK	22.13812	3782	2797	5115
CAYAMON CREEK	23.16769	3805	2813	5145
CAYAMON CREEK	24.11752	3802	2811	5142
CAYAMON CREEK	24.95993	3832	2834	5183
CAYAMON CREEK	30.75004	4518	3341	6110
HONDO CREEK	1.07861	364	269	492
HONDO CREEK	2.22161	631	466	853
HONDO CREEK	3.13047	789	583	1067
HONDO CREEK	3.58441	892	660	1207
HONDO CREEK	5.7341	1415	1046	1913
HONDO CREEK	6.63811	1600	1183	2163
HONDO CREEK	7.11806	1757	1299	2376
HONDO CREEK	11.96861	2984	2207	4036
HONDO CREEK	12.48415	3132	2316	4236
HONDO CREEK	12.77623	3590	2654	4855
HONDO CREEK	14.96149	3992	2952	5399
HONDO CREEK	20.30891	4751	3513	6425
HONDO CREEK	22.58917	5199	3844	7030
HONDO CREEK	23.32917	5072	3750	6859
HONDO CREEK	24.27489	5245	3878	7093
HONDO CREEK	25.2345	5268	3895	7124
HONDO CREEK	28.12056	5604	4144	7579
HONDO CREEK	28.71999	5619	4155	7599
HONDO CREEK	29.69512	5710	4222	7722
HONDO CREEK	30.90116	5423	4010	7333
HONDO CREEK	33.42364	5798	4287	7841
HONDO CREEK	34.89592	5705	4218	7715
HONDO CREEK	36.65418	6053	4475	8185

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
JAVELIN CREEK	1.24451	1002	741	1356
JAVELIN CREEK	1.84973	1362	1007	1842
JAVELIN CREEK	2.53583	1524	1127	2061
JAVELIN CREEK	3.53544	1804	1334	2440
JAVELIN CREEK	4.3566	1951	1443	2639
JAVELIN CREEK	4.81484	2083	1540	2817
JAVELIN CREEK	5.71966	2334	1726	3157
JAVELIN CREEK	10.2088	4100	3032	5545
JAVELIN CREEK	10.65242	4088	3023	5529
JAVELIN CREEK	16.84317	6440	4762	8709
JAVELIN CREEK	17.20965	6246	4619	8447
JAVELIN CREEK	17.85163	6517	4819	8813
LAIN CREEK	0.80466	396	293	536
LAIN CREEK	3.69856	2142	1584	2897
LAIN CREEK	3.96669	2338	1729	3163
NUECES RIVER TRIB 1	1.02039	1000	739	1352
NUECES RIVER TRIB 1	1.53999	1491	1103	2016
SANDY HOLLOW CREEK	1.02804	524	388	709
SANDY HOLLOW CREEK	1.35885	664	491	898
SANDY HOLLOW CREEK	1.90075	824	609	1115
SANDY HOLLOW CREEK	2.42177	992	733	1341
SANDY HOLLOW CREEK	2.86925	1132	837	1531
SANDY HOLLOW CREEK	3.73129	1397	1033	1890
SANDY HOLLOW CREEK	4.72956	1627	1203	2200
SANDY HOLLOW CREEK	4.98504	1665	1231	2252
SANDY HOLLOW CREEK	5.78136	1889	1397	2555
SANDY HOLLOW CREEK	6.1041	2004	1482	2710
SANDY HOLLOW CREEK	6.2778	1997	1477	2700
SANDY HOLLOW CREEK	8.67482	2588	1914	3500
SANDY HOLLOW CREEK	9.52709	2703	1998	3655
SANDY HOLLOW CREEK	10.22987	2897	2142	3918
SIXMILE CREEK	0.57078	487	360	659
SIXMILE CREEK	1.21725	856	633	1158
SIXMILE CREEK	1.75799	1016	751	1374
SIXMILE CREEK	2.44535	1445	1069	1954
SIXMILE CREEK	3.34085	1853	1370	2506
SIXMILE CREEK	3.91701	2183	1614	2952
SIXMILE CREEK	5.54479	2918	2158	3947

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
SIXMILE CREEK	6.54826	3509	2595	4745
SIXMILE CREEK	7.49195	3999	2957	5408
SIXMILE CREEK	10.05698	5323	3936	7199
SIXMILE CREEK	10.99534	5593	4135	7563
SIXMILE CREEK	11.42076	6001	4437	8115
SIXMILE CREEK TRIB	1.1717	694	513	939
SIXMILE CREEK TRIB	1.61286	1140	843	1542
UNNAMED GULLY NO 8	1.59281	577	427	781
UNNAMED GULLY NO 8	1.85063	697	516	943
UNNAMED GULLY NO 8	4.41767	1332	985	1802
UNNAMED GULLY NO 8	7.08371	1865	1379	2523
UNNAMED GULLY NO 8	8.07901	2038	1507	2756
UNNAMED GULLY NO 8	9.07853	2223	1644	3006
UNNAMED GULLY NO 8	9.29331	2266	1675	3064
UNT001 IN BACR	1.29016	528	390	713
UNT001 IN BACR	1.93949	806	596	1090
UNT001 IN BACR	3.13513	1259	931	1702
UNT003 IN BACR	1.14255	528	390	714
UNT003 IN BACR	1.8839	824	609	1115
UNT003 IN BACR	3.09299	886	655	1199
UNT004 IN BACR	1.08274	776	573	1049
UNT006 IN BACR	1.04911	515	381	696
UNT006 IN BACR	1.41902	749	554	1014
UNT007 IN BACR	1.00185	724	535	979
UNT007 IN BACR	1.51461	1190	880	1609
UNT007 IN BACR	2.51413	1310	969	1772
UNT007 IN BACR	2.97076	1869	1382	2528
UNT008 IN BACR	1.06534	393	290	531
UNT008 IN BACR	2.54314	967	715	1307
UNT008 IN BACR	3.41918	1191	881	1611
UNT008 IN BACR	4.41269	1356	1003	1834
UNT008 IN BACR	4.82565	1451	1073	1962
UNT008 IN BACR	5.74607	1480	1094	2002
UNT008 IN BACR	8.33284	1964	1452	2656
UNT009 IN BACR	1.33164	195	144	264
UNT009 IN BACR	1.49349	336	248	454
UNT009 IN BACR	2.83989	647	479	876
UNT009 IN BACR	3.46143	934	691	1263

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT009 IN BACR	3.91873	1370	1013	1853
UNT009 IN BACR	4.87285	1583	1170	2140
UNT009 IN BACR	5.91532	1712	1266	2315
UNT009 IN BACR	6.31384	1679	1242	2271
UNT010 IN BACR	1.13997	371	275	502
UNT012 IN BACR	0.96715	782	578	1058
UNT012 IN BACR	1.03593	794	587	1073
UNT013 IN BACR	0.97531	751	555	1015
UNT013 IN BACR	1.14623	866	641	1172
UNT016 IN BACR	1.97061	988	731	1337
UNT016 IN BACR	2.97031	1431	1058	1935
UNT016 IN BACR	3.77084	1932	1429	2613
UNT016 IN BACR	4.62782	2368	1751	3203
UNT016 IN BACR	5.14601	2763	2043	3736
UNT017 IN BACR	1.03826	565	418	764
UNT017 IN BACR	1.58337	1127	833	1524
UNT019 IN BACR	1.10417	848	627	1147
UNT019 IN BACR	1.30648	1100	814	1488
UNT022 IN BACR	1.28101	276	204	373
UNT022 IN BACR	1.55326	515	381	697
UNT027 IN BACR	1.35989	423	312	572
UNT027 IN BACR	1.40913	657	486	888
UNT028 IN BACR	2.50122	361	267	488
UNT028 IN BACR	3.65372	785	580	1061
UNT028 IN BACR	4.96621	1257	930	1701
UNT029 IN BACR	1.08677	349	258	471
UNT030 IN BACR	1.05368	364	270	493
UNT030 IN BACR	1.31518	538	398	728
UNT031 IN BACR	1.01109	533	394	720
UNT031 IN BACR	1.37804	733	542	991
UNT031 IN BACR	2.49162	1237	915	1673
UNT031 IN BACR	3.41582	1401	1036	1895
UNT031 IN BACR	3.98942	1545	1142	2089
UNT031 IN BACR	11.7305	3733	2760	5049
UNT031 IN BACR	13.43325	3637	2690	4919
UNT032 IN BACR	1.08606	545	403	737
UNT032 IN BACR	1.40117	709	524	958
UNT032 IN BACR	1.85816	867	641	1172

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT033 IN BACR	1.17582	722	534	976
UNT033 IN BACR	2.07015	975	721	1319
UNT035 IN BACR	0.96966	482	356	652
UNT035 IN BACR	1.99034	944	698	1277
UNT035 IN BACR	2.37836	1058	783	1431
UNT036 IN BACR	1.00051	1032	763	1396
UNT036 IN BACR	1.20981	1194	883	1614
UNT036 IN BACR	1.33132	1337	988	1808
UNT036 IN BACR	3.16017	2395	1771	3239
UNT036 IN BACR	3.83281	2937	2172	3972
UNT036 IN BACR	4.76328	3615	2673	4889
UNT037 IN BACR	1.00122	809	598	1094
UNT037 IN BACR	1.13592	894	661	1209
UNT037 IN BACR	1.29043	1116	826	1510
UNT038 IN BACR	1.3614	1048	775	1417
UNT038 IN BACR	1.83355	1112	823	1504
UNT038 IN BACR	5.30228	1909	1412	2582
UNT039 IN BACR	1.06202	508	376	687
UNT039 IN BACR	2.05482	981	725	1327
UNT039 IN BACR	2.71285	1270	939	1717
UNT040 IN BACR	5.57882	708	524	958
UNT040 IN BACR	6.02898	788	583	1066
UNT040 IN BACR	7.02519	1315	972	1778
UNT040 IN BACR	9.32365	1773	1311	2397
UNT040 IN BACR	10.23109	1936	1432	2619
UNT040 IN BACR	11.209	2128	1573	2878
UNT040 IN BACR	11.61487	2268	1677	3067
UNT040 IN BACR	12.01437	2350	1737	3178
UNT040 IN BACR	12.13445	2397	1772	3241
UNT041 IN BACR	1.19214	298	220	403
UNT041 IN BACR	1.95026	615	455	832
UNT042 IN BACR	1.11511	604	447	817
UNT042 IN BACR	3.56965	1324	979	1790
UNT042 IN BACR	4.07675	1439	1064	1945
UNT042 IN BACR	5.29196	1513	1119	2046
UNT0421 IN BACR	0.39203	272	201	368
UNT0421 IN BACR	0.63089	430	318	581
UNT043 IN BACR	1.02382	289	214	390

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT043 IN BACR	1.30235	553	409	748
UNT045 IN BACR	1.21232	612	452	828
UNT045 IN BACR	1.4713	954	706	1290
UNT045 IN BACR	2.65089	1650	1220	2231
UNT045 IN BACR	2.84665	1817	1344	2458
UNT045 IN BACR	3.73667	2307	1706	3120
UNT045 IN BACR	4.03413	2476	1831	3349
UNT046 IN BACR	0.9641	677	501	916
UNT101 IN BACR	0.46187	191	141	258
UNT101 IN BACR	0.81692	431	319	583
UNT104 IN BACR	1.02526	929	687	1256
UNT104 IN BACR	1.74544	1345	995	1819
UNT104 IN BACR	1.89726	1410	1043	1907
UNT105 IN BACR	0.66225	448	332	606
UNT105 IN BACR	0.87063	610	451	825
UNT107 IN BACR	0.90303	474	351	641
UNT107 IN BACR	1.242	652	482	881
UNT107 IN BACR	1.52806	709	524	959
UNT108 IN BACR	0.47644	177	131	239
UNT108 IN BACR	0.58975	339	250	458
UNT110 IN BACR	1.09942	208	154	282
UNT110 IN BACR	1.23447	245	181	331
UNT111 IN BACR	0.52021	455	336	615
UNT112 IN BACR	0.43869	487	360	659
UNT316 IN BACR	0.80708	285	211	385
LAGARTO CREEK – LAKE CORPUS CHRISTI (LACR)				
BOTELLO CREEK	0.66055	315	233	426
BOTELLO CREEK	1.09493	436	323	590
BOTELLO CREEK	1.84704	641	474	867
BOTELLO CREEK	2.78659	864	639	1168
BOTELLO CREEK	13.52355	2490	1841	3368
BOTELLO CREEK	15.04211	2657	1965	3593
BOTELLO CREEK	15.49497	2698	1995	3648
BOTELLO CREEK	24.20817	3777	2793	5108
GATO CREEK	1.01584	414	306	560
GATO CREEK	1.35158	504	373	682
GATO CREEK	1.93376	660	488	892
GATO CREEK	1.97121	676	500	914

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
GATO CREEK	3.19613	990	732	1339
GATO CREEK	3.97162	1177	870	1591
GATO CREEK	4.57702	1285	950	1738
GATO CREEK	5.28384	1408	1041	1904
GATO CREEK	7.11877	1752	1296	2370
GATO CREEK	8.46381	1971	1457	2665
JULIAN CREEK	0.66458	256	189	346
JULIAN CREEK	1.83816	583	431	788
JULIAN CREEK	2.82396	795	588	1075
JULIAN CREEK	3.10348	850	628	1149
KENTUCK CREEK	1.08579	382	283	517
KENTUCK CREEK	1.69674	568	420	768
KENTUCK CREEK	1.89143	621	459	840
KENTUCK CREEK	3.85845	1084	802	1466
KENTUCK CREEK	4.52635	1231	910	1665
KENTUCK CREEK	5.3215	1362	1007	1841
KENTUCK CREEK	5.83113	1422	1052	1923
KENTUCK CREEK	6.10903	1449	1072	1960
KENTUCK CREEK	10.65888	2267	1676	3066
KENTUCK CREEK	13.27793	2638	1951	3568
LAGARTO CREEK	0.92941	356	263	481
LAGARTO CREEK	1.9533	671	496	907
LAGARTO CREEK	4.84291	1161	858	1569
LAGARTO CREEK	5.30635	1210	895	1636
LAGARTO CREEK	7.71664	1539	1138	2081
LAGARTO CREEK	8.42204	1610	1191	2178
LAGARTO CREEK	10.00022	1850	1368	2502
LAGARTO CREEK	10.65619	1915	1416	2589
LAGARTO CREEK	13.0003	2224	1645	3008
LAGARTO CREEK	14.17522	2325	1719	3145
LAGARTO CREEK	17.88257	2724	2014	3684
LAGARTO CREEK	32.8429	4362	3225	5899
LAGARTO CREEK	34.01639	4351	3218	5885
LAGARTO CREEK	37.46	4684	3463	6334
LAGARTO CREEK	38.31649	4707	3481	6366
LAGARTO CREEK	38.6421	4709	3482	6369
LAGARTO CREEK	41.31317	4853	3589	6564
LAGARTO CREEK	42.10814	4870	3601	6587

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
LAGARTO CREEK	55.8696	5995	4433	8107
LAGARTO CREEK	64.7191	6712	4963	9077
LAGARTO CREEK	66.98062	6842	5060	9254
LAGARTO CREEK	72.90088	7279	5382	9843
LAGARTO CREEK	74.45226	7079	5235	9574
LAGARTO CREEK	79.96836	7486	5535	10123
LAGARTO CREEK	80.62945	7484	5534	10121
LAGARTO CREEK	86.07632	7806	5772	10556
LAGARTO CREEK	86.74637	7776	5750	10516
LAGARTO CREEK	88.49844	7730	5716	10455
LAGARTO CREEK	92.46011	7896	5838	10678
LAGARTO CREEK	93.08613	7856	5809	10624
LAGARTO CREEK	94.29962	7938	5870	10736
LAGARTO CREEK	95.38774	7932	5865	10727
LAGARTO CREEK	119.66872	9576	7081	12950
LAGARTO CREEK	121.09725	9522	7041	12878
LAGARTO CREEK	121.40125	9606	7103	12990
LAGARTO CREEK	122.71248	9584	7087	12961
LAGARTO CREEK	124.41595	9713	7182	13136
LAGARTO CREEK	126.09996	9723	7189	13149
LAGARTO CREEK	127.24968	9638	7126	13034
LAGARTO CREEK	130.08162	9733	7197	13163
LAGARTO CREEK	144.07525	10449	7726	14130
LAGARTO CREEK	144.17147	10427	7710	14101
LAGARTO CREEK	146.91813	10468	7741	14157
LAGARTO CREEK	148.43678	10545	7797	14260
LAGARTO CREEK	151.25348	10494	7760	14192
LAGARTO CREEK	154.59666	10779	7970	14577
LAGARTO CREEK	154.81349	10726	7931	14505
LAGARTO CREEK	163.3095	11081	8194	14986
LAGARTO CREEK	165.49345	11196	8279	15141
LAGARTO CREEK	166.07454	11208	8288	15158
LAGARTO CREEK	169.50264	11200	8281	15146
LAGARTO CREEK	170.11486	11238	8310	15198
LAGARTO CREEK	174.15113	11403	8432	15421
LAGARTO CREEK	176.25312	11443	8461	15475
LAGARTO CREEK	178.90446	11510	8511	15566
LAGARTO CREEK	179.68642	11450	8467	15485

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
LAGARTO CREEK	181.83683	11509	8510	15565
LAGARTO CREEK	185.04147	11672	8631	15785
LAGARTO CREEK	187.2064	11662	8623	15771
LAGARTO CREEK	190.18747	11812	8734	15974
LAGARTO CREEK	190.5043	11953	8839	16166
LAGARTO CREEK	194.32443	12255	9062	16573
LAGARTO CREEK	194.42603	12303	9097	16639
LAGARTO CREEK	195.26979	12456	9210	16845
LAGARTO CREEK	196.13193	12518	9256	16929
LAGARTO CREEK	197.02617	12529	9264	16944
LAGARTO CREEK	197.60448	12470	9221	16864
LAGARTO CREEK	197.65524	12446	9203	16831
LAGARTO CREEK	201.51728	12726	9410	17211
LAGARTO CREEK	202.18538	12718	9404	17200
LONGORIA CREEK	0.84277	298	220	403
LONGORIA CREEK	1.44135	476	352	644
LONGORIA CREEK	2.12171	645	477	872
LONGORIA CREEK	2.65708	738	546	998
MULE TANK CREEK	1.14156	538	398	728
MULE TANK CREEK	1.58599	426	315	576
PALO AMARILLO CREEK	0.72215	319	236	432
PALO AMARILLO CREEK	1.26498	477	352	644
PALO AMARILLO CREEK	2.01097	696	515	942
PALO AMARILLO CREEK	2.54785	827	612	1119
PALO AMARILLO CREEK	3.51249	1052	778	1423
PALO AMARILLO CREEK	4.29526	1181	873	1597
PALO AMARILLO CREEK	6.27045	1511	1117	2043
PALO AMARILLO CREEK	7.41748	1733	1281	2343
PALO AMARILLO CREEK	9.19601	2057	1521	2781
PALO AMARILLO CREEK	10.58128	2109	1560	2853
TEPECATE CREEK	1.11	418	309	565
TEPECATE CREEK	2.06235	636	471	861
TEPECATE CREEK	3.06124	838	620	1134
TEPECATE CREEK	3.97754	932	689	1261
TEPECATE CREEK	5.3094	1193	882	1613
TEPECATE CREEK	6.2813	1310	969	1772
TEPECATE CREEK	8.38409	1592	1178	2154
UNT 001 IN LACR	0.12797	272	201	367

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT 003 IN LACR	0.68028	276	204	373
UNT 003 IN LACR	1.88883	598	442	809
UNT 004 IN LACR	0.21621	102	75	137
UNT 005 IN LACR	1.0118	399	295	540
UNT 005 IN LACR	1.49713	483	357	654
UNT 006 IN LACR	0.67203	220	162	297
UNT 006 IN LACR	1.34477	403	298	544
UNT 006 IN LACR	1.56026	441	326	596
UNT 007 IN LACR	0.63427	213	158	289
UNT 008 IN LACR	1.15744	427	316	578
UNT 008 IN LACR	1.33455	445	329	602
UNT 008 IN LACR	2.11714	661	488	893
UNT 009 IN LACR	1.56492	511	378	691
UNT 009 IN LACR	2.3477	653	483	883
UNT 009 IN LACR	2.86943	778	575	1052
UNT 010 IN LACR	1.00284	447	330	604
UNT 010 IN LACR	1.14677	473	350	640
UNT 010 IN LACR	2.75877	926	684	1252
UNT 010 IN LACR	2.93049	926	684	1252
UNT 010 IN LACR	4.30952	1304	965	1764
UNT 010 IN LACR	7.62723	1910	1412	2582
UNT 010 IN LACR	7.84492	1916	1416	2591
UNT 010 IN LACR	8.71517	2043	1511	2763
UNT 010 IN LACR	11.02565	2323	1717	3141
UNT 010 IN LACR	11.42497	2319	1714	3136
UNT 010 IN LACR	13.41971	2581	1908	3490
UNT 010 IN LACR	14.35314	2686	1986	3633
UNT 010 IN LACR	14.72556	2665	1970	3604
UNT 012 IN LACR	1.37602	513	379	694
UNT 013 IN LACR	1.02176	385	285	521
UNT 013 IN LACR	1.68222	527	390	713
UNT 013 IN LACR	3.18006	930	688	1258
UNT 014 IN LACR	1.06409	422	312	571
UNT 014 IN LACR	1.28729	444	328	600
UNT 015 IN LACR	1.1083	369	273	498
UNT 015 IN LACR	1.34163	412	305	558
UNT 016 IN LACR	0.64799	279	206	378
UNT 016 IN LACR	1.39301	499	369	674

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT 017 IN LACR	1.11439	388	287	525
UNT 017 IN LACR	1.40207	450	333	609
UNT 017 IN LACR	2.41244	671	496	908
UNT 017 IN LACR	3.43465	920	681	1245
UNT 018 IN LACR	0.92132	368	272	498
UNT 019 IN LACR	1.00015	405	299	547
UNT 019 IN LACR	1.32432	463	342	626
UNT 019 IN LACR	1.81987	588	435	795
UNT 020 IN LACR	1.01414	492	363	665
UNT 020 IN LACR	2.09427	768	568	1038
UNT 020 IN LACR	2.16117	779	576	1053
UNT 020 IN LACR	2.92987	1003	741	1356
UNT 020 IN LACR	3.4637	1097	811	1484
UNT 020 IN LACR	5.07212	1463	1082	1978
UNT 020 IN LACR	5.6776	1590	1175	2150
UNT 020 IN LACR	6.17808	1708	1263	2309
UNT 020 IN LACR	7.91661	1992	1473	2693
UNT 020 IN LACR	9.2604	2109	1559	2852
UNT 020 IN LACR	9.7519	2160	1597	2921
UNT 020 IN LACR	12.39311	2472	1828	3343
UNT 020 IN LACR	13.3929	2586	1912	3497
UNT 020 IN LACR	13.7333	2571	1901	3477
UNT 021 IN LACR	1.10596	389	287	526
UNT 021 IN LACR	1.56779	504	372	681
UNT 022 IN LACR	0.96482	367	272	497
UNT 023 IN LACR	1.04409	492	363	665
UNT 023 IN LACR	2.09777	724	536	980
UNT 025 IN LACR	1.11036	376	278	508
UNT 026 IN LACR	1.29796	508	375	687
UNT 027 IN LACR	1.24532	383	283	517
UNT 027 IN LACR	1.68535	490	362	662
UNT 028 IN LACR	1.01333	391	289	529
UNT 028 IN LACR	2.19067	692	512	936
UNT 028 IN LACR	2.50678	813	601	1099
UNT 028 IN LACR	3.1163	913	675	1235
UNT 028 IN LACR	4.35229	1151	851	1556
UNT 028 IN LACR	4.99177	1265	935	1710
UNT 028 IN LACR	5.68872	1391	1028	1881

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT 029 IN LACR	1.03521	377	279	510
UNT 029 IN LACR	1.4696	465	344	629
UNT 029 IN LACR	2.52624	719	532	973
UNT 029 IN LACR	3.50827	928	686	1255
UNT 029 IN LACR	5.27711	1284	950	1737
UNT 030 IN LACR	0.90688	208	154	282
UNT 031 IN LACR	1.05655	472	349	639
UNT 031 IN LACR	1.42359	602	445	815
UNT 031 IN LACR	1.62411	684	506	925
UNT 032 IN LACR	1.17555	435	321	588
UNT 032 IN LACR	2.12136	675	499	913
UNT 032 IN LACR	4.29885	1153	852	1559
UNT 032 IN LACR	5.17892	1282	948	1734
UNT 033 IN LACR	0.99638	465	344	629
UNT 034 IN LACR	1.03064	441	326	597
UNT 034 IN LACR	1.95348	681	504	921
UNT 034 IN LACR	2.68272	814	602	1101
UNT 034 IN LACR	3.5289	1006	744	1361
UNT 037 IN LACR	0.37359	180	133	243
UNT 038 IN LACR	0.73534	347	256	469
UNT 038 IN LACR	1.18021	485	359	656
UNT 039 IN LACR	1.00239	386	286	522
UNT 039 IN LACR	1.69809	569	421	769
UNT 042 IN LACR	0.62656	304	225	411
UNT 042 IN LACR	1.05395	439	324	593
UNT 043 IN LACR	1.25572	525	388	710
UNT 047 IN LACR	0.7886	337	249	456
UNT 047 IN LACR	1.00983	416	308	563
UNT 047 IN LACR	1.86668	682	504	922
UNT 048 IN LACR	0.15209	97	72	131
UNT 050 IN LACR	0.97728	375	278	508
UNT 051 IN LACR	1.13986	473	349	639
UNT 051 IN LACR	1.89035	667	494	903
UNT 051 IN LACR	3.43913	1087	804	1470
UNT 051 IN LACR	4.49039	1314	972	1777
UNT 052 IN LACR	1.2081	575	425	778
UNT 052 IN LACR	1.53237	631	466	853
UNT 053 IN LACR	1.04427	461	341	623

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT 053 IN LACR	1.36217	522	386	706
UNT 053 IN LACR	2.00819	695	514	940
UNT 054 IN LACR	1.25213	470	347	635
UNT 054 IN LACR	2.1201	651	481	880
UNT 054 IN LACR	2.64685	731	540	988
UNT 054 IN LACR	2.6925	784	580	1060
UNT 055 IN LACR	1.03386	276	204	373
UNT 055 IN LACR	1.17501	308	227	416
UNT 055 IN LACR	1.41902	377	279	510
UNT 056 IN LACR	1.01441	328	243	444
UNT 056 IN LACR	1.49246	468	346	633
UNT 056 IN LACR	1.9855	603	446	815
UNT 057 IN LACR	1.03718	347	257	469
UNT 057 IN LACR	1.18667	391	289	529
UNT 057 IN LACR	2.94924	792	585	1071
UNT 057 IN LACR	3.30175	832	616	1126
UNT 058 IN LACR	1.01476	404	299	547
UNT 058 IN LACR	1.94774	688	509	930
UNT 058 IN LACR	2.81329	882	652	1193
UNT 058 IN LACR	3.54863	1038	768	1404
UNT 058 IN LACR	5.70989	1473	1089	1992
UNT 058 IN LACR	5.89327	1497	1107	2025
UNT 058 IN LACR	7.45649	1797	1329	2430
UNT 058 IN LACR	7.55809	1773	1311	2397
UNT 058 IN LACR	8.45099	1915	1416	2589
UNT 059 IN LACR	1.06444	462	342	625
UNT 059 IN LACR	1.16183	481	355	650
UNT 060 IN LACR	1.00759	389	287	526
UNT 060 IN LACR	1.37006	471	348	636
UNT 061 IN LACR	1.00329	358	265	484
UNT 061 IN LACR	1.6945	541	400	731
UNT 062 IN LACR	0.42901	177	131	239
UNT 064 IN LACR	0.61688	258	191	349
UNT 065 IN LACR	1.17367	493	365	667
UNT 065 IN LACR	2.03868	746	552	1009
UNT 066 IN LACR	1.0883	356	263	481
UNT 066 IN LACR	2.0159	592	438	801
UNT 067 IN LACR	1.29634	518	383	700

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT 067 IN LACR	1.59891	621	459	840
UNT 068 IN LACR	1.19223	435	322	588
UNT 068 IN LACR	2.19238	678	502	917
UNT 068 IN LACR	3.12374	872	645	1180
UNT 069 IN LACR	1.11251	318	235	430
UNT 069 IN LACR	1.72974	517	382	699
UNT 070 IN LACR	1.11888	357	264	482
UNT 070 IN LACR	1.29948	444	328	600
UNT 072 IN LACR	1.16138	893	660	1208
UNT 072 IN LACR	1.77787	1194	883	1614
UNT 072 IN LACR	2.41206	1704	1260	2304
UNT 072 IN LACR	2.81999	2150	1589	2907
UNT 073 IN LACR	1.02499	612	452	827
UNT 073 IN LACR	1.23492	924	683	1249
UNT 073 IN LACR	1.3028	1224	905	1655
UNT 073 IN LACR	2.2886	2259	1670	3055
UNT 073 IN LACR	2.72747	2569	1900	3474
UNT 074 IN LACR	0.96786	1087	804	1470
UNT 075 IN LACR	0.8251	806	596	1089
UNT 076 IN LACR	0.15209	291	216	394
UNT 082 IN LACR	0.59114	783	579	1059
UNT 082 IN LACR	0.72798	923	683	1249
UNT 083 IN LACR	0.18339	376	278	508
UNT 085 IN LACR	0.21038	114	84	154
UNT 085 IN LACR	0.4516	236	174	318
UNT 086 IN LACR	0.16446	98	73	133
UNT 087 IN LACR	0.32669	171	127	231
UNT 088 IN LACR	0.72511	327	242	442
UNT 089 IN LACR	0.701	318	235	430
UNT 090 IN LACR	0.49797	240	177	324
UNT 090 IN LACR	0.76753	349	258	472
UNT 091 IN LACR	0.23898	124	92	167
UNT 092 IN LACR	0.7594	387	286	523
UNT 093 IN LACR	0.76849	366	271	496
UNT 094 IN LACR	0.45788	213	157	288
UNT 099 IN LACR	0.65351	300	222	405
UNT 100 IN LACR	0.18544	112	83	152
UNT 103 IN LACR	0.29629	144	107	195

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT 105 IN LACR	0.26042	142	105	192
UNT 106 IN LACR	0.16124	91	67	123
UNT 107 IN LACR	0.14798	114	84	154
UNT 110 IN LACR	0.23863	164	121	222
UNT 113 IN LACR	0.74475	262	194	354
UNT 115 IN LACR	0.29754	130	96	176
UNT 119 IN LACR	0.77121	272	201	368
UNT 123 IN LACR	0.70269	260	192	352
UNT 126 IN LACR	0.7695	243	180	329
UNT 130 IN LACR	0.50272	233	173	316
UNT 130 IN LACR	0.75354	321	237	434
UNT 131 IN LACR	0.67785	313	231	423
UNT 132 IN LACR	0.47375	198	146	267
UNT 134 IN LACR	0.33799	166	123	225
UNT 137 IN LACR	0.22715	138	102	186
UNT 139 IN LACR	0.26203	155	115	210
UNT 140 IN LACR	0.29674	142	105	192
UNT 143 IN LACR	0.19962	133	98	180
UNT 146 IN LACR	0.31072	163	121	221
UNT 147 IN LACR	0.73462	249	184	337
UNT 148 IN LACR	0.88949	414	306	560
UNT 149 IN LACR	0.65418	322	238	436
UNT 151 IN LACR	0.16742	112	83	151
UNT 152 IN LACR	0.50891	236	174	319
UNT 153 IN LACR	0.4577	248	184	336
UNT 157 IN LACR	0.14178	74	55	100
UNT 158 IN LACR	0.42963	201	148	271
UNT 159 IN LACR	0.73372	284	210	384
UNT 161 IN LACR	0.37188	190	140	257
UNT 162 IN LACR	0.14743	78	58	105
UNT 168 IN LACR	0.46138	234	173	316
UNT 171 IN LACR	0.39717	216	160	292
UNT 174 IN LACR	0.35771	192	142	260
UNT 177 IN LACR	0.51832	231	171	312
UNT 178 IN LACR	0.59069	243	180	329
UNT 179 IN LACR	0.39825	199	147	269
UNT 182 IN LACR	0.48846	243	179	328
UNT 187 IN LACR	0.5784	296	219	401

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT 189 IN LACR	0.28544	133	98	180
UNT 193 IN LACR	0.59544	267	198	361
UNT 202 IN LACR	0.83432	333	246	450
UNT 203 IN LACR	0.91451	331	245	447
UNT 204 IN LACR	0.62432	287	212	389
UNT 210 IN LACR	0.09398	71	53	96
WILLIE TANK CREEK	0.50693	256	189	346
WILLIE TANK CREEK	1.24433	554	410	749
WILLIE TANK CREEK	1.39077	578	428	782
LOWER NUECES RIVER - MAINSTEM (LNRI)				
NUECES RIVER	2.91611	59773	44198	80836
NUECES RIVER	29.40032	59773	44198	80836
NUECES RIVER	191.41371	79188	58555	107093
NUECES RIVER	209.03623	79188	58555	107093
NUECES RIVER	243.85892	79188	58555	107093
NUECES RIVER	284.74875	79188	58555	107093
NUECES RIVER	304.82975	79188	58555	107093
NUECES RIVER	405.55621	79188	58555	107093
NUECES RIVER	452.7912	79188	58555	107093
NUECES RIVER	494.69249	79188	58555	107093
NUECES RIVER	535.83712	79188	58555	107093
NUECES RIVER	578.46291	79188	58555	107093
NUECES RIVER	648.55907	79188	58555	107093
NUECES RIVER	770.46244	79188	58555	107093
NUECES RIVER	973.31688	79188	58555	107093
NUECES RIVER	1026.36282	79188	58555	107093
NUECES RIVER	1072.2261	83245	61554	112579
NUECES RIVER	1072.88345	106918	79059	144594
NUECES RIVER	1093.84754	106918	79059	144594
NUECES RIVER	1132.4706	106918	79059	144594
NUECES RIVER	1164.51403	109924	81282	148660
NUECES RIVER	1189.46597	109924	81282	148660
NUECES RIVER	1236.60371	109924	81282	148660
NUECES RIVER	1287.61741	109924	81282	148660
NUECES RIVER	1302.8467	109924	81282	148660
NUECES RIVER – LAKE CORPUS CHRISTI (NURI)				
GILDEN CREEK	0.93881	420	310	568
GILDEN CREEK	3.55329	1221	903	1651

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
GILDEN CREEK	6.739	2027	1499	2742
GILDEN CREEK	8.24138	2216	1638	2996
GILDEN CREEK	9.52795	2454	1814	3318
GILDEN CREEK	10.81308	2597	1920	3512
GILDEN CREEK	12.54873	2889	2136	3907
GILDEN CREEK	13.74087	2980	2204	4031
LA PARA CREEK	1.08632	1406	1040	1901
LA PARA CREEK	1.50538	1692	1251	2288
LA PARA CREEK	2.49234	2551	1886	3450
LA PARA CREEK	3.41564	3188	2357	4311
LA PARA CREEK	5.21838	4295	3176	5808
LA PARA CREEK	6.7077	5131	3794	6939
LA PARA CREEK	10.33668	7165	5298	9690
LA PARA CREEK	11.97935	7675	5675	10380
LA PARA CREEK	12.22694	7713	5703	10431
LA PARA CREEK	15.05996	8742	6464	11823
LA PARA CREEK	15.52976	8788	6498	11884
LA PARA CREEK	17.13172	9102	6730	12309
LA PARA CREEK	23.91085	11671	8630	15783
LA PARA CREEK	24.77249	11688	8643	15807
LA PARA CREEK	30.25452	13264	9808	17938
LA PARA CREEK	34.08042	14185	10489	19183
LA PARA CREEK	34.25654	14177	10483	19173
LA PARA CREEK	37.38459	14306	10579	19348
MUSTANG CREEK	1.19645	1486	1099	2010
MUSTANG CREEK	1.93564	2132	1577	2883
MUSTANG CREEK	3.09953	3008	2224	4068
MUSTANG CREEK	5.71554	4790	3542	6478
MUSTANG CREEK	6.23206	5053	3736	6833
MUSTANG CREEK	7.58419	5909	4369	7991
MUSTANG CREEK	10.41712	7050	5213	9535
MUSTANG CREEK	11.76816	7700	5694	10413
MUSTANG CREEK	16.9226	10059	7438	13604
MUSTANG CREEK	18.25042	10473	7744	14164
MUSTANG CREEK	20.18409	10681	7898	14445
MUSTANG CREEK	23.05799	11165	8256	15099
PAISANO CREEK	1.0014	600	444	812
PAISANO CREEK	2.39388	1100	813	1488

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
PAISANO CREEK	9.85052	2933	2169	3967
PAISANO CREEK	10.87201	3229	2388	4367
UNT002 IN NURI	1.02445	521	385	704
UNT002 IN NURI	2.02495	827	612	1119
UNT002 IN NURI	3.25359	1092	808	1477
UNT002 IN NURI	3.55616	1192	882	1612
UNT003 IN NURI	1.14801	1647	1218	2227
UNT003 IN NURI	2.23945	2560	1893	3462
UNT003 IN NURI	4.47407	4404	3256	5955
UNT003 IN NURI	5.62218	5157	3813	6974
UNT003 IN NURI	7.2603	6189	4576	8370
UNT003 IN NURI	8.54532	6372	4712	8618
UNT003 IN NURI	13.24017	8443	6243	11418
UNT003 IN NURI	14.1849	8898	6579	12033
UNT003 IN NURI	18.15265	10566	7813	14290
UNT003 IN NURI	19.02825	10060	7439	13605
UNT003 IN NURI	20.26039	10530	7786	14240
UNT003 IN NURI	24.61392	10396	7688	14060
UNT003 IN NURI	24.62524	10440	7719	14118
UNT003 IN NURI	25.25862	10174	7523	13759
UNT003 IN NURI	27.14771	10585	7827	14315
UNT003 IN NURI	28.85961	10150	7505	13727
UNT003 IN NURI	29.95894	9854	7286	13326
UNT003 IN NURI	30.61527	9949	7357	13455
UNT003 IN NURI	30.72387	9839	7276	13307
UNT003 IN NURI	32.49477	9380	6936	12685
UNT003 IN NURI	36.06519	9391	6944	12700
UNT003 IN NURI	36.52666	9415	6962	12733
UNT003 IN NURI	37.64383	9244	6835	12501
UNT004 IN NURI	1.01019	1273	941	1721
UNT004 IN NURI	1.27141	1400	1035	1893
UNT005 IN NURI	0.7131	1013	749	1370
UNT005 IN NURI	1.74176	2059	1522	2784
UNT005 IN NURI	2.563	2698	1995	3648
UNT005 IN NURI	3.64669	3455	2555	4672
UNT005 IN NURI	3.79182	3505	2592	4741
UNT006 IN NURI	1.18308	1702	1259	2302
UNT006 IN NURI	2.0896	2478	1832	3351

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT006 IN NURI	2.6343	2809	2077	3799
UNT007 IN NURI	1.05081	1387	1025	1875
UNT007 IN NURI	1.22353	1403	1037	1897
UNT008 IN NURI	1.03799	612	452	827
UNT008 IN NURI	1.51483	888	657	1201
UNT008 IN NURI	2.29612	1071	792	1448
UNT008 IN NURI	2.93049	1171	866	1584
UNT008 IN NURI	3.15558	1216	899	1644
UNT009 IN NURI	0.16258	108	80	146
UNT010 IN NURI	0.20545	64	48	87
UNT011 IN NURI	1.0014	1309	968	1770
UNT011 IN NURI	1.29338	1262	933	1707
UNT011 IN NURI	1.36342	1271	940	1719
UNT011 IN NURI	1.76391	1440	1065	1947
UNT012 IN NURI	0.16769	211	156	286
UNT012 IN NURI	0.34274	316	234	427
UNT013 IN NURI	0.40874	197	146	267
UNT015 IN NURI	1.01091	290	215	393
UNT015 IN NURI	2.29739	517	382	699
UNT015 IN NURI	3.45249	748	553	1011
UNT016 IN NURI	1.08085	256	197	360
UNT016 IN NURI	2.09939	481	356	651
UNT017 IN NURI	1.3888	323	239	436
UNT017 IN NURI	1.55936	356	263	481
UNT018 IN NURI	1.18398	1307	967	1768
UNT018 IN NURI	2.55404	1270	939	1718
UNT018 IN NURI	5.01957	1907	1410	2579
UNT018 IN NURI	9.83683	4066	3006	5498
UNT018 IN NURI	11.52963	4125	3050	5579
UNT018 IN NURI	14.8346	4173	3085	5643
UNT019 IN NURI	1.00095	1116	825	1509
UNT019 IN NURI	1.67053	1647	1218	2228
UNT019 IN NURI	2.99993	2616	1934	3538
UNT019 IN NURI	4.12264	3249	2402	4393
UNT021 IN NURI	1.0587	529	391	715
UNT021 IN NURI	1.39014	599	443	810
UNT022 IN NURI	1.30773	547	404	739
UNT022 IN NURI	2.23085	785	581	1062

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT023 IN NURI	1.02174	563	416	761
UNT023 IN NURI	1.57477	746	552	1009
UNT024 IN NURI	1.15233	608	450	823
UNT024 IN NURI	1.89349	878	649	1187
UNT025 IN NURI	1.84578	711	526	962
UNT025 IN NURI	2.02594	902	667	1221
UNT025 IN NURI	4.54348	2199	1626	2974
UNT026 IN NURI	2.44499	1756	1299	2375
UNT028 IN NURI	0.86034	1207	892	1632
UNT029 IN NURI	1.10453	1465	1084	1982
UNT030 IN NURI	1.02517	1492	1103	2017
UNT030 IN NURI	1.42393	1821	1346	2462
UNT031 IN NURI	1.01754	1391	1029	1881
UNT031 IN NURI	1.48403	1779	1315	2405
UNT031 IN NURI	2.72819	2782	2057	3762
UNT032 IN NURI	0.30409	545	403	737
UNT032 IN NURI	0.47949	799	591	1081
UNT032 IN NURI	0.85496	1325	980	1792
UNT033 IN NURI	1.11915	1683	1244	2276
UNT033 IN NURI	1.7753	2251	1665	3044
UNT033 IN NURI	1.95223	2378	1758	3216
UNT034 IN NURI	1.00033	1299	960	1756
UNT034 IN NURI	1.75064	2042	1510	2761
UNT034 IN NURI	3.1893	3200	2366	4328
UNT034 IN NURI	4.96258	4330	3202	5856
UNT034 IN NURI	6.22668	4874	3604	6592
UNT035 IN NURI	1.1456	1430	1057	1934
UNT036 IN NURI	1.0058	1240	917	1677
UNT036 IN NURI	2.84279	2731	2020	3694
UNT036 IN NURI	4.65181	3977	2941	5379
UNT037 IN NURI	1.18066	1776	1313	2401
UNT038 IN NURI	0.99226	1543	1141	2086
UNT038 IN NURI	1.44996	1940	1435	2624
UNT038 IN NURI	2.27793	2780	2056	3760
UNT039 IN NURI	1.00015	1402	1037	1896
UNT039 IN NURI	1.83852	2191	1620	2963
UNT039 IN NURI	1.96622	2456	1816	3322
UNT040 IN NURI	1.00074	448	331	606

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT040 IN NURI	2.91755	998	738	1350
UNT040 IN NURI	4.67303	1401	1036	1895
UNT040 IN NURI	6.4486	2030	1501	2745
UNT042 IN NURI	1.00275	1279	945	1729
UNT042 IN NURI	1.12175	1395	1032	1887
UNT042 IN NURI	2.91507	2902	2146	3925
UNT042 IN NURI	5.99721	5181	3831	7007
UNT043 IN NURI	0.92518	1259	931	1702
UNT043 IN NURI	2.76334	2818	2084	3811
UNT045 IN NURI	1.11825	1271	940	1719
UNT045 IN NURI	1.98917	1960	1450	2651
UNT046 IN NURI	0.38533	763	564	1031
UNT047 IN NURI	1.00329	1149	850	1554
UNT047 IN NURI	1.44879	1626	1202	2199
UNT048 IN NURI	1.00051	889	657	1202
UNT048 IN NURI	1.50556	1236	914	1672
UNT048 IN NURI	2.35388	1907	1410	2579
UNT048 IN NURI	4.85178	3596	2659	4863
UNT049 IN NURI	1.03942	1037	767	1402
UNT049 IN NURI	1.09735	1096	811	1483
UNT049 IN NURI	1.84013	1751	1295	2368
UNT050 IN NURI	1.00391	1393	1030	1884
UNT050 IN NURI	1.14829	1531	1132	2070
UNT051 IN NURI	1.33428	1561	1155	2112
UNT051 IN NURI	1.77844	2014	1489	2724
UNT051 IN NURI	1.95187	2116	1564	2861
UNT051 IN NURI	2.43082	2329	1722	3150
PENITAS CREEK – NUECES RIVER (PECR)				
BARBONE CREEK	0.64464	208	154	281
BARBONE CREEK	2.96923	891	659	1205
BARBONE CREEK	3.88975	1347	996	1821
BARBONE CREEK	5.52453	2114	1563	2859
BARBONE CREEK	6.92463	2814	2081	3806
BARBONE CREEK	9.32236	3896	2881	5268
BARBONE CREEK	9.71792	4051	2996	5479
BARBONE CREEK	10.88755	4289	3171	5800
CHARQUITAS CREEK	1.00562	987	730	1335
CHARQUITAS CREEK	3.8963	2900	2144	3922

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
CHARQUITAS CREEK	4.35717	3189	2358	4313
HOBBS HOLLOW	1.43462	980	725	1325
HOBBS HOLLOW	3.43205	2155	1593	2914
HOBBS HOLLOW	4.41883	2671	1975	3612
JACK GREEN HOLLOW	1.01736	847	626	1145
JACK GREEN HOLLOW	2.66954	1785	1320	2414
PENITAS CREEK	1.02319	241	178	325
PENITAS CREEK	1.86067	394	291	533
PENITAS CREEK	2.18	439	325	594
PENITAS CREEK	2.56622	510	377	690
PENITAS CREEK	2.89548	558	413	755
PENITAS CREEK	3.03434	592	438	801
PENITAS CREEK	3.51343	700	518	947
PENITAS CREEK	4.51254	865	640	1170
PENITAS CREEK	6.15225	1098	812	1485
PENITAS CREEK	6.86607	1234	913	1669
PENITAS CREEK	7.04676	1243	919	1681
PENITAS CREEK	7.2202	1287	952	1741
PENITAS CREEK	8.12854	1420	1050	1920
PENITAS CREEK	8.58801	1525	1128	2063
PENITAS CREEK	10.10953	1940	1435	2624
PENITAS CREEK	10.4668	2036	1506	2754
PENITAS CREEK	11.57638	2363	1747	3195
PENITAS CREEK	19.70278	3722	2752	5034
PENITAS CREEK	23.27411	4672	3455	6318
PENITAS CREEK	24.76214	4932	3647	6670
PENITAS CREEK	30.64864	6307	4663	8529
PENITAS CREEK	43.2054	8753	6472	11838
PENITAS CREEK	44.19228	8792	6501	11891
UNT001 IN PECR	1.00077	384	284	519
UNT001 IN PECR	1.95384	607	449	821
UNT001 IN PECR	3.65467	996	737	1347
UNT001 IN PECR	6.3177	1470	1087	1988
UNT001 IN PECR	10.82083	2149	1589	2906
UNT001 IN PECR	16.12655	2816	2083	3809
UNT001 IN PECR	18.81878	3136	2319	4241
UNT001 IN PECR	21.30048	3459	2558	4678
UNT001 IN PECR	23.4032	3824	2828	5172

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT001 IN PECR	26.09843	4406	3258	5959
UNT001 IN PECR	28.6392	5060	3742	6843
UNT001 IN PECR	28.97315	5007	3702	6771
UNT002 IN PECR	1.22652	557	412	753
UNT003 IN PECR	1.1712	484	358	654
UNT004 IN PECR	1.34629	591	437	800
UNT004 IN PECR	1.73252	657	486	889
UNT005 IN PECR	1.17421	454	336	614
UNT005 IN PECR	2.54426	824	609	1114
UNT006 IN PECR	1.00804	406	300	549
UNT006 IN PECR	2.3251	787	582	1064
UNT008 IN PECR	1.18331	842	623	1139
UNT008 IN PECR	1.81682	1474	1090	1994
UNT008 IN PECR	2.77464	2104	1556	2846
UNT008 IN PECR	5.12682	3422	2530	4627
UNT008 IN PECR	8.19972	4989	3689	6747
UNT008 IN PECR	8.31262	5031	3720	6804
UNT008 IN PECR	8.64078	5119	3785	6922
UNT008 IN PECR	9.51705	5139	3800	6951
UNT008 IN PECR	11.0313	5342	3950	7224
UNT008 IN PECR	12.6207	5881	4349	7954
UNT009 IN PECR	1.38916	1251	925	1692
UNT010 IN PECR	1.00598	733	542	991
UNT010 IN PECR	2.49898	2018	1492	2730
UNT011 IN PECR	1.00463	935	691	1264
UNT011 IN PECR	2.89409	2371	1754	3207
UNT011 IN PECR	2.95744	2464	1822	3333
UNT011 IN PECR	3.87468	2994	2214	4048
UNT011 IN PECR	5.2859	3643	2694	4927
UNT011 IN PECR	7.46417	4630	3424	6262
UNT011 IN PECR	14.52895	7625	5638	10312
UNT011 IN PECR	15.63639	7885	5831	10664
UNT012 IN PECR	1.00131	613	453	829
UNT012 IN PECR	1.76938	1392	1029	1882
UNT012 IN PECR	2.02773	1615	1194	2184
UNT013 IN PECR	1.51542	1492	1103	2018
UNT013 IN PECR	3.84222	3039	2247	4110
UNT013 IN PECR	5.70166	3930	2906	5315

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT014 IN PECR	1.02624	1023	757	1384
UNT014 IN PECR	1.48727	1482	1096	2004
UNT015 IN PECR	0.99548	1180	873	1596
UNT016 IN PECR	1.00006	1137	841	1538
UNT016 IN PECR	2.25144	2056	1520	2781
UNT016 IN PECR	3.6028	3009	2225	4069
UNT016 IN PECR	6.39087	4374	3234	5915
UNT016 IN PECR	7.17225	4265	3154	5768
UNT017 IN PECR	1.30939	1265	935	1711
UNT018 IN PECR	1.00122	954	706	1290
UNT018 IN PECR	2.39612	1972	1458	2667
UNT018 IN PECR	3.63125	2812	2080	3803
UNT018 IN PECR	4.61614	3359	2483	4542
UNT018 IN PECR	4.79745	3454	2554	4671
UNT018 IN PECR	7.21368	4680	3460	6329
UNT018 IN PECR	8.03931	4927	3643	6663
UNT018 IN PECR	9.19514	5192	3839	7022
UNT018 IN PECR	10.18964	5621	4156	7602
UNT018 IN PECR	10.83252	5608	4147	7584
UNT019 IN PECR	1.02857	1150	850	1555
UNT019 IN PECR	1.47392	1512	1118	2044
UNT020 IN PECR	1.38745	1244	920	1682
UNT020 IN PECR	1.88515	1602	1185	2167
UNT020 IN PECR	2.62192	2119	1567	2866
UNT020 IN PECR	3.48799	2826	2090	3822
UNT020 IN PECR	4.36251	3294	2435	4454
UNT020 IN PECR	6.9517	4744	3508	6416
UNT020 IN PECR	7.05132	4733	3500	6401
UNT020 IN PECR	8.6339	5119	3785	6923
UNT020 IN PECR	13.45815	6818	5042	9221
UNT020 IN PECR	13.81676	6548	4842	8855
UNT021 IN PECR	1.22174	752	556	1017
UNT021 IN PECR	1.59129	1150	850	1555
UNT022 IN PECR	1.0087	807	597	1092
UNT022 IN PECR	1.08541	922	682	1247
UNT025 IN PECR	0.93755	271	200	367
UNT026 IN PECR	1.04498	823	608	1112
UNT027 IN PECR	1.31293	370	274	500

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT027 IN PECR	1.60375	425	315	575
UNT027 IN PECR	2.12297	539	399	729
UNT027 IN PECR	4.08282	925	684	1252
UNT027 IN PECR	6.19189	1411	1043	1908
UNT027 IN PECR	7.01449	1747	1292	2363
UNT028 IN PECR	1.00051	528	391	715
UNT028 IN PECR	1.69647	1153	853	1559
UNT030 IN PECR	1.123	995	736	1346
UNT072 IN PECR	0.89272	310	229	419
UNT073 IN PECR	1.44108	534	395	722
UNT074 IN PECR	0.61487	673	497	910
UNT143 IN PECR	0.07963	60	44	81
UNT223 IN PECR	0.11981	82	60	110
UNT283 IN PECR	0.04833	33	25	45
UNT283 IN PECR	0.13219	91	67	123
UNT290 IN PECR	0.32529	137	101	185
UNT300 IN PECR	0.2762	104	77	141
UNT301 IN PECR	0.13209	58	43	79
UNT302 IN PECR	0.05673	27	20	37
UNT303 IN PECR	0.10797	51	38	69
UNT304 IN PECR	0.1355	80	59	108
UNT305 IN PECR	0.20128	106	78	144
UNT306 IN PECR	0.84994	741	548	1002
RAMIRENA CREEK – LAKE CORPUS CHRISTI (RACR)				
ELM CREEK	1.09162	568	420	768
ELM CREEK	1.76324	817	604	1104
ELM CREEK	2.68316	1087	804	1471
ELM CREEK	3.36082	1213	897	1641
ELM CREEK	4.00633	1315	972	1778
ELM CREEK	10.03707	2333	1725	3156
ELM CREEK	12.87771	2641	1953	3572
ELM CREEK	13.9175	2821	2086	3815
ELM CREEK	14.83476	2885	2133	3901
ELM CREEK	18.08581	3333	2464	4507
RAMIRENA CREEK	1.18524	441	326	596
RAMIRENA CREEK	2.58685	839	621	1135
RAMIRENA CREEK	3.09327	907	671	1227
RAMIRENA CREEK	6.04124	1472	1088	1990

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
RAMIRENA CREEK	8.6941	1986	1469	2686
RAMIRENA CREEK	9.54484	2057	1521	2782
RAMIRENA CREEK	10.5992	2150	1590	2907
RAMIRENA CREEK	14.60145	2718	2010	3676
RAMIRENA CREEK	17.77093	3041	2249	4112
RAMIRENA CREEK	18.85249	3127	2312	4229
RAMIRENA CREEK	39.05435	4958	3666	6705
RAMIRENA CREEK	40.95502	5122	3787	6927
RAMIRENA CREEK	42.97543	5310	3927	7181
RAMIRENA CREEK	51.93762	5998	4435	8112
RAMIRENA CREEK	52.85948	6024	4455	8147
RAMIRENA CREEK	54.8175	6140	4540	8304
RAMIRENA CREEK	56.03932	6160	4555	8331
RAMIRENA CREEK	57.15532	6200	4585	8385
RAMIRENA CREEK	60.99523	6345	4692	8581
RAMIRENA CREEK	79.95358	7712	5702	10429
RAMIRENA CREEK	81.04697	7887	5832	10667
RAMIRENA CREEK	82.93087	8035	5942	10867
RAMIRENA CREEK	85.83555	8114	6000	10973
RAMIRENA CREEK	90.2299	8412	6220	11376
RAMIRENA CREEK	94.79294	8696	6430	11761
RAMIRENA CREEK	96.77368	8756	6474	11841
RAMIRENA CREEK	99.65934	8925	6600	12070
RAMIRENA CREEK	102.96122	8967	6631	12127
RAMIRENA CREEK	110.05995	9177	6786	12411
RAMIRENA CREEK	111.01035	9293	6872	12568
RAMIRENA CREEK	111.73337	9333	6901	12622
RAMIRENA CREEK	112.78948	9358	6920	12656
RAMIRENA CREEK	114.96402	9548	7060	12913
RAMIRENA CREEK	116.147	9682	7159	13094
RAMIRENA CREEK	117.65327	9845	7280	13315
RAMIRENA CREEK	118.57232	9908	7326	13399
RAMIRENA CREEK	119.26098	9980	7380	13497
RAMIRENA CREEK	120.23324	9897	7318	13385
SALT BRANCH RAMIRENA CREEK	0.91533	359	266	486
SALT BRANCH RAMIRENA CREEK	1.41177	477	353	645
SALT BRANCH RAMIRENA	2.78102	791	585	1070

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
CREEK				
SALT BRANCH RAMIRENA CREEK	5.168	1233	912	1668
SALT BRANCH RAMIRENA CREEK	6.2275	1403	1037	1897
SALT BRANCH RAMIRENA CREEK	7.86098	1644	1215	2223
SALT BRANCH RAMIRENA CREEK	8.6013	1688	1248	2283
SALT BRANCH RAMIRENA CREEK	13.25642	2315	1712	3131
SALT BRANCH RAMIRENA CREEK	15.18919	2497	1846	3376
SALT BRANCH RAMIRENA CREEK	19.42787	3001	2219	4059
SALT BRANCH RAMIRENA CREEK	19.90567	3011	2226	4072
UNT 002 IN RACR	1.40028	480	355	650
UNT 003 IN RACR	1.03942	373	276	504
UNT 003 IN RACR	1.93017	566	418	765
UNT 003 IN RACR	2.72933	751	555	1016
UNT 003 IN RACR	3.39554	872	645	1179
UNT 004 IN RACR	1.14506	516	381	698
UNT 005 IN RACR	1.011	402	297	543
UNT 005 IN RACR	1.52789	512	379	693
UNT 005 IN RACR	2.4534	726	537	982
UNT 005 IN RACR	3.61144	938	694	1269
UNT 007 IN RACR	1.48249	573	424	775
UNT 008 IN RACR	1.00086	395	292	534
UNT 008 IN RACR	2.12633	680	503	920
UNT 009 IN RACR	1.09233	542	401	733
UNT 009 IN RACR	2.5856	913	675	1235
UNT 009 IN RACR	3.43846	1079	798	1459
UNT 010 IN RACR	1.11318	479	354	647
UNT 010 IN RACR	1.50502	570	421	771
UNT 010 IN RACR	2.32617	773	572	1046
UNT 011 IN RACR	1.00472	427	316	578
UNT 011 IN RACR	1.55667	567	419	766
UNT 012 IN RACR	1.07888	517	382	699
UNT 012 IN RACR	1.43965	598	443	809

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT 013 IN RACR	1.00768	441	326	596
UNT 013 IN RACR	1.63523	622	460	841
UNT 013 IN RACR	2.76515	967	715	1308
UNT 013 IN RACR	2.95451	993	734	1343
UNT 013 IN RACR	5.02172	1417	1048	1916
UNT 013 IN RACR	6.79406	1773	1311	2398
UNT 013 IN RACR	7.70248	1948	1440	2635
UNT 014 IN RACR	0.95748	397	294	537
UNT 015 IN RACR	1.52457	567	419	767
UNT 017 IN RACR	1.00669	554	410	750
UNT 017 IN RACR	1.5807	713	527	964
UNT 018 IN RACR	1.09323	460	340	622
UNT 018 IN RACR	2.39406	854	632	1155
UNT 018 IN RACR	2.98041	949	701	1283
UNT 020 IN RACR	1.04194	447	331	605
UNT 020 IN RACR	2.12908	762	563	1030
UNT 020 IN RACR	4.81152	1351	999	1827
UNT 021 IN RACR	1.37448	552	408	747
UNT 023 IN RACR	1.00699	477	353	646
UNT 023 IN RACR	2.11956	748	553	1012
UNT 024 IN RACR	1.29052	553	409	748
UNT 024 IN RACR	2.81125	995	735	1345
UNT 025 IN RACR	1.12471	498	368	674
UNT 026 IN RACR	1.27348	521	385	704
UNT 026 IN RACR	1.87275	728	538	985
UNT 027 IN RACR	1.18077	470	348	636
UNT 027 IN RACR	1.63373	626	463	847
UNT 028 IN RACR	1.07099	338	250	457
UNT 028 IN RACR	1.56752	436	322	590
UNT 028 IN RACR	3.07118	812	600	1098
UNT 028 IN RACR	4.30279	1087	804	1470
UNT 029 IN RACR	1.15306	500	370	677
UNT 030 IN RACR	1.00033	448	331	606
UNT 030 IN RACR	2.0216	780	576	1054
UNT 030 IN RACR	3.17247	1054	779	1425
UNT 030 IN RACR	3.96965	1227	907	1660
UNT 031 IN RACR	1.00006	476	352	643
UNT 031 IN RACR	1.77161	660	488	893

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT 032 IN RACR	1.02597	431	319	583
UNT 032 IN RACR	1.33741	532	393	720
UNT 033 IN RACR	1.23052	562	415	760
UNT 033 IN RACR	2.00926	761	562	1028
UNT 034 IN RACR	1.00006	245	181	331
UNT 034 IN RACR	2.38343	527	390	712
UNT 034 IN RACR	3.29709	748	553	1012
UNT 034 IN RACR	4.49086	1000	739	1352
UNT 034 IN RACR	5.41086	1180	872	1595
UNT 036 IN RACR	1.01925	552	408	746
SPRING CREEK – NUECES RIVER (SPCR)				
HACKBERRY CREEK	1.01163	410	303	554
HACKBERRY CREEK	1.51156	552	408	746
HACKBERRY CREEK	7.80784	1774	1312	2399
HACKBERRY CREEK	10.28413	2130	1575	2881
HACKBERRY CREEK	10.9271	2242	1658	3031
LEOPARD BRANCH	1.00284	406	300	549
LEOPARD BRANCH	2.0098	668	494	904
LEOPARD BRANCH	2.53216	790	584	1068
LEOPARD BRANCH	15.53748	3019	2232	4083
LEOPARD CREEK	1.76552	815	603	1103
LEOPARD CREEK	2.06746	831	615	1124
LEOPARD CREEK	4.22585	1338	989	1809
LEOPARD CREEK	7.28395	1981	1465	2679
LEOPARD CREEK	8.27693	2225	1645	3009
LEOPARD CREEK	9.4519	2288	1692	3094
LEOPARD CREEK	10.76075	2506	1853	3389
LEOPARD CREEK	11.83031	2541	1879	3437
LEOPARD CREEK	12.61222	2607	1927	3525
MCKIMZEY CREEK	1.07736	459	339	620
MCKIMZEY CREEK	1.67119	621	459	839
MCKIMZEY CREEK	3.76994	1118	827	1512
MCKIMZEY CREEK	5.00432	1311	970	1773
MCKIMZEY CREEK	10.15446	2144	1585	2899
SALT BRANCH	1.11995	367	271	496
SALT BRANCH	3.33583	940	695	1272
SALT BRANCH	6.59306	1594	1179	2156
SALT BRANCH	9.27268	2018	1492	2729

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
SALT BRANCH	9.95879	2024	1497	2737
SALT BRANCH	12.71343	2357	1743	3188
SALT BRANCH	13.76585	2481	1835	3356
SALT BRANCH	14.67704	2600	1922	3516
SALT BRANCH	15.73781	2702	1998	3654
SALT BRANCH	16.93847	2842	2101	3843
SALT BRANCH	18.08434	2996	2215	4051
SALT BRANCH	18.87725	3018	2232	4081
SALT BRANCH	27.13364	3945	2917	5335
SALT BRANCH	28.00215	4048	2993	5474
SALT BRANCH	28.98364	4117	3045	5568
SALT BRANCH	30.99945	4275	3161	5781
SALT BRANCH	32.26001	4291	3173	5803
SALT BRANCH	34.79522	4458	3297	6029
SOUTH FORK SALT BRANCH	1.00409	412	305	558
SOUTH FORK SALT BRANCH	1.89385	710	525	960
SOUTH FORK SALT BRANCH	3.08151	1040	769	1406
SOUTH FORK SALT BRANCH	3.9571	1163	860	1573
SOUTH FORK SALT BRANCH	4.93769	1381	1021	1867
SOUTH FORK SALT BRANCH	5.91704	1566	1158	2118
SOUTH FORK SALT BRANCH	7.0108	1714	1268	2318
SOUTH FORK SALT BRANCH	7.54123	1782	1318	2410
SPRING CREEK	0.90993	455	337	616
SPRING CREEK	2.14889	857	634	1159
SPRING CREEK	2.67528	967	715	1308
SPRING CREEK	3.49957	1220	902	1649
SPRING CREEK	4.11152	1333	985	1802
SPRING CREEK	5.21847	1520	1124	2055
SPRING CREEK	6.87602	1854	1371	2508
SPRING CREEK	23.42477	3974	2939	5375
SPRING CREEK	24.04765	3874	2864	5239
SPRING CREEK	35.83264	5160	3815	6978
SPRING CREEK	48.89413	6343	4690	8578
SPRING CREEK	53.73309	6749	4990	9127
SPRING CREEK	54.89734	6724	4972	9094
SPRING CREEK	63.1253	7290	5391	9859
SPRING CREEK	71.38295	7886	5832	10666
SPRING CREEK	74.35864	8022	5932	10849

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
SPRING CREEK	77.1366	8191	6057	11077
SPRING CREEK	77.95883	8134	6014	11000
SPRING CREEK	80.6794	8270	6115	11184
SPRING CREEK	94.66047	9225	6822	12476
SPRING CREEK	96.54697	9141	6759	12362
SPRING CREEK	98.53282	9156	6770	12382
SPRING CREEK	99.48266	9110	6736	12320
SPRING CREEK	100.58943	9011	6663	12186
TIMON CREEK	1.0292	455	337	616
TIMON CREEK	2.20709	783	579	1059
TIMON CREEK	3.21163	985	728	1332
TIMON CREEK	4.35095	1186	877	1605
TIMON CREEK	5.59107	1428	1056	1931
TIMON CREEK	6.1623	1480	1094	2002
TIMON CREEK	7.2384	1684	1245	2277
TIMON CREEK	8.01741	1714	1268	2318
UNT001 IN SPCR	1.00104	485	358	655
UNT001 IN SPCR	1.87735	735	543	993
UNT001 IN SPCR	3.10742	1074	794	1452
UNT001 IN SPCR	3.99951	1287	952	1741
UNT001 IN SPCR	4.6623	1335	987	1805
UNT001 IN SPCR	7.28378	1883	1393	2547
UNT001 IN SPCR	11.0296	2529	1870	3420
UNT001 IN SPCR	11.87326	2544	1881	3441
UNT002 IN SPCR	1.10345	508	376	688
UNT003 IN SPCR	1.19878	538	398	727
UNT003 IN SPCR	2.18924	791	585	1070
UNT004 IN SPCR	1.22416	603	446	815
UNT004 IN SPCR	2.18305	843	623	1140
UNT004 IN SPCR	3.11845	1017	752	1375
UNT007 IN SPCR	1.12175	569	421	770
UNT007 IN SPCR	1.39059	601	444	813
UNT008 IN SPCR	1.27357	463	342	626
UNT008 IN SPCR	2.51933	812	600	1098
UNT008 IN SPCR	3.58252	1045	773	1413
UNT008 IN SPCR	3.91952	1102	815	1491
UNT008 IN SPCR	5.11866	1350	998	1825
UNT008 IN SPCR	5.42337	1361	1006	1840

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT010 IN SPCR	1.0301	399	295	540
UNT010 IN SPCR	1.67181	573	424	775
UNT012 IN SPCR	0.8451	442	327	598
UNT012 IN SPCR	1.9038	713	528	965
UNT013 IN SPCR	1.01808	546	404	739
UNT013 IN SPCR	1.84435	801	593	1084
UNT014 IN SPCR	1.06292	431	318	582
UNT014 IN SPCR	2.16458	722	534	976
UNT014 IN SPCR	2.90556	893	660	1207
UNT014 IN SPCR	3.99476	1103	816	1492
UNT015 IN SPCR	0.96177	432	319	584
UNT016 IN SPCR	1.24353	626	463	846
UNT016 IN SPCR	2.41567	967	715	1308
UNT016 IN SPCR	2.79858	1021	755	1381
UNT016 IN SPCR	6.33994	1970	1457	2664
UNT016 IN SPCR	6.96955	2013	1489	2723
UNT016 IN SPCR	7.68337	2106	1557	2848
UNT017 IN SPCR	1.00095	543	402	735
UNT017 IN SPCR	2.27497	898	664	1215
UNT018 IN SPCR	1.38127	532	393	719
UNT018 IN SPCR	1.76122	618	457	836
UNT018 IN SPCR	2.77984	874	646	1182
UNT018 IN SPCR	5.77544	1710	1265	2313
UNT018 IN SPCR	6.6886	1764	1304	2385
UNT018 IN SPCR	7.95401	1875	1386	2535
UNT019 IN SPCR	1.00015	463	342	626
UNT019 IN SPCR	2.1861	768	568	1039
UNT020 IN SPCR	1.00167	469	347	634
UNT020 IN SPCR	1.79029	738	546	998
UNT020 IN SPCR	2.60004	921	681	1245
UNT021 IN SPCR	1.02095	489	361	661
UNT021 IN SPCR	1.94577	702	519	949
UNT022 IN SPCR	1.04678	506	374	684
UNT022 IN SPCR	1.98173	797	589	1078
UNT022 IN SPCR	2.65896	1004	742	1358
UNT023 IN SPCR	1.19761	589	436	797
UNT023 IN SPCR	1.94568	760	562	1028
UNT023 IN SPCR	4.26244	1359	1005	1837

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT023 IN SPCR	4.93572	1483	1097	2006
UNT023 IN SPCR	8.318	2217	1639	2998
UNT023 IN SPCR	8.35674	2220	1642	3003
UNT023 IN SPCR	11.35601	2828	2091	3824
UNT023 IN SPCR	11.61347	2817	2083	3810
UNT023 IN SPCR	13.23238	2864	2118	3874
UNT024 IN SPCR	1.54259	735	543	994
UNT025 IN SPCR	1.00015	424	314	574
UNT025 IN SPCR	2.08163	748	553	1011
UNT025 IN SPCR	3.05649	982	726	1327
UNT026 IN SPCR	1.00463	481	356	650
UNT026 IN SPCR	2.19857	881	651	1191
UNT026 IN SPCR	2.9791	1100	814	1488
UNT027 IN SPCR	0.90186	447	330	604
UNT027 IN SPCR	1.14973	523	387	707
UNT029 IN SPCR	1.10507	1428	1056	1931
UNT029 IN SPCR	2.32895	2398	1773	3243
UNT029 IN SPCR	3.98427	3611	2670	4883
UNT029 IN SPCR	4.59711	3981	2944	5384
UNT029 IN SPCR	5.17506	4180	3091	5653
UNT029 IN SPCR	6.10186	4371	3232	5911
UNT029 IN SPCR	7.11806	4348	3215	5879
UNT029 IN SPCR	8.13874	4271	3158	5776
UNT029 IN SPCR	8.16734	4963	3669	6711
UNT030 IN SPCR	1.01333	1271	940	1719
UNT030 IN SPCR	1.27814	1497	1107	2024
UNT030 IN SPCR	1.46511	1628	1204	2201
UNT032 IN SPCR	1.00311	411	304	556
UNT032 IN SPCR	1.97805	679	502	918
UNT033 IN SPCR	2.3665	606	448	820
UNT033 IN SPCR	2.75309	704	520	952
UNT035 IN SPCR	1.16829	470	347	635
UNT036 IN SPCR	1.02929	299	221	405
UNT036 IN SPCR	1.95653	531	393	718
UNT036 IN SPCR	2.67097	697	515	943
UNT036 IN SPCR	3.94553	975	721	1319
UNT038 IN SPCR	1.39992	478	354	647
UNT038 IN SPCR	2.69321	728	538	984

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT038 IN SPCR	3.46738	928	686	1255
UNT038 IN SPCR	5.37121	1332	985	1801
UNT039 IN SPCR	1.05201	323	238	436
UNT039 IN SPCR	1.83281	588	434	795
UNT040 IN SPCR	1.00158	431	318	582
UNT040 IN SPCR	1.33973	491	363	664
UNT040 IN SPCR	2.63367	839	620	1134
UNT040 IN SPCR	3.81182	991	733	1341
UNT040 IN SPCR	5.90941	1361	1007	1841
UNT041 IN SPCR	1.05072	371	274	502
UNT041 IN SPCR	1.1604	406	300	549
UNT042 IN SPCR	1.00571	431	318	582
UNT042 IN SPCR	1.42431	557	412	753
UNT043 IN SPCR	1.2924	434	321	587
UNT045 IN SPCR	1.56958	558	412	754
UNT045 IN SPCR	1.97016	655	484	886
UNT046 IN SPCR	1.00777	395	292	534
UNT046 IN SPCR	1.42435	520	385	703
UNT047 IN SPCR	1.01306	450	333	609
UNT047 IN SPCR	1.45758	541	400	732
UNT049 IN SPCR	1.04696	549	406	742
UNT049 IN SPCR	1.68948	719	531	972
UNT051 IN SPCR	1.24756	384	284	519
UNT051 IN SPCR	2.29497	623	461	843
UNT051 IN SPCR	3.10509	769	569	1041
UNT051 IN SPCR	4.05466	945	699	1278
UNT051 IN SPCR	4.50107	992	733	1341
UNT051 IN SPCR	6.65847	1324	979	1791
UNT051 IN SPCR	8.86136	1608	1189	2175
UNT051 IN SPCR	9.05226	1673	1237	2262
UNT051 IN SPCR	10.61171	1883	1392	2546
UNT052 IN SPCR	1.01557	350	259	474
UNT052 IN SPCR	1.5668	440	325	595
UNT053 IN SPCR	1.36566	324	239	438
UNT053 IN SPCR	1.87349	429	317	580
UNT0731 IN SPCR	0.38686	580	429	785
UNT0733 IN SPCR	0.38157	663	490	896
UNT0736 IN SPCR	0.4421	584	432	789

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
VATOSS GULLY	1.01683	1112	822	1504
VATOSS GULLY	1.47713	1489	1101	2014
VATOSS GULLY	2.71249	2221	1643	3004
VATOSS GULLY	3.69686	2805	2074	3793
VATOSS GULLY	4.54806	3083	2280	4169
VATOSS GULLY	5.74585	3097	2290	4189
VATOSS GULLY	6.5618	3035	2245	4105
VATOSS GULLY	7.50195	3059	2262	4137
VATOSS GULLY	16.79759	6026	4456	8149
VATOSS GULLY	17.77989	5903	4365	7983
VATOSS GULLY	18.20872	5821	4304	7872
VATOSS GULLY	19.11883	5756	4256	7784
VATOSS GULLY	20.38944	5762	4260	7792
VATOSS GULLY	23.25671	5799	4288	7843
VATOSS GULLY	23.86758	5910	4370	7993
VATOSS GULLY	24.76209	5944	4396	8039
VATOSS GULLY	25.93863	5863	4335	7929
VATOSS GULLY	29.71151	6010	4444	8128
VATOSS GULLY	30.98669	6149	4547	8316
SULPHUR CREEK – NUECES RIVER (SUCR)				
BEST BRANCH	0.92518	370	273	500
BEST BRANCH	1.67791	580	429	785
BEST BRANCH	2.18709	672	497	909
BEST BRANCH	3.13657	877	649	1187
BEST BRANCH	3.80232	973	719	1316
BEST BRANCH	4.85726	1148	849	1553
EAST FORK SALT CREEK	1.00158	1336	988	1807
EAST FORK SALT CREEK	1.14381	1461	1080	1975
EAST FORK SALT CREEK	4.30557	4466	3302	6040
EAST FORK SALT CREEK	4.48555	4286	3169	5797
EAST FORK SALT CREEK	5.90968	5287	3910	7151
EAST FORK SALT CREEK	8.23657	5922	4379	8008
EAST FORK SALT CREEK	8.34687	5757	4257	7786
EAST FORK SALT CREEK	9.1553	5605	4145	7580
EAST FORK SALT CREEK	11.45313	5851	4327	7913
EAST FORK SALT CREEK	11.82591	5638	4169	7624
ELM CREEK	0.9571	692	512	936
ELM CREEK	1.70186	821	607	1110

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
ELM CREEK	2.46481	977	722	1321
ELM CREEK	2.58982	977	722	1321
ELM CREEK	4.79457	1452	1074	1964
ELM CREEK	5.49646	1552	1148	2099
ELM CREEK	6.42262	1672	1236	2261
ELM CREEK	7.32709	1793	1326	2425
ELM CREEK	9.0858	2050	1516	2772
ELM CREEK	9.80589	2118	1566	2864
ELM CREEK	14.78277	2767	2046	3742
ELM CREEK	15.29975	2798	2069	3784
ELM CREEK	19.8574	3321	2456	4491
MUSTANG CREEK	0.42712	172	127	233
MUSTANG CREEK	1.54564	557	412	753
MUSTANG CREEK	2.2973	712	526	962
MUSTANG CREEK	3.31	904	668	1222
MUSTANG CREEK	3.48478	934	691	1263
MUSTANG CREEK	7.83919	1721	1272	2327
MUSTANG CREEK	8.90014	1849	1368	2501
OLDS SLOUGH	1.36936	208	154	281
OLDS SLOUGH	2.47398	317	234	428
OLDS SLOUGH	2.66822	307	227	415
OLDS SLOUGH	5.54514	581	429	785
OLDS SLOUGH	6.56143	702	519	950
OLDS SLOUGH	6.91475	766	567	1036
ROCK QUARRY BRANCH	1.24716	382	282	516
ROCK QUARRY BRANCH	1.86014	530	392	717
ROCK QUARRY BRANCH	3.9243	948	701	1282
ROCK QUARRY BRANCH	4.5411	1050	776	1420
ROCK QUARRY BRANCH	5.46529	1228	908	1660
ROCK QUARRY BRANCH	6.18901	1351	999	1828
ROCK QUARRY BRANCH	6.71587	1389	1027	1879
ROCK QUARRY BRANCH	7.73951	1624	1201	2196
ROCK QUARRY BRANCH	7.96798	1659	1226	2243
ROCK QUARRY BRANCH	8.07597	1652	1222	2234
ROCK QUARRY BRANCH	9.86041	1898	1403	2567
ROCK QUARRY BRANCH	11.00413	2066	1528	2794
ROCK QUARRY BRANCH	13.22358	2403	1777	3250
ROCK QUARRY BRANCH	20.82022	3296	2437	4458

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
SALT BRANCH	1.01	1362	1007	1842
SALT BRANCH	1.46063	1828	1352	2472
SALT BRANCH	1.92039	2098	1551	2837
SALT BRANCH	3.38658	3097	2290	4189
SALT BRANCH	7.096	4362	3226	5899
SALT BRANCH	8.35997	4589	3393	6206
SALT BRANCH	9.1214	4485	3316	6065
SALT BRANCH	10.20476	4467	3303	6041
SALT BRANCH	10.95606	4496	3324	6080
SALT BRANCH	12.04678	4516	3339	6107
SALT BRANCH	12.90152	4482	3314	6061
SALT BRANCH	13.33326	4517	3340	6109
SALT BRANCH	14.28974	4561	3373	6169
SALT BRANCH	14.80214	4531	3351	6128
SALT BRANCH	16.10736	4573	3382	6185
SALT BRANCH	18.10102	4675	3456	6322
SALT BRANCH	18.96845	4770	3527	6451
SALT BRANCH	19.56282	4787	3540	6474
SALT CREEK	1.1621	452	334	612
SALT CREEK	1.17295	459	339	620
SALT CREEK	3.66144	2308	1706	3121
SALT CREEK	8.02597	4699	3474	6354
SALT CREEK	9.54018	4731	3498	6398
SALT CREEK	9.66348	4611	3410	6236
SALT CREEK	11.22545	4771	3528	6452
SALT CREEK	12.38226	4712	3484	6372
SALT CREEK	13.48688	4622	3418	6251
SALT CREEK	14.07138	4594	3397	6213
SALT CREEK	26.39086	8593	6354	11621
SALT CREEK	26.66195	8218	6077	11114
SALT CREEK	29.9003	8301	6138	11227
SALT CREEK	30.96295	8159	6033	11034
SULPHUR CREEK	1.00786	1556	1150	2104
SULPHUR CREEK	1.19151	1659	1226	2243
SULPHUR CREEK	2.16108	2629	1944	3555
SULPHUR CREEK	2.34034	2812	2079	3803
SULPHUR CREEK	2.37307	2789	2062	3772
SULPHUR CREEK	3.08572	3447	2549	4662

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
SULPHUR CREEK	4.64615	4737	3503	6406
SULPHUR CREEK	5.4109	5195	3842	7026
SULPHUR CREEK	6.40746	5727	4235	7745
SULPHUR CREEK	7.29615	6019	4451	8140
SULPHUR CREEK	9.25698	7143	5282	9661
SULPHUR CREEK	14.99009	9809	7253	13265
SULPHUR CREEK	16.28868	10026	7414	13560
SULPHUR CREEK	17.03657	10309	7623	13941
SULPHUR CREEK	17.43419	10148	7504	13725
SULPHUR CREEK	19.18824	10902	8061	14743
SULPHUR CREEK	22.9632	12427	9189	16806
SULPHUR CREEK	23.94452	12612	9325	17056
SULPHUR CREEK	24.74299	12368	9145	16726
SULPHUR CREEK	25.16697	12144	8980	16423
SULPHUR CREEK	26.18416	11918	8813	16118
SULPHUR CREEK	27.2217	11729	8673	15863
SULPHUR CREEK	28.13594	11330	8378	15323
SULPHUR CREEK	29.03322	11071	8186	14972
SULPHUR CREEK	30.01041	10680	7897	14443
SULPHUR CREEK	32.03851	10308	7622	13940
SULPHUR CREEK	52.20529	11208	8288	15158
SULPHUR CREEK	53.02348	11111	8216	15027
SULPHUR CREEK	53.43097	10958	8103	14820
SULPHUR CREEK	55.14932	11028	8154	14914
SULPHUR CREEK	59.66339	11041	8164	14931
SULPHUR CREEK	61.84913	10979	8118	14847
SULPHUR CREEK	62.92981	11082	8194	14987
SULPHUR CREEK	63.26044	10914	8070	14760
SULPHUR CREEK	63.86575	10942	8091	14798
SULPHUR CREEK	64.23189	10766	7961	14560
SULPHUR CREEK	67.33411	10701	7913	14472
SULPHUR CREEK	72.31252	10922	8076	14771
SULPHUR CREEK	72.32032	10911	8068	14755
SULPHUR CREEK	103.6018	14963	11064	20236
SULPHUR CREEK	112.52687	15163	11212	20507
SULPHUR CREEK	116.03801	15430	11409	20867
SULPHUR CREEK	119.1917	15340	11343	20746
SULPHUR CREEK	120.11258	15357	11355	20768

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
SULPHUR CREEK	120.83742	15345	11346	20752
SULPHUR CREEK	121.70282	15037	11119	20336
SULPHUR CREEK	124.56055	15231	11262	20598
SULPHUR CREEK	125.51282	15235	11265	20604
SULPHUR CREEK	125.91151	15075	11147	20387
SULPHUR CREEK	145.79994	16571	12253	22410
SULPHUR CREEK	151.1105	16878	12480	22826
SULPHUR CREEK	152.76474	16807	12427	22729
SULPHUR CREEK	153.65441	16624	12292	22482
SULPHUR CREEK	154.86915	16589	12266	22435
SULPHUR CREEK	155.06114	16362	12099	22128
SULPHUR CREEK	159.70102	16532	12224	22357
SULPHUR CREEK	160.50998	16285	12042	22024
UNT002 IN SUCR	1.00095	440	325	595
UNT002 IN SUCR	1.63316	649	480	877
UNT004 IN SUCR	1.09682	367	271	496
UNT005 IN SUCR	1.20219	463	342	626
UNT005 IN SUCR	1.33638	478	354	647
UNT005 IN SUCR	1.37544	475	351	643
UNT007 IN SUCR	1.05717	362	267	489
UNT007 IN SUCR	1.70301	507	375	685
UNT009 IN SUCR	1.20323	366	271	495
UNT009 IN SUCR	1.94027	563	416	761
UNT010 IN SUCR	0.50846	209	155	283
UNT011 IN SUCR	0.5854	279	206	378
UNT012 IN SUCR	0.35251	704	520	951
UNT012 IN SUCR	1.57138	2218	1640	2999
UNT012 IN SUCR	1.86838	2334	1726	3156
UNT013 IN SUCR	0.27844	502	371	679
UNT014 IN SUCR	0.24768	521	385	705
UNT015 IN SUCR	0.27602	374	276	505
UNT015 IN SUCR	0.55527	696	515	941
UNT015 IN SUCR	0.73516	889	658	1203
UNT016 IN SUCR	0.15209	305	225	412
UNT016 IN SUCR	0.2058	393	291	532
UNT016 IN SUCR	0.64288	1047	774	1415
UNT017 IN SUCR	0.30005	550	406	743
UNT019 IN SUCR	0.66252	965	714	1306

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT020 IN SUCR	0.22679	343	254	464
UNT020 IN SUCR	0.66458	901	666	1219
UNT021 IN SUCR	0.14752	279	207	378
UNT022 IN SUCR	0.878	1212	897	1640
UNT022 IN SUCR	1.36252	1636	1210	2213
UNT023 IN SUCR	0.76027	1112	822	1503
UNT023 IN SUCR	1.43525	1768	1308	2391
UNT023 IN SUCR	2.97784	3160	2337	4274
UNT023 IN SUCR	3.21073	3258	2409	4405
UNT023 IN SUCR	4.32145	3882	2871	5250
UNT023 IN SUCR	4.46331	3880	2869	5247
UNT023 IN SUCR	4.74956	3943	2916	5333
UNT023 IN SUCR	5.63617	4374	3235	5916
UNT024 IN SUCR	0.51357	390	289	528
UNT024 IN SUCR	0.66458	709	524	958
UNT025 IN SUCR	1.01091	1365	1009	1846
UNT025 IN SUCR	1.1968	1503	1112	2033
UNT026 IN SUCR	0.59302	527	390	713
UNT026 IN SUCR	0.67382	654	483	884
UNT027 IN SUCR	1.05933	690	510	933
UNT028 IN SUCR	0.21352	321	237	434
UNT029 IN SUCR	1.08139	1417	1048	1916
UNT029 IN SUCR	1.53945	1922	1421	2600
UNT0297 IN SUCR	0.30714	148	109	200
UNT0297 IN SUCR	0.33727	161	119	218
UNT0297 IN SUCR	0.65158	278	205	376
UNT0298 IN SUCR	0.23562	118	87	159
UNT030 IN SUCR	0.64916	925	684	1251
UNT030 IN SUCR	1.46009	1840	1361	2489
UNT030 IN SUCR	1.52053	1898	1404	2567
UNT030 IN SUCR	2.18996	2419	1789	3271
UNT030 IN SUCR	3.47698	3329	2462	4502
UNT031 IN SUCR	0.64557	993	734	1342
UNT032 IN SUCR	0.31037	577	427	781
UNT032 IN SUCR	0.36067	634	469	857
UNT033 IN SUCR	0.16124	252	187	341
UNT033 IN SUCR	0.6549	860	636	1163
UNT034 IN SUCR	1.11619	343	253	463

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT034 IN SUCR	1.46287	464	343	628
UNT036 IN SUCR	1.02714	462	341	624
UNT036 IN SUCR	1.645	633	468	857
UNT0368 IN SUCR	0.2675	462	342	625
UNT037 IN SUCR	1.17385	307	227	416
UNT038 IN SUCR	0.93567	307	227	415
UNT038 IN SUCR	2.02244	612	452	828
UNT038 IN SUCR	2.78719	761	563	1029
UNT038 IN SUCR	3.61803	907	671	1227
UNT038 IN SUCR	4.03493	1000	740	1353
UNT039 IN SUCR	1.08552	356	263	481
UNT039 IN SUCR	1.56734	471	349	638
UNT039 IN SUCR	3.59705	949	702	1283
UNT039 IN SUCR	3.92732	1001	740	1354
UNT040 IN SUCR	0.47985	153	113	207
UNT040 IN SUCR	1.02804	320	237	433
UNT041 IN SUCR	1.44189	477	352	645
UNT041 IN SUCR	1.71558	544	402	736
UNT042 IN SUCR	1.1369	368	272	498
UNT042 IN SUCR	2.13543	618	457	836
UNT042 IN SUCR	2.72684	718	531	972
UNT042 IN SUCR	3.52298	885	654	1197
UNT042 IN SUCR	3.86159	933	690	1262
UNT043 IN SUCR	1.01458	393	290	531
UNT043 IN SUCR	1.9308	666	493	901
UNT044 IN SUCR	0.84061	324	240	438
UNT044 IN SUCR	1.07619	393	291	532
UNT044 IN SUCR	1.97043	612	452	827
UNT044 IN SUCR	2.21542	669	494	904
UNT046 IN SUCR	1.00006	1406	1040	1901
UNT046 IN SUCR	1.34091	1710	1265	2313
UNT046 IN SUCR	1.50143	1853	1370	2507
UNT046 IN SUCR	1.72948	2014	1489	2724
UNT046 IN SUCR	3.63355	3382	2501	4574
UNT046 IN SUCR	4.09546	3425	2533	4632
UNT047 IN SUCR	0.94195	1348	997	1823
UNT047 IN SUCR	0.98804	1367	1010	1848
UNT048 IN SUCR	1.16515	1731	1280	2341

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT048 IN SUCR	2.12279	2260	1671	3056
UNT048 IN SUCR	2.26591	2208	1633	2986
UNT050 IN SUCR	1.29114	395	292	534
UNT050 IN SUCR	1.4222	440	326	595
UNT051 IN SUCR	1.00418	628	464	849
UNT052 IN SUCR	0.50227	234	173	316
UNT053 IN SUCR	0.33637	159	117	214
UNT053 IN SUCR	0.82788	325	241	440
UNT054 IN SUCR	0.82967	1253	927	1695
UNT054 IN SUCR	1.53533	2036	1506	2753
UNT054 IN SUCR	3.06913	3710	2744	5018
UNT055 IN SUCR	0.39843	753	557	1018
UNT055 IN SUCR	0.44111	821	607	1111
UNT056 IN SUCR	0.54783	930	687	1257
UNT056 IN SUCR	0.59707	957	708	1294
UNT056 IN SUCR	1.45283	1944	1438	2630
UNT056 IN SUCR	1.53318	1963	1452	2655
UNT057 IN SUCR	0.42575	700	518	947
UNT059 IN SUCR	0.34615	615	455	831
UNT059 IN SUCR	0.96751	1391	1029	1882
UNT059 IN SUCR	1.00077	1426	1054	1928
UNT059 IN SUCR	1.18407	1620	1198	2191
UNT059 IN SUCR	1.30316	1717	1270	2323
UNT060 IN SUCR	0.33323	634	468	857
UNT061 IN SUCR	0.64889	922	682	1247
UNT061 IN SUCR	1.35696	1676	1239	2266
UNT062 IN SUCR	0.56639	889	658	1203
UNT063 IN SUCR	0.24302	523	386	707
UNT063 IN SUCR	0.76807	1107	819	1497
UNT063 IN SUCR	1.427	1447	1070	1957
UNT063 IN SUCR	1.76436	1355	1002	1833
UNT064 IN SUCR	0.43573	781	578	1057
UNT065 IN SUCR	0.59804	540	399	730
UNT066 IN SUCR	1.02427	406	300	549
UNT066 IN SUCR	1.89125	656	485	887
UNT066 IN SUCR	2.74173	888	657	1201
UNT066 IN SUCR	2.90852	898	664	1214
UNT068 IN SUCR	1.05509	355	262	480

Stream Name	Drainage Area (sq. mi.)	1% Peak Discharge (cfs)	1%- Peak Discharge (cfs)	1%+ Peak Discharge (cfs)
UNT068 IN SUCR	1.57547	485	359	656
UNT068 IN SUCR	2.4933	705	521	953
UNT068 IN SUCR	3.10622	839	620	1134
UNT069 IN SUCR	1.01916	435	322	588
UNT069 IN SUCR	2.24977	769	569	1040
UNT069 IN SUCR	3.34631	975	721	1318
UNT070 IN SUCR	1.17465	555	411	751
UNT070 IN SUCR	1.37212	577	426	780
UNT070 IN SUCR	2.63385	937	693	1267
UNT071 IN SUCR	0.98526	375	277	507
UNT071 IN SUCR	2.11433	700	518	947
UNT073 IN SUCR	0.53706	793	586	1073
UNT073 IN SUCR	1.15367	1426	1054	1928
UNT074 IN SUCR	0.34794	655	485	886
UNT075 IN SUCR	1.14793	1475	1090	1994
UNT075 IN SUCR	1.22954	1520	1124	2056
UNT075 IN SUCR	1.52224	1730	1279	2340
UNT075 IN SUCR	2.97632	2018	1492	2729
UNT076 IN SUCR	0.33081	472	349	638
UNT077 IN SUCR	1.24478	493	365	667
UNT078 IN SUCR	1.02167	356	263	481
UNT078 IN SUCR	2.00648	623	461	842
UNT078 IN SUCR	2.50265	759	561	1027
UNT078 IN SUCR	3.65919	1006	744	1360
UNT078 IN SUCR	4.52008	1129	835	1527
UNT078 IN SUCR	4.962	1208	893	1633
UNT078 IN SUCR	5.08987	1227	907	1659
UNT079 IN SUCR	0.9267	403	298	545
UNT080 IN SUCR	1.0006	455	337	616
UNT080 IN SUCR	2.10898	775	573	1048
UNT080 IN SUCR	3.33547	1106	818	1495
UNT080 IN SUCR	4.33938	1310	969	1771
UNT081 IN SUCR	1.01692	422	312	570
UNT082 IN SUCR	0.47653	211	156	286

Appendix B BLE Map