DETERMINATION OF INSTANTANEOUS UNIT HYDROGRAPHS

FOR

SMALL WATERSHEDS OF CENTRAL TEXAS

A Thesis

Presented to

the Faculty of the Interdisciplinary Graduate Program

in Environmental Engineering

University of Houston

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

in Environmental Engineering

by

Krishna P Jonnalagadda

February 2003

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ABSTRACT

USGS small watershed studies were conducted largely during the period spanning the early 1960's and the middle 1970's. A significant number of individual storm events were contained within these studies. No data pertinent to unit hydrograph research from these studies are digitally available and the USGS reports represent the sole data source. The data obtained from the studies was digitized and a database containing all the recorded events of rainfall and runoff was constructed for the small watersheds of Central Texas. The database was divided into five different modules each with certain number of watersheds. The database was used to derive the Instantaneous Unit Hydrographs (IUH's) for all the Stations operated by USGS. A form of convolution model was used to duplicate the observed hydrographs. The model parameters were analyzed for their dependencies on the location of the station. Tables with stations showing similar behavior for a given model parameter were prepared for all the modules. Analysis revealed the possibility of generalizing the parameters obtained with in a module as groups of stations but not the module as a whole.

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

A fundamental hydrologic problem is derivation of the rainfall-runoff relationship. Runoff estimation on small watersheds is often approached using the rational method for estimating peak instantaneous discharges. Application of the rational method is inappropriate for watersheds with drainage areas greater than about 250 acres and does not provide a time history of runoff.

A hydrograph is a time series of either water-surface elevation or instantaneous discharge, taken at a particular point on a stream, usually an outlet from the watershed. For watersheds with drainage areas greater than 250 acres, but less than 20 square miles, Texas Department of Transportation (TxDOT) engineers use hydrograph methods to estimate the magnitude and duration of discharges for design of drainage structures.

A unit hydrograph or unit graph is the watershed hydrograph response for a unit pulse of effective rainfall uniformly distributed over the entire watershed over a unit of time. The effective rainfall for a watershed is the total rainfall less losses or abstractions. Hydrographs developed using the unit hydrograph (UH) procedure are often preferred for hydraulic design over the rational method because:

a. Complete hydrograph not a peak discharge is produced.
b. The effects of variations in storm duration and temporal distribution of the storm are incorporated into the runoff hydrograph.

Deriving a watershed's unit hydrograph requires a rainfall-runoff history of the watershed (gaged watersheds). For ungaged watersheds, unit hydrographs are estimated from statistical procedures. Such unit hydrographs are called synthetic unit hydrographs. Ungaged watersheds typically use timing and shape parameters of unit hydrographs from nearby gaged watersheds that are statistically adjusted or regionalized.

1.2 RESEARCH OBJECTIVES

The objectives of the research in this thesis are:

- To review current TxDOT unit hydrograph procedures and prepare a supporting literature review.
- To assemble a database of measured rainfall-runoff responses for selected Texas watersheds.
- To develop unit hydrograph functions from the database.

The work in this thesis will eventually support:

- Comparisons of the Natural Resources Conservation Service (NRCS) dimensionless unit hydrograph to observed unit hydrographs in Texas, and the
- Regionalization of the observed unit hydrographs for purposes of estimating unit hydrographs for ungaged watersheds.

1.3 ORGANIZATION OF THE THESIS

This thesis is organized into different chapters each dealing with a specific task of the research. Chapter 2, the problem statement explains the purpose of the project; it explains the necessity of a central database showing the rainfall-runoff data for Texas. Chapter 3 explores the currently applied methods in Texas region, with an emphasis on the methods suitable for the watershed with drainage areas ranging from 250 acres to 10 square miles. Chapter 4 discusses the available data for the database construction; it presents the different formats of the collected data. It gives a detailed explanation of the organization of the data in the database. Chapter 5 explains existing methods of developing unit hydrographs from the available rainfall-runoff data organized in Chapter 4. This chapter explains the Instantaneous Unit Hydrograph (IUH) method, and provides a derivation from simple linearized physics. Chapter 6 is an analysis of the database using the IUH model(s). The parameters of the IUH model for each watershed are analyzed for their dependencies on watershed identity such as an area. The analysis is the first step to a regionalization. Chapter 7 presents the results of the analysis and the associated conclusions. Chapter 8 gives the list of references that have been cited in the Thesis. The thesis includes the tables with the parameters of the suitable model for Texas. The tables are organized into different modules, each showing the event specific parameters for all the events. Appendix.A contains the tables with the model parameters for each module.

CHAPTER 2

PROBLEM STATEMENT

Unit hydrographs can be developed from a number of existing methods for gaged and ungaged watersheds. Unit hydrographs are developed using the rainfall and runoff data from a specific location. A given hydrograph is best suited for the location for which it was derived. Texas has few if any generalized hydrographs developed specifically for its watersheds.

Texas watersheds are monitored by the USGS (United States Geological Survey). USGS small watershed studies were conducted largely from the early 1960's to the middle 1970's with intent of unit hydrograph analysis in the future. To date little unit hydrograph analysis was done from the individual storms recorded in the above period. The data, which is not in a consistent format, must be digitized to perform unit hydrograph studies for central Texas. The database id then analyzed to develop Unit hydrographs. Statistical analysis must be performed to check the applicability of a general method for the whole of central Texas. The data recorded over the years will be used to derive a model that can be applied for the central Texas. Finally the possibility of a single unit hydrograph for Texas watersheds can be analyzed for its dependence on the regional characteristics.

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CHAPTER 3

LITERATURE REVIEW

3.1 INTRODUCTION

A hydrograph is a recording of stage, discharge or velocity values at a given point in a watershed as a function of time. Historically, the results have been presented as a two dimensional plot, but the series of ordered pairs (time, value) used to generate the plot is also a hydrograph. Many methods have been developed to predict the runoff hydrograph for a given rainfall event. Rainfall is represented using a hyetograph: a time-series of rainfall. The resulting hydrographs are used to design engineering projects, predict required storage volumes, and as input for pollutograph predictions.

3.1.1 RUNOFF PROCESS

Runoff is the surface water flow collected at a location in a watershed. Conceptually, the watershed integrates all the physiographic and hydro-meteorological processes that produce runoff. From this definition it should be clear that runoff varies both with location and time. The runoff in stream channels is classified as direct runoff and base flow. The total rainfall over a watershed is considered to consist of rainfall excess and rainfall abstractions or losses. Rainfall excess is the fraction of the total rainfall that contributes directly to the surface runoff. The part of the rainfall that contributes entirely to the direct runoff is called the effective rainfall. The effective rainfall consists of rainfall excess and that part of the rainfall that becomes prompt subsurface runoff.

Figure 3.1 below is a block diagram indicating various runoff components.

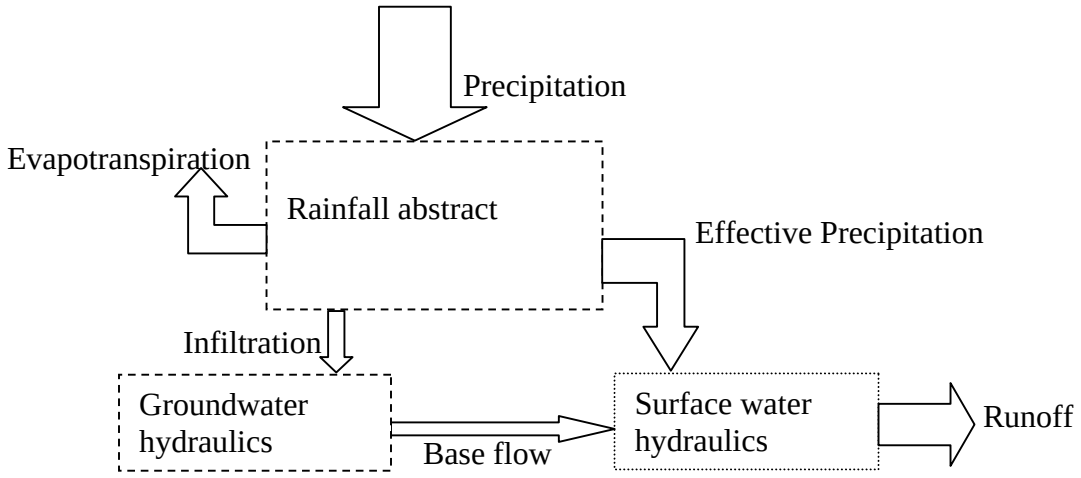

Figure 3.1. Block diagram indicating various runoff components.

3.1.2 COMPONENTS OF HYDROGRAPH

The following four components of a hydrograph are the major contributions to runoff volume in a hydrograph:

Surface runoff: The water that reached the stream by traveling over the soil surface is called surface runoff. Surface runoff is the residual after infiltration, interception, and surface storage have been extracted from precipitation.

Interflow: It is that part of the water that infiltrates the soil surface and moves laterally though the upper soil horizons until its course is intercepted by a stream channel or until it returns to the surface at some point down slope from its point of infiltration.

Groundwater flow: The amount of rainfall that reaches the groundwater table when the soil in the zone of aeration contains sufficient soil moisture to permit the passage of gravity water downward.

Channel precipitation: The precipitation that falls directly on the water surfaces of lakes and streams is called channel precipitation. Stream flow from this source is computed as the product of average rainfall and the percentage of basin area covered by water surfaces connected with the stream system. This percentage varies from basin to basin and from time to time for a given basin depending on the level of streams.

3.1.3 METHODS OF ESTIMATING RUNOFF

Empirical methods have been used in the determination of hydrograph, since at least the early 1900's. All of the methods relate rainfall intensity rate of rainfall, duration and watershed characteristics to the runoff. The rational method has been one of the most extensively used methods in the estimation of runoff. In spite of assumptions that cannot be readily justified, the method is widely used for its simplicity. T.J. Mulvaney is credited as the first engineer to publish the principles of the rational method in 1851(Chow, 1964).

According to the rational formula the peak discharge, Q_p in cfs is given by

$$Q_p = C\,I\,A, \tag{3.1}$$

where C is a runoff coefficient depending on characteristics of the drainage basin, I is the rainfall intensity (LT^{-1}), and A is the drainage area in (L^2).

The Soil Conservation Service (SCS) method is widely used for estimating floods on small to medium-sized ungaged drainage basins. The Soil Conservation Service (SCS)

was reorganized into the Natural Resources Conservation Service (NRCS) in 1994 and the two names are used interchangeably in this thesis. The method was developed originally as a procedure to estimate peak discharge and for design of soil conservation works and agricultural flood-control projects. Many variations of the currently published procedures have been used. Current procedures are published in the national engineering handbook (NRCS, 1985) and TR-55 (NRCS, 1986). Runoff does not occur unless the rainfall exceeds an initial abstraction I_a. After allowing for I_a, the depth of runoff Q is the residual after subtracting F, the infiltration or water retained in the drainage basin (excluding I_a) from the rainfall P. The potential retention, S is the value ($F+I_a$) that would occur in a very long storm.

The basic assumption in the SCS curve number method is

$$\frac{F}{S} = \frac{Q}{P_e} \ , \tag{3.2}$$

where, P_e is the effective storm rainfall equal to $(P-I_a)$.

The runoff Q can be estimated for the SCS method as

$$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)} \ . \tag{3.3}$$

The potential retention, S is expressed in terms of a dimensionless quantity called the curve number, CN as

$$S = \frac{1000}{CN} - 10 \ . \tag{3.4}$$

CN depends on the soil, cover, and hydrologic condition of the land surface. Values of CN for different conditions can be found in the NEH (NRCS, 1985).

In addition to the above two methods there are other methods that are used by TxDOT for the watersheds in Texas in the determination of hydrographs. For highway drainage, design peak discharge methods are used in the estimation of runoff. However, for situations such as the detention pond design, reservoir routing, or channel routing, especially for large watersheds, the estimation of runoff hydrographs is necessary. TxDOT uses the NRCS dimensionless unit hydrograph method for these types of situations. The NRCS dimensionless unit hydrograph was developed by Victor Mockus as cited in the NEH (NRCS,1985). It was derived from a large number of natural unit hydrographs from watersheds varying widely in size and geographical locations. The dimensionless curvilinear hydrograph, has its ordinate values expressed in a dimensionless ratio q/q_p and its abscissa values as t/t_p , where, q is the storm runoff during a given time interval t, q_p is the peak discharge and t_p is the time to peak.

Regional regression equations are the most commonly used method for establishing peak flows at larger ungaged sites in Texas. Regression equations have been developed for Texas and were categorized according to the urban area for which they were developed. Regression equations were developed for three urban areas in Texas: Austin, Dallas-Fort Worth, and Houston. Also, statewide regional equations for rural watershed were developed.

3.1.4 STRUCTURE OF A HYDROGRAPH

A typical runoff hydrograph produced by a concentrated storm rainfall is generally a single-peaked skew distribution curve. Different parts of a simple hydrograph are:

a) Rising limb or concentration curve: period of time elapses before the flow begins to rise due to interception, infiltration, soil-moisture deficits. After losses, rainfall excess contributes to stream flow.
b) Crest segment with peak discharge.
c) Recession curve or falling limb: after rainfall ceases, still there is some contribution to stream flow until the inflection point. After this time water comes from soil storage (interflow).

The following are the properties of a typical hydrograph:

a) Lag time (L): time interval from the center of mass of rainfall excess to the peak of the resulting hydrograph.
b) Time to peak (t_p)***:*** time interval from the start of rainfall excess to the peak of the resulting hydrograph.
c) Time of concentration (t_c): the time interval from the end of rainfall excess to the inflection point (change of slope) on the recession curve. Also, the longest time for water to flow to a discharge point from any point in the watershed.
d) Recession time (t_R): time from the peak to the end of surface runoff.
e) Time base (t_b): time from the beginning to the end of surface runoff.

Figure 3.2 below is a typical hydrograph indicating the above-mentioned parts and properties.

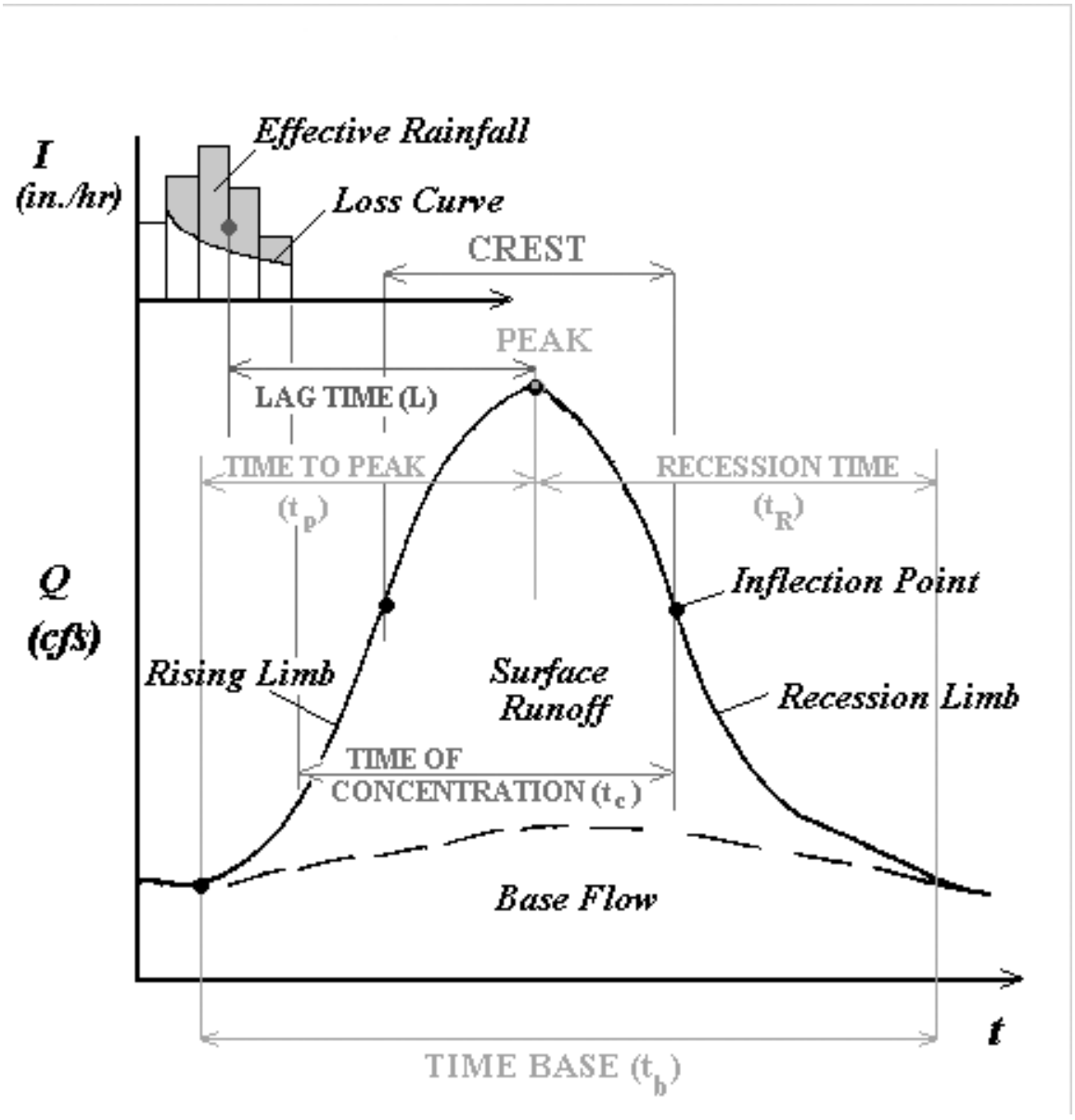

Figure 3.2. A typical hydrograph.

(Ref. http://www.eng.fiu.edu/evrglads/cwr3103/lectures/lectur10/lectur10.htm)

3.2 METHODS OF ANALYSIS

Numerous methods have been proposed for the estimation of runoff from the given effective rainfall (total rainfall void losses). A hydrograph can be developed using the unit hydrograph method developed by Sherman (Sherman, 1932), Snyder's synthetic unit hydrograph method (Snyder, 1938), and Commons dimensionless hydrograph (Commons, 1942). In general a model is constructed so that the model parameters can be related to the physical parameters of the corresponding watershed. Studies showed that the model parameters estimated this way exhibited considerable regional stability (Snyder, 1938). Mostly these models were proven to be more accurate in the respective regions for which they have been developed.

3.3 UNIT HYDROGRAPHS

According to Chow (Chow, 1964) Folse recognized the relationship between rainfall and runoff in 1929. Three years later a similar concept involving the successive ordinates of a 24-hr unit hydrograph was published by Sherman (Sherman, 1932).

Sherman's work is considered the seminal paper on unit hydrographs. A unit hydrograph for a drainage basin has been defined as the direct runoff hydrograph resulting from 1 inch of effective rainfall generated uniformly over the basin area at a uniform rate during a specified period of time or duration. The word "unit" as used by Sherman in his study was the 'unit of time' of the effective rainfall.

A runoff hydrograph for a drainage basin can be determined from the unit hydrograph given the amount of effective rainfall. The unit hydrograph defined above can be used to derive the hydrograph of runoff due to any amount of effective rainfall. The above definition and some assumptions constitute the unit hydrograph theory. Table 3.1 is a list of the assumptions and associated limitations.

The two basic principles to be satisfied to use the unit hydrograph theory are the linearity and time invariance. The ordinates of the direct-runoff hydrographs are mutually proportional and thus can be added or superimposed numerically in proportion to the total amount of direct runoff featuring the principle of linearity. The direct runoff hydrograph from a watershed due to a given pattern of effective rainfall at whatever time it may occur is invariable. This is known as the principle of time invariance.

Table 3.1. Assumptions and limitations of unit hydrograph theory.

Assumption	Limitation
Uniform distribution of the effective rainfall within the duration specified.	Duration of the storm being selected for analysis should be short.
Uniform distribution of effective rainfall over the entire drainage area of the basin under consideration.	May not be applicable for basins with larger drainage areas.
Time base of the hydrograph of direct runoff resulting from the effective rainfall of unit duration is constant.	The base of the direct runoff hydrograph is dependent on the base-flow separation method considered.
The ordinates of the direct runoff hydrograph of a common base time are directly proportional to the total amount of the direct runoff represented by each hydrograph.	Limits the analysis to the linear unit hydrograph theory excluding any non-linear response of the watershed.
For a given watershed, the size of the direct runoff hydrograph for two effective rainfall pulses is in direct proportion to the relative sizes of the pulses.	The principle is valid only when the time and conditions of the drainage basin are fixed and specified.

In reality, all these assumptions are violated. In practice however, the unit hydrograph method has proved to be a very useful method to obtain engineering estimates for design purposes. Though initially developed for large drainage basins, studies have shown that UHs can be applied for smaller watersheds varying in area from 4 acres to 10 sq mi (Brater, 1940).

Snyder (1956) obtained unit hydrographs by least squares analysis of rainfall and runoff data. Nash (1959) studied the relation between the number of parameters (moments about origin) and the stream catchment's characteristics for the instantaneous unit hydrograph.

Eagleson et. al. (1966) applied the Weiner-Hopf theory to determine unit hydrographs from the observed rainfall and runoff data.

High frequency oscillations observed in the unit hydrographs were related to colinearity, the linear relation between the elements in a linear system. Multiple events were used in the deconvolution process in deriving the unit hydrographs (Bree, 1978). A similar approach of deconvolution was used in overcoming the high frequency oscillations in the unit hydrographs derivation (Mawdsley et.al., 1981).

Extended research in this direction involved the development of a linear programming approach for the optimal determination of unit hydrographs (Mays et al., 1980). Non-linear programming models for the development of unit hydrographs were also developed (Unver et. al., 1984).

Commons (1942) suggested that a dimensionless hydrograph, the so-called basic hydrograph, would give an acceptable approximation of the flood hydrograph on any Texas basin. This hydrograph was developed from flood hydrographs in Texas. It is

divided so that the base time is expressed as 100 units, the peak discharge as 60 units and the area as a constant of 1,196.5 units.

A form of NRCS dimensionless unit hydrograph was developed using the data from 40 Midwestern and Eastern watersheds (Holton et al., 1963). Synthetic hydrographs can be developed using a two-parameter Gamma distribution (Croley II, 1980)

A model when developed using the correlation methods will constitute of some parameters, which can be related to the physical characteristics of the watersheds for the case of ungaged watersheds.

3.4 INSTANTANEOUS UNIT HYDROGRAPH (IUH)

The unit hydrograph theory is the application of linear systems theory to the rainfall-runoff process (Dooge, 1973; Chow, et al, 1988). Chow and others have applied various theories to hydrologic modeling since the late 1960's. One of the simpler approaches to rainfall-runoff modeling has been through the applications of linear systems theories (Dooge, 1973).

The unit hydrograph from an effective precipitation of infinitesimally small duration is called an Instantaneous Unit Hydrograph (IUH). Generally the IUH is represented by $u(t)$ in the literature. For an IUH the effective precipitation is applied to the drainage basin over a very short duration of time (impulse). The major advantage of the IUH over the unit hydrograph is that the IUH is independent of the duration of the effective rainfall reducing the number of variables in the hydrograph analysis. Of course the zero time duration is a fictitious situation that will be violated in the hydrograph analysis, but it can

be approximated from the slope of a finite-duration precipitation depth plot. In a linear unit hydrograph theory by the principle of superposition, when an effective rainfall of function $I(\tau)$ of duration t_0 is applied , each infinitesimal element of the effective rainfall hydrograph (ERH) will produce a direct runoff hydrograph (DRH). This DRH will be equal to the product of $I(\tau)$ and the IUH expected by $u(t-\tau)$. Therefore the ordinate of the DRH at time t is given as

$$Q(t) = \int_0^{t' \le t_0} u(t-\tau) I(\tau) d\tau . \tag{3.5}$$

The ordinate of the DRH at time t shown above is called the convolution integral, also known as Duhamel integral, in which $u(t-\tau)$ is a kernel function, $I(\tau)$ is the input function and $t' = t_0$ when $t > t_0$ and $t' = t$ when $t' \le t_0$. The shape of an IUH resembles a single peaked hydrograph. If the rainfall and the runoff in the convolution integral are measured in the same units, the ordinates of the IUH must have a dimension of $[T^{-1}]$. The following are the properties of IUH:

$0 \le u(t) \le$ a positive peak value, for $t > 0$

$u(t) = 0$, for $t \le 0$

$u(t) \to 0$, for $t \to \infty$

$$\int_0^{\infty} u(t)\, dt = 1 , \tag{3.6}$$

$$\int_0^{\infty} u(t)\, t\, dt = t_L , \tag{3.7}$$

where t_L is the lag time of the IUH (Chow, 1964). Since convolution is a linear process it can be shown that t_L is also equal to the time interval between the centroid of the effective rainfall and that of the direct runoff. The idea of applying an IUH to derive a unit

hydrograph was originally attributed to Clark in 1945 (Clark, 1945). Nash in 1957, instead of characterizing the runoff as translation followed by storage in a single reservoir as Clark did, viewed the watershed as a series of *n* identical linear storage reservoirs. Once the IUH is obtained for a watershed it can be used to synthesize any other hydrograph from a rainfall time series on the watershed by convolution.

Unit hydrograph procedures should be limited to watershed drainage areas that are less than about 2000 square miles. If the storm patterns are thought to impact runoff hydrographs, then the watershed can be subdivided into smaller sub-watersheds and each of those subjected to a hydrograph analysis. To calculate a flood hydrograph, the unit hydrograph is applied to the hyetograph of rainfall excess to estimate the hydrograph of surface runoff, and base flow is added to produce the flood hydrograph.

To develop a unit hydrograph, one should acquire as many rainfall records as possible within the study area to ensure the amount and distribution of rainfall over the watershed is accurately known. The final unit hydrograph will represent the variations in the rainfall-runoff processes over a larger period of time allowing a generalized UH.

For a specific watershed, unit hydrographs can be developed using two approaches. Given the rainfall-runoff data, different techniques can be applied to estimate the unit hydrographs from the measurements. For watersheds with no rainfall-runoff record, methods of synthetic hydrology must be applied. This thesis uses the first approach only, that is the analysis of unit hydrographs from measured rainfall-runoff events.

3.5 WATERSHED RESPONSE FUNCTION

The unit hydrograph (UH) or the IUH can be treated as a function that converts the rainfall to the observed runoff on a given watershed. This transfer function is often termed as response function in hydrology. On a gaged watershed, determination of model parameters from the observed rainfall-runoff data is one of the objectives of UH analysis. Similar analysis can be done on the ungaged watersheds except that the model parameters are obtained from the physical characteristics of the watershed (area, perimeter, etc.,).

For gaged watersheds, the unit hydrograph is obtained by the following procedure:

1. Determine the direct runoff hydrograph by subtracting the base flow from the hydrograph using an appropriate base flow separation technique.
2. Compute the volume of the runoff under the hydrograph.
3. Divide the ordinates of the direct runoff hydrograph by the direct runoff volume. The resulting hydrograph is the unit hydrograph for the watershed (this step essentially forces the integral of the UH to equal one).
4. Duration of the unit hydrograph can be obtained from the effective rainfall hyetograph (ERH), which can be obtained by assuming a suitable method for the abstractions. The time-duration of the pulses of effective precipitation is the duration of the unit hydrograph.

Using the above method, for more than one event, a set of unit hydrographs with different durations will be obtained for a given watershed. Morgan and Hullinghors were the first to suggest the S-hydrograph technique (Chow, 1964) that can be used to obtain a common duration for all the derived unit hydrographs. This set of common time-duration

unit hydrographs can be averaged to arrive at a single UH that can be applied to the watershed. One way that an average unit hydrograph may be constructed is by taking the arithmetic means of the peak flows (U_p) and the times to peak (T_p), plotting the average peak at the appropriate mean value of T_p, and drawing the hydrograph to match the general shapes of the individual unit hydrographs. The resulting average unit hydrograph is then checked to ensure that the enclosed volume of runoff is equivalent to a unit of effective rainfall.

Deconvolution is the process of extracting the unit response function (UH) from a direct runoff hydrograph and the generating precipitation sequence. Deconvolution can be used to obtain the UHs for complex storms with no non-linearity or errors in the data. The error between the observed and the estimated direct runoff hydrograph (DRH) can be minimized using the least squares fitting or an optimization technique (Singh, 1976).

Collins (1939) proposed a method of successive approximation putting forward a unique convolution. The drawbacks in estimating the unit hydrograph as a solution for a set of linear equations for different rainfall pulses is overcome by the Collins procedure.

CHAPTER 5

METHOD OF ANALYSIS

5.1 INTRODUCTION

The database in chapter 4 was analyzed to derive IUHs for each station. The unit hydrographs may be developed using many procedures starting from the elementary approach as explained in the literature review (Linsley et al., 1949) to more complex analysis involving the application of linear systems theory (Dooge, 1973). Three different methods have been used in the current project (only one method is the subject of this thesis). The following paragraphs give a brief discussion about two of the methods and a detailed description of the method that has been chosen for the analysis.

Deconvolution, is the reverse process of convolution, and is used to infer the unit hydrograph from a complex multi peaked hydrograph. Least-squares fitting and optimization are two of the three methods investigated. The application of these techniques is facilitated by expressing the hydrograph in matrix form as in Chow et al.,(1988).

$$[Q] = [P][U], \qquad (5.1)$$

where *[P]* is the Effective Rainfall Hyetograph (ERH) matrix,

[U] is the Unit hydrograph (UH),

[Q] is the Direct Runoff Hydrograph (DRH) matrix.

It is the intent of the analysis to find the unit hydrograph *[U]* that can satisfy the equation 5.1. A solution for *[U]* is assumed and the model DRH, *[Q*]* is arrived at for this assumed *[U]*. The solution for *[U]* is obtained by minimizing the error between the

observed and estimated DRH's. The solution for *[U]* can be obtained by the following two methods:

5.1.1 LEAST SQUARES FITTING METHOD

This method minimizes the sum of the sum of squares of differences between the given and estimated values of *Q*. The following is the representation of the system of equations that has to be solved.

$$Q_j = U_1R_j + U_2R_{j-1} + \ldots\ldots\ldots\ldots\ldots U_iR_{j-i-1}, \quad (5.2)$$

in which $j=1,2,3\ldots\ldots,n$ (where n is the positive *Q* ordinates spaced at time interval Δt),

$i= 1,2,\ldots\ldots,m;$ where *m* is the total number of unit hydrograph ordinates.

Let

$$Q_j = Q_j^* + e_j, \quad (5.3)$$

where e_j is the error between the observed and the estimated value of *Q*. The sum of squares of deviations S is computed as

$$S = \sum_j^n e_j^{\,2}. \quad (5.4)$$

The least squares method minimizes the sum of the squares of the deviations of the computed and observed values of *Q*. Using multiple regression analysis that yields values of the unit hydrograph ordinates as regression coefficients, the system of equations represented by equation 5.2 can be solved. The derived unit hydrographs using the least squares method may not have a unit volume and some unit hydrographs ordinates may be negative (Singh,1976). Texas Tech University is applying this method to the entire database.

5.1.2 LINEAR PROGRAMMING METHOD

Linear programming techniques can be used in solving equation 5.2 for the unit hydrograph. The general linear programming model is stated in the form of a linear objective function to be optimized subject to linear constraints. The sum of absolute difference between the observed runoff, Q and the estimated Q^* is minimized and the unit hydrograph is obtained. The drawback of the least squares method can be overcome by incorporating the following linear constraints (Singh,1976)

$U_i \geq 0$, where $i = 1,2,\ldots,m$, and (5.5)

$$\Delta t \sum_{i=1}^{m} U_i = 1. \quad (5.6)$$

Similarly, constraints can be incorporated into the model to overcome the disadvantages observed commonly in other models. Lamar University is applying this method to the database.

5.2 INSTANTANEOUS UNIT HYDROGRAPH

An instantaneous unit hydrograph is defined as a unit hydrograph resulting from one unit of rainfall applied for a very short duration of time over a watershed. Nash postulated that the transformation by a watershed of an effective rainfall into a surface runoff could be modeled by routing that rainfall down a cascade of equal linear reservoirs (Nash, 1957). Concentrating on linear mechanisms, Dooge (1959) suggested that the response of a watershed could be modeled by combining storage effects and the translations effects. A similar approach has been used in arriving at the instantaneous unit hydrograph for this thesis.

5.3 METHODOLOGY

The behavior of watershed is assumed to be analogous to a linear reservoir where discharge is proportional to the accumulated depth of rainfall remaining within the watershed. The runoff in a watershed is caused by the excess precipitation *I(t)*, which is that fraction of precipitation without losses. Excess precipitation is represented as an ensemble of "raindrops" or labeled particles that initially enter and eventually leave the watershed. The number of particles leaving the watershed at any given time *N(t)* normalized by the total number of particles initially placed in the watershed N_∞ is the cumulative discharge hydrograph. The rate at which the labeled molecules come out can be found by the derivative as the Δt approaches to zero. Normalizing the derivative function we obtain the response function *U(t)* $[T^{-1}]$. The response function is called a unit hydrograph.

$$U(t) = \frac{dN/dt}{N_\infty} \Rightarrow U(t)\,dt = \frac{dN}{N_\infty}. \qquad \text{Also } \int_0^\infty U(t)dt = 1 \tag{5.7}$$

The watershed is further assumed to behave as a cascade of identical reservoirs with a constant mean residence time. The excess rainfall is applied only to the first reservoir. The cascade structure mimics the physical response delay observed in real hydrographs. The response function was initially derived for a single reservoir by introducing an instantaneous rainfall pulse and was extended to multi reservoir case.

Figure 5.1 is a schematic representing the watershed, the depth of precipitation excess I_0 *[L]* is the pulse input to the reservoir with surface area *A* $[L^2]$, *q(t)* is the rate of

output from the reservoir [LT^{-1}] and *z(t)* depth of water in the reservoir *[L]* at any instant of time. *U(t)* can be defined as the ratio of the depth of outflow at any given time to volume of inflow. For a pulse input *I(t)dt* is I_0, the initial input depth of excess precipitation.

By definition, *U(t)* is given by, $U(t) = \frac{q(t)}{I_0}$

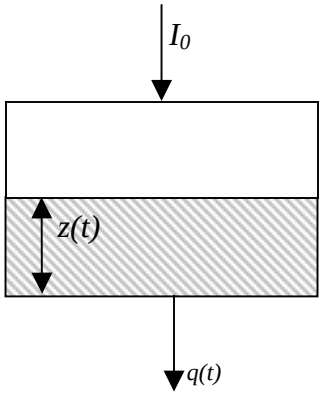

Figure 5.1. Schematic of input-output concepts.

The mean residence time ($\bar{t}$) is given by equation 5.8 below,

$$\bar{t} = \frac{\int_0^\infty tU(t)dt}{\int_0^\infty U(t)dt} = \frac{\int_0^\infty t\frac{q(t)dt}{I_0}}{\int_0^\infty \frac{q(t)dt}{I_0}} = \frac{\int_0^\infty tq(t)dt}{\int_0^\infty q(t)dt} = \frac{I_0}{q(t)}. \qquad (5.8)$$

$$\text{Also, } \bar{t} = \frac{\int_0^\infty tU(t)dt}{\int_0^\infty U(t)dt} = \int_0^\infty tU(t)dt, \text{ as } \int_0^\infty U(t)dt = 1. \qquad (5.9)$$

5.3.1 SINGLE RESERVOIR CASE

The volume balance for the reservoir shown in Figure 5.1 can be written as

$$A\frac{dz(t)}{dt} = AI(t) - Aq(t)\,. \tag{5.10}$$

For a pulse input, rate of change in *I, I(t) =0.*

$$\Rightarrow \frac{dz(t)}{dt} = -q(t) = -\frac{z(t)}{\bar{t}} \text{ [as } \bar{t} = \frac{I_0}{q(t)} = \frac{z(t)}{q(t)} \text{(for an instantaneous input } Io=z(t)\text{)]}$$

$$\frac{1}{z(t)}dz = -\frac{1}{\bar{t}}dt \ . \tag{5.11}$$

Integrating we have, $\int_{z_o}^{z(t)} \frac{1}{z(t)}dz = -\int_0^t \frac{1}{\bar{t}}dt$, ($z(t)=z_o$ @ $t=0$)

$$\Rightarrow \ z(t) = z_o \exp(-\frac{t}{\bar{t}})\,.$$

The instantaneous input I_0 is assumed to be equal to the depth of z_0

$$\Rightarrow \ z(t) = I_0 \exp(-\frac{t}{\bar{t}}) \text{ (Since, } I_0 = z_o). \tag{5.12}$$

Dividing both the sides of equation 5.12 by $\bar{t}$ we have,

$$\frac{z(t)}{\bar{t}} = \frac{I_0}{\bar{t}}\exp(\frac{-t}{\bar{t}}) \quad \Rightarrow \quad q(t) = \frac{I_0}{\bar{t}}\exp(\frac{-t}{\bar{t}})\,,$$

$$\Rightarrow \quad U(t) = \frac{q(t)}{I_0} = \frac{\frac{I_0}{\bar{t}}\exp(\frac{-t}{\bar{t}})}{I_0}\,, \tag{5.13}$$

$$\Rightarrow U(t) = \frac{1}{\bar{t}}\exp(\frac{-t}{\bar{t}})\,. \tag{5.14}$$

The discharge $Q(t)$ $[L^3T^{-1}]$ for the outflow hydrograph is given by

$$Q(t) = Aq(t) = A\frac{I_0}{\bar{t}}\exp(\frac{-t}{\bar{t}}) = AI_0U(t). \qquad (5.15)$$

Equation 5.15 represents an instantaneous unit hydrograph (IUH). By definition, a unit hydrograph is a linear and time-invariant system response function. Thus one should verify that the volume balance and the linearity are conserved,

$$\int_{-\infty}^{\infty} Q(t)dt = \int_{-\infty}^{\infty} AI_0\frac{1}{\bar{t}}\exp(\frac{-t}{\bar{t}}) = AI_0 \qquad \Rightarrow\text{(Volume balance is conserved).}$$

Linearity can be checked by determining if two rainfall charges applied simultaneously produces the same hydrograph as a single charge with twice the magnitude,

$$AI_0\frac{1}{\bar{t}}\exp(\frac{-t}{\bar{t}}) + AI_0\frac{1}{\bar{t}}\exp(\frac{-t}{\bar{t}}) = A(2I_0)\frac{1}{\bar{t}}\exp(\frac{-t}{\bar{t}}) \qquad \Rightarrow\text{(Linearity is preserved)}$$

5.3.1.1 CONTINUOUS RAINFALL AT CONSTANT RATE

Effect of continuous rainfall at constant rate is examined next. These continuous input functions can be used to extend the time base for practical application. Let the rate be *I(t)* so that $I_0=I(t)d\tau$. The incremental discharge function using this rate is given by

$$dQ(t)[\tau] = AI_0\frac{1}{\bar{t}}\exp(\frac{t-\tau}{\bar{t}})d\tau. \qquad (5.16)$$

Integrating we get the continuous rainfall discharge hydrograph,

$$Q(t) = \int_{t}^{0} -AI_0\frac{1}{\bar{t}}\exp(\frac{-\tau}{\bar{t}})d\tau = AI(t)[1-\exp(\frac{-t}{\bar{t}})]. \qquad (5.17)$$

Finite duration rainfall events can be modeled by convolution of equation 5.17 as

$$Q(t) = AI_0[\{1-\exp(\frac{-t}{\bar{t}})\} - \{1-\exp(\frac{t-t_d}{\bar{t}})\}], \text{ where } t_d \text{ is duration}\ldots\ldots(5.18)$$

Figure 5.2 is a plot of a single reservoir response, for a unit input and unit area. In figure 5.2 the instantaneous unit hydrograph produces runoff immediately upon application of rainfall. This behavior is contrary to practical experience but the unit hydrographs are only an approximation of reality. When we examine the continuous rainfall hydrograph the graph makes sense. Rainfall starts at time zero and there is no runoff, as rainfall continues runoff begins and the discharge increases over time until it reaches an asymptotic value. At the asymptote, the discharge should equal the volumetric input (product of area and rainfall rate). The elapsed time required to reach the asymptotic value is related to the residence time. The finite duration graph also makes sense and looks somewhat like the storm hydrograph with a rising limb, peak, and falling limb.

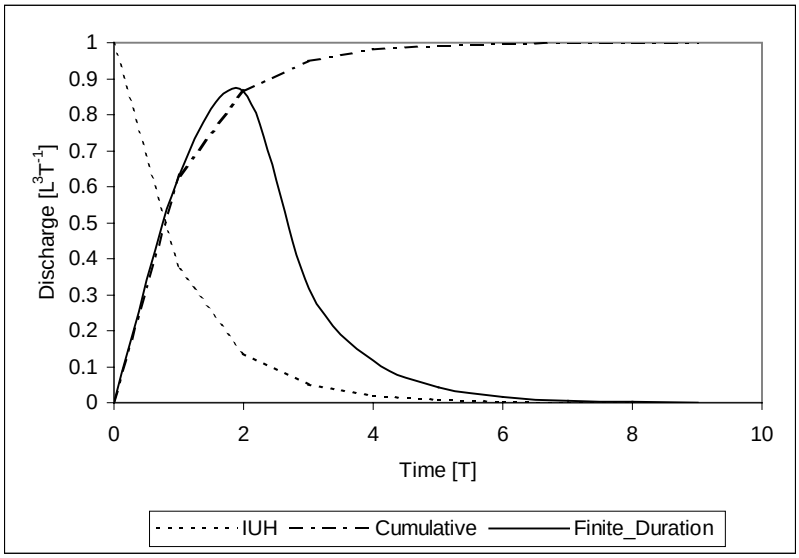

Figure 5.2:Instantaneous unit hydrograph (IUH), Cumulative (continuous rainfall) hydrograph and Finite duration rainfall hydrograph for a single reservoir case.

5.3.2 TWO-RESERVOIR CASE

The instantaneous unit hydrograph $Q_2(t)$, assuming a two-reservoir cascade is obtained as

$Q_2(t) = Q_1(t) * U_2(t)$, where * is the convolution operator. (5.19)

Laplace transforms were used to solve equation 5.19, assuming same $\bar{t}$ in all the reservoirs:

$$L\{Q_2(t)\} = L\{Q_1(t) * U_2(t)\}\}, \tag{5.20}$$

$$L\{Q_1(t)\} \bullet L\{U_2(t)\} = L\{AI_0 \frac{1}{\bar{t}} \exp(\frac{-t}{\bar{t}})\} \bullet L\{\frac{1}{\bar{t}} \exp(\frac{-t}{\bar{t}})\}. \tag{5.21}$$

Solving equation 5.21, the instantaneous unit hydrograph for two-reservoir case is,

$$Q_2(t) = AI_0 \frac{1}{\bar{t}^2} \frac{t \exp(\frac{-t}{\bar{t}})}{1!}. \tag{5.22}$$

Corresponding continuous rainfall discharge hydrograph is given by

$$Q(t) = AI_0[1 - \frac{t}{\bar{t}} \exp(-\frac{t}{\bar{t}}) - \exp(-\frac{t}{\bar{t}})]. \tag{5.23}$$

Figure 5.3 on the next page is the IUH for a two-reservoir case. The runoff is not immediately observed after the application of the rainfall unlike the single reservoir case where the runoff was observed immediately after the input of rainfall.

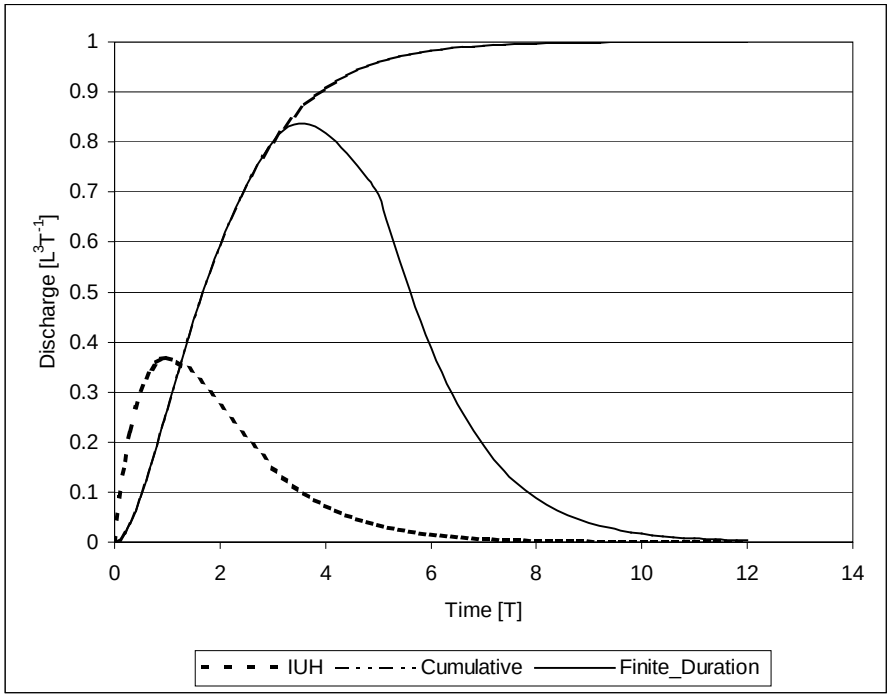

Figure 5.3: Instantaneous unit hydrograph (IUH), Cumulative (continuous rainfall) hydrograph and Finite duration rainfall hydrograph for a two-reservoir case.

5.3.3 N-RESERVOIR CASE

The instantaneous unit hydrograph for an n-reservoir case can be obtained as shown below:

$$Q_N(t) = ((((AI_0.U_1(t)) * U_2(t)) * U_3(t)) * .....U_N(t)),$$

$$Q_N(t) = AI_0 \frac{1}{\bar{t}^N} \frac{t^{N-1} \exp(\frac{-t}{\bar{t}})}{(N-1)!}, \qquad (5.24)$$

$$(\text{Since}, U_1(t) = U_{21}(t) = U_3(t) = ... = U_N(t) = U(t) = \frac{1}{\bar{t}} \exp(\frac{-t}{\bar{t}})). \qquad (5.25)$$

The general solution for the continuous input discharge hydrograph is given by Equation 5.26

$$Q(t) = \frac{AI_0}{(N-1)!}[(N-1)! - \exp^{\frac{-t}{\bar{t}}}\{\frac{1}{(-1)}(\frac{-t}{\bar{t}})^N - \frac{N}{(-1)^2}(\frac{-t}{\bar{t}})^{N-1} + \frac{N(N-1)}{(-1)^3}(\frac{-t}{\bar{t}})^{N-2} - ..... \pm \frac{N!}{(-1)^N}(\frac{-t}{\bar{t}})^{N-(N-1)}\}]$$

…….. (5.26)

Equation 5.26 for the continuous input is actually evaluated using the incomplete–gamma function P(n,t) (Press et. al., 1986) which is the integral of the incremental discharge function derived from the IUH,

$$Q_n(t) = \int_0^t AI_0 \frac{1}{\bar{t}^n} \frac{\tau^{n-1} \exp(\frac{-\tau}{\bar{t}})}{(n-1)!} d\tau = A \bullet P(n,t). \qquad (5.27)$$

Figure 5.4 is a plot of the IUH for different values of *N*. As the *N* value increased, the peak occurs at later times and the flows are spread over a greater time.

Figure 5.5 is a plot of the variation of $\bar{t}$ for an *N*-value of 3. For lower values of $\bar{t}$, the peak of the hydrograph is concentrated, but as $\bar{t}$ increases the peak is spreading and also the tail is asymptotic to the x-axis. By estimating $\bar{t}$ values for a watershed, direct runoff hydrographs for future rainfall patterns can be predicted.

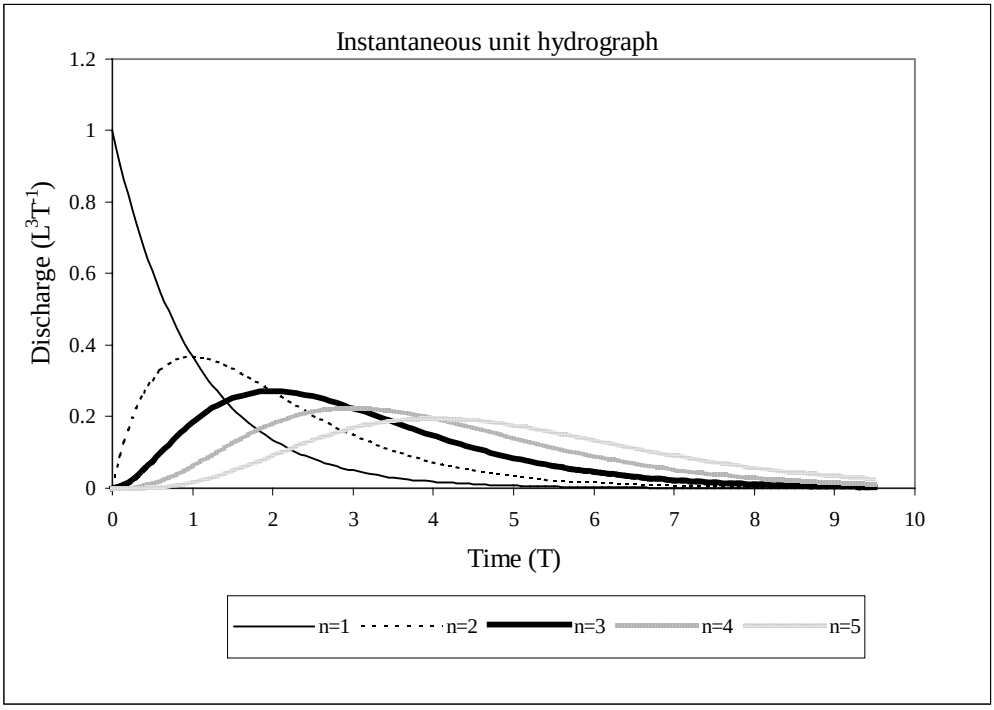

Figure 5.4. Plot of response functions, IUH's, for different values of N and $\bar{t}$ =1.

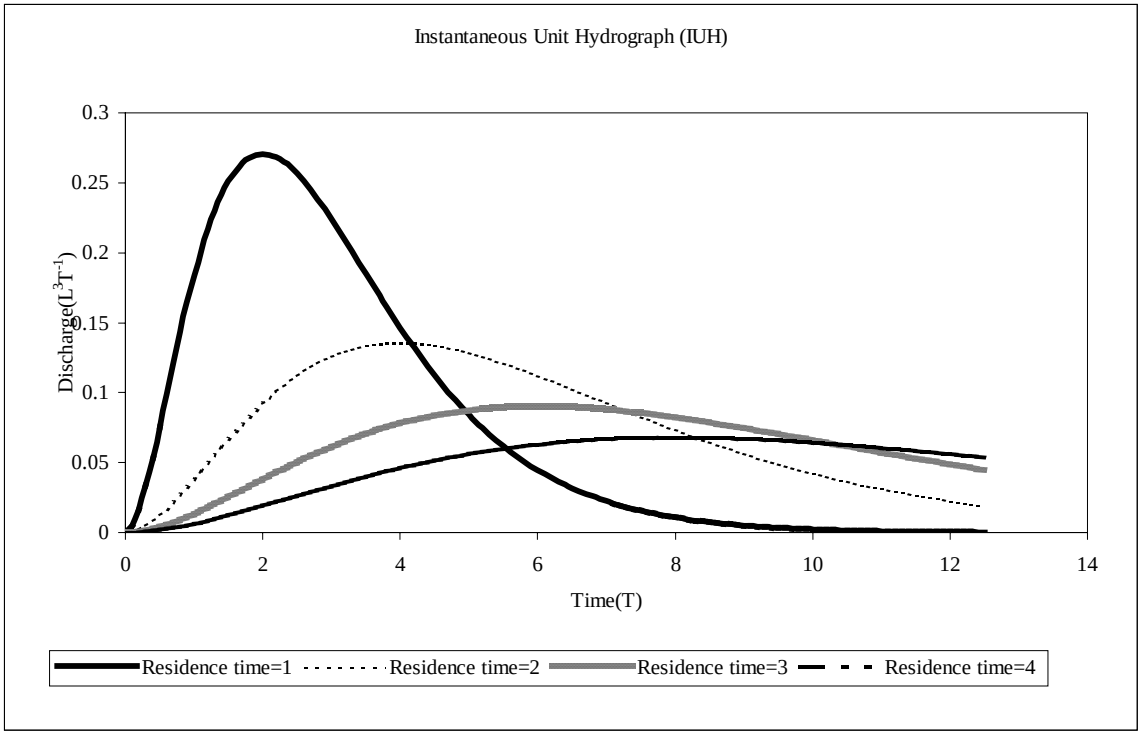

Figure 5.5. Plot of response functions for different values of $\bar{t}$ and constant N.

The modeled Instantaneous unit hydrograph was dependent on *N*, $\bar{t}$ (also noted as t-bar at some places). The IUH developed in the model does not take the translation effects into consideration. Introducing a parameter *t-lag* can incorporate the translation effect in the cascade model. The parameter *t-lag* shifts the time in IUH function from '*t*' to '(*t–t-lag)*'. Figure 5.6 represents the cascade model with the translation effects incorporated. A general equation for IUH was arrived at, including a general equation for continuous rainfall input.

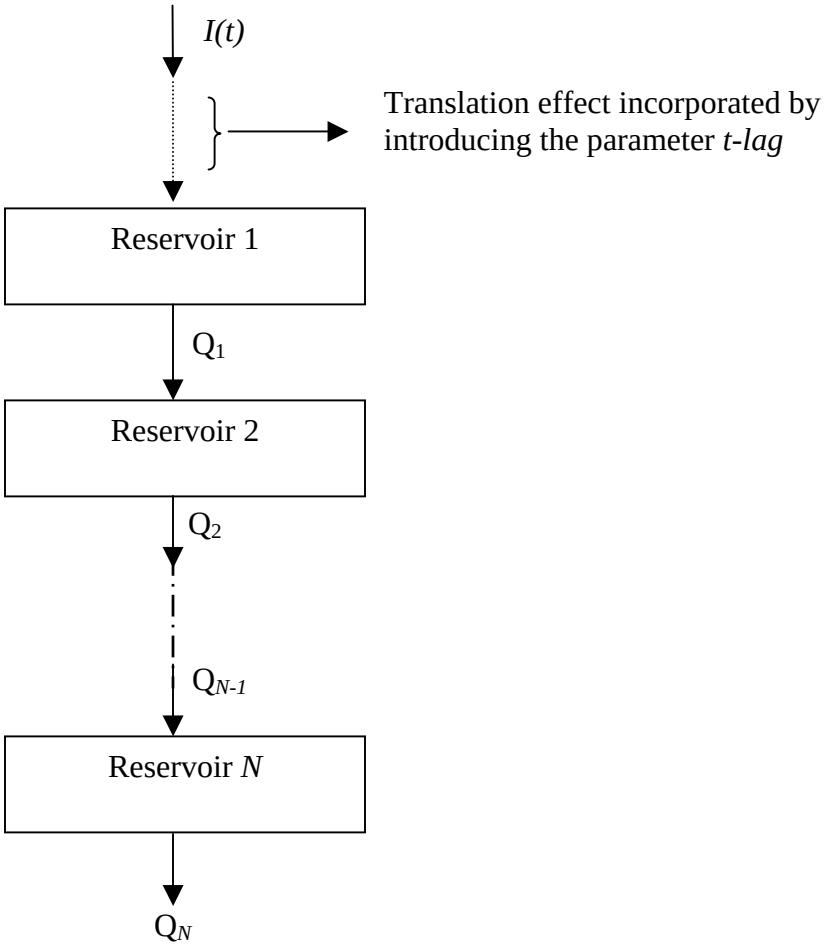

Figure 5.6. Routing the flow through the cascade of linear reservoirs considering translation effect.

5.4 CONVOLUTION

The IUH's obtained in the previous sections were used in constructing direct runoff hydrographs by convolving a sequence of rainfall inputs over time. Convolution is a procedure that is used to obtain the response from a series of reservoirs, given an input at the first reservoir. Convolution is superposition of a sequence of responses from a sequence of inputs each occurring at a different location in the time domain to produce a direct runoff hydrograph. Figure5.6 is a graphical representation of the convolution of the individual instantaneous unit hydrographs to obtain a unit hydrograph. Also, the instantaneous precipitation responsible for the observed IUH's is shown. The unit hydrograph is the same for each pulse, i.e., the parameters (*N,t-bar*) are constant. In this example the mean residence time was 5 and the reservoir number was 2. Thus if one has the hydrograph parameters, then one can construct any DRH from any rainfall sequence by applying the convolution operation.

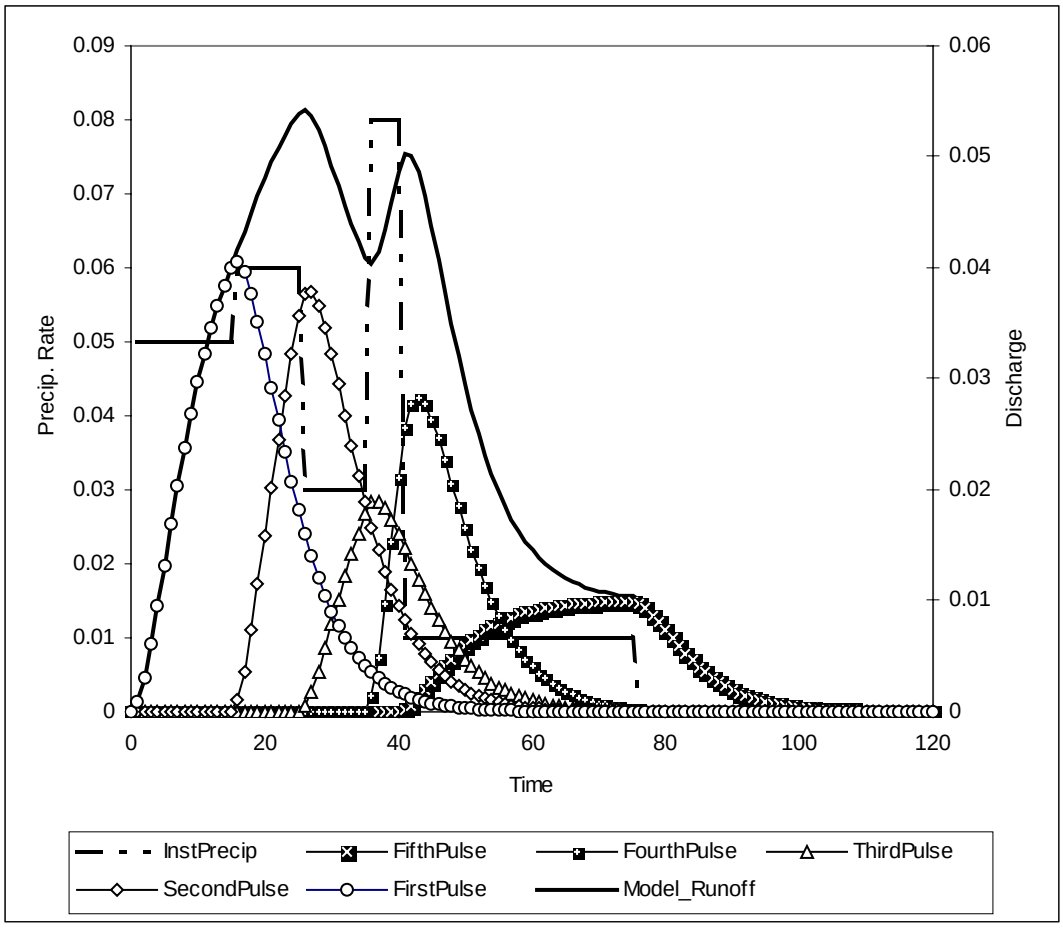

Figure 5.7. Convolution of unit hydrographs to obtain the direct runoff hydrograph.

The modeled hydrographs can be compared with the observed hydrographs for the gaged stations. The approach can be extended to ungaged stations by deriving the governing parameters from the watershed characteristics.

5.5 DECONVOLUTION

Deconvolution is the inverse of convolution process. Deconvolution determines the individual response characteristics from a convolved (the observed hydrograph) direct runoff hydrograph. The IUH parameters from the observed hydrograph and the observed hyetograph can be determined using the deconvolution process.

Numerical differentiation can be coupled with the deconvolution process to determine incremental rainfall rates from the cumulative rainfall data. Figure 5.7 is a sketch showing the incremental rate and the cumulative depth relationship.

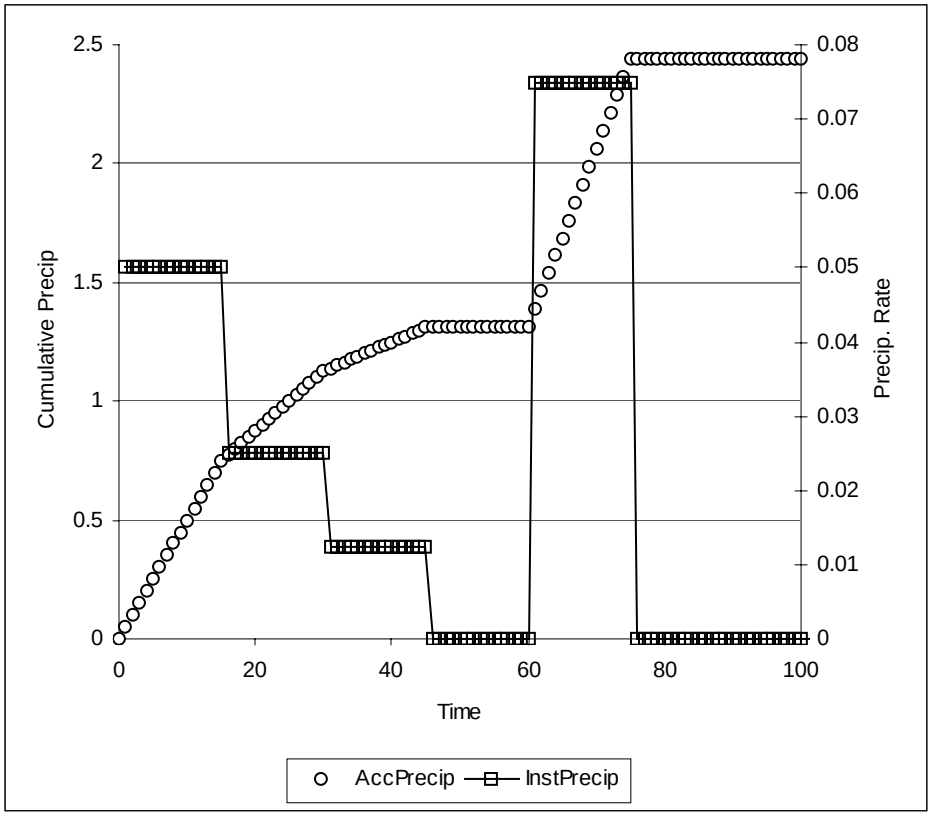

Figure 5.8. Cumulative Precipitation and Incremental Precipitation Relationship.

The cumulative rainfall distribution is the integral of the incremental rainfall distribution over the entire rainfall event. Equation 5.28 expresses this relationship.

$$P(t) = \int_{-\infty}^{\infty} p(t)dt \qquad (5.28)$$

In the present work a simple first-order, forward differencing scheme is used to obtain the precipitation rate from the cumulative precipitation *P(t).*

$$p(t) \approx \frac{P(t+\Delta t) - P(t)}{\Delta t} \qquad (5.29)$$

The time-step length used in the research was one-minute intervals. This time length was chosen because it is the smallest increment that can be represented in the current DATE_TIME format in the database. Linear interpolation was used to convert the cumulative precipitation into one-minute intervals, and then the numerical differentiation is performed to obtain the rainfall rates. The typical units were inches per minute.

5.6 PREPARING THE DATA

Initial estimates of the hydrograph characteristics are made by graphical analysis of selected data sets in each watershed. Because the watershed characteristics are supposed to be invariant, only one event pair needs to be analyzed to get initial estimates of the *t-lag*, and the mean residence time. Figure 5.8 is a plot of rainfall and runoff for a particular event at a particular station. The vertical axes are in inches of depth, the left axis is the runoff depth, and the right axis is the rainfall depth. The step function appearance is an artifact of the linear interpolation scheme used to represent the data on one-minute intervals. The transit lag time initial estimate is the time between the arrival

of the peak rainfall and the peak runoff. The mean residence time initial estimate is the time between the first 1% of cumulative flow (start of runoff) and the time to peak flow.

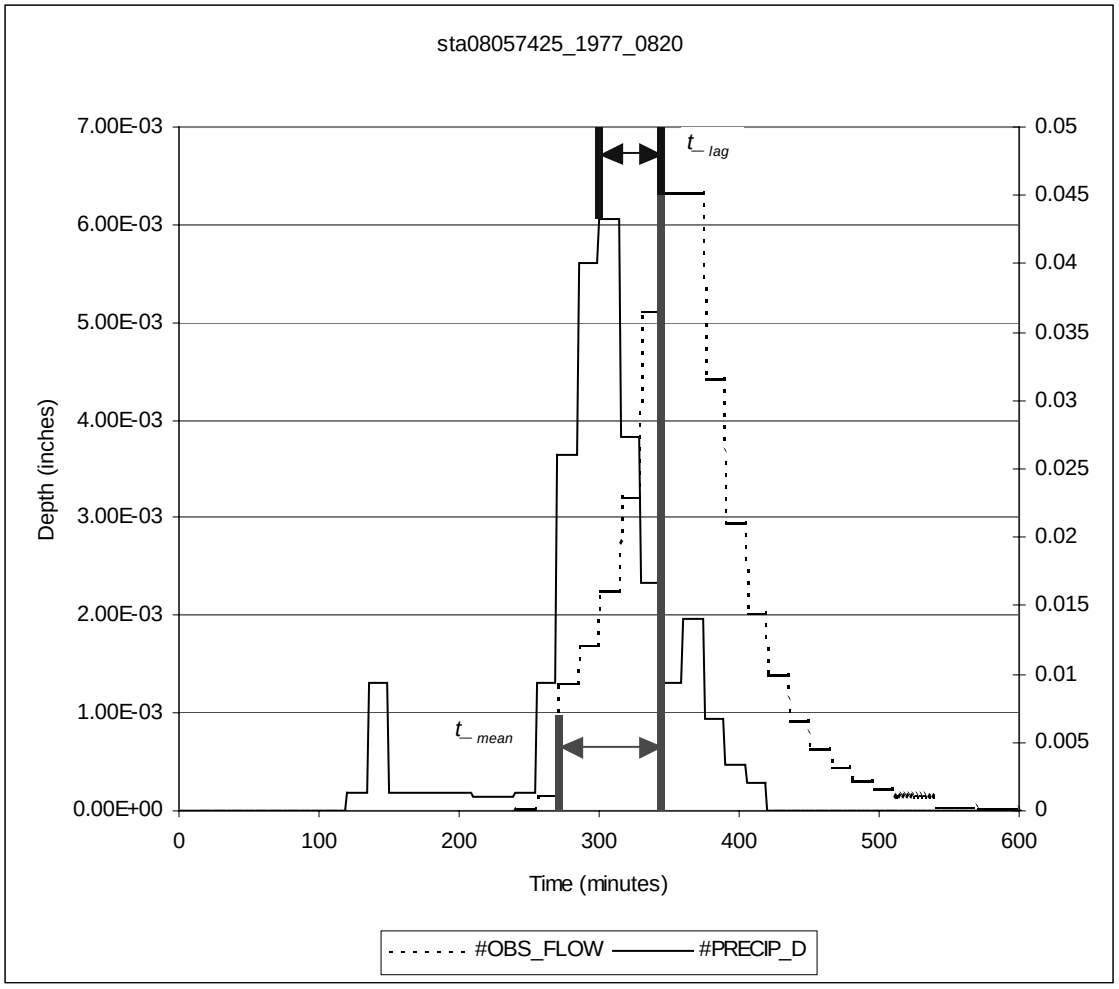

Figure 5.9. Initial parameter estimations using the graphical observation.

For hydrographs with multiple peaks the time to 50% runoff was used as the initial estimate of mean residence time. The model parameters were estimated for each storm event by using a form of grid search, which used the initial estimates of the parameters obtained.

5.6.1 GRID SEARCH METHOD

The modeled runoff (Q_{MOD}) is dependent on the precipitation *I(t)* and the three parameters *N*, *t-bar* and *t-lag*.

Mathematically Q_{MOD} can be expressed as

Q_{MOD}=*Func (t-bar, t-lag, N, I(t)).*

Each of the parameters of the model was defined as follows:

$N \in [N_{high}, N_{low}]$,

$t\text{-}bar \in [t\text{-}bar_{high}, t\text{-}bar_{low}]$,

$t\text{-}lag \in [t\text{-}lag_{high}, t\text{-}lag_{low}]$.

For each of the combinations of the three parameters, the sum of squared error (SSE) has been calculated between the observed and the model flow as

$$\sum_{i=1}^{NUMOBS} (Q_{MOD} - Q_{OBS}) = SSE ,$$

where, Q_{OBS} is the observed flow.

The combination with the smallest SSE is reported as the parameters defining the flow for the given storm event. Q_{MOD}, the modeled flow has been obtained using the estimated model parameters.

The model has been used to obtain the hydrographs using the parameters estimated. Figures 5.9 through 5.11 are the plots with the observed and modeled hydrographs. The model parameters were obtained for each module and were tabulated. Tables A.1 through A.5 in Appendix A gives a list of parameters for each recorded rainfall-runoff event with the station number and the watershed name.

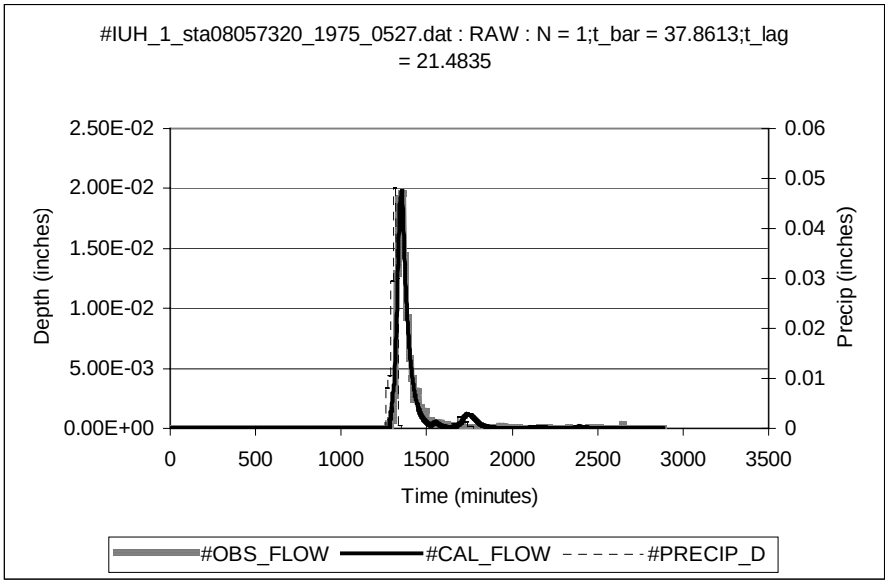

Figure 5.10 . Observed and Modeled hydrographs for a typical station.

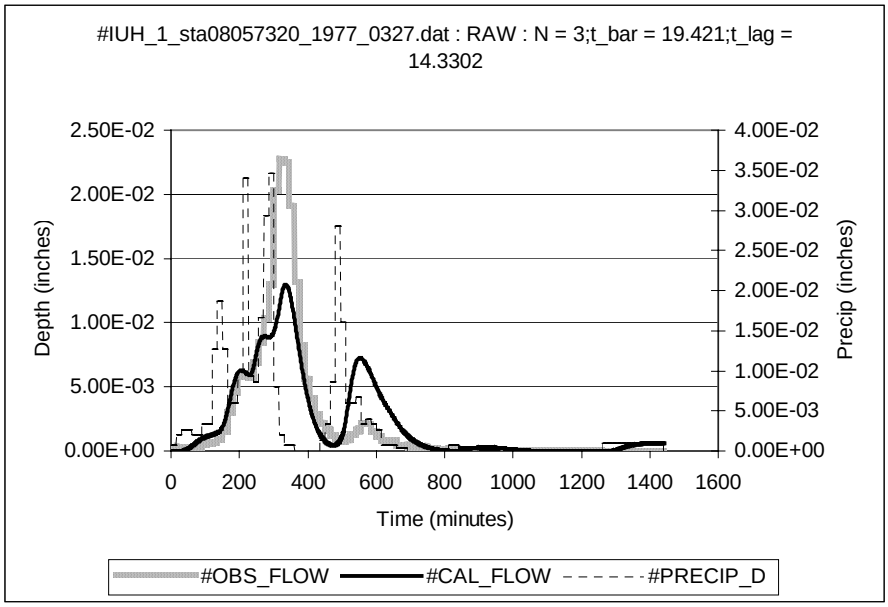

Figure 5.11 . Observed and Modeled hydrographs for a typical station.

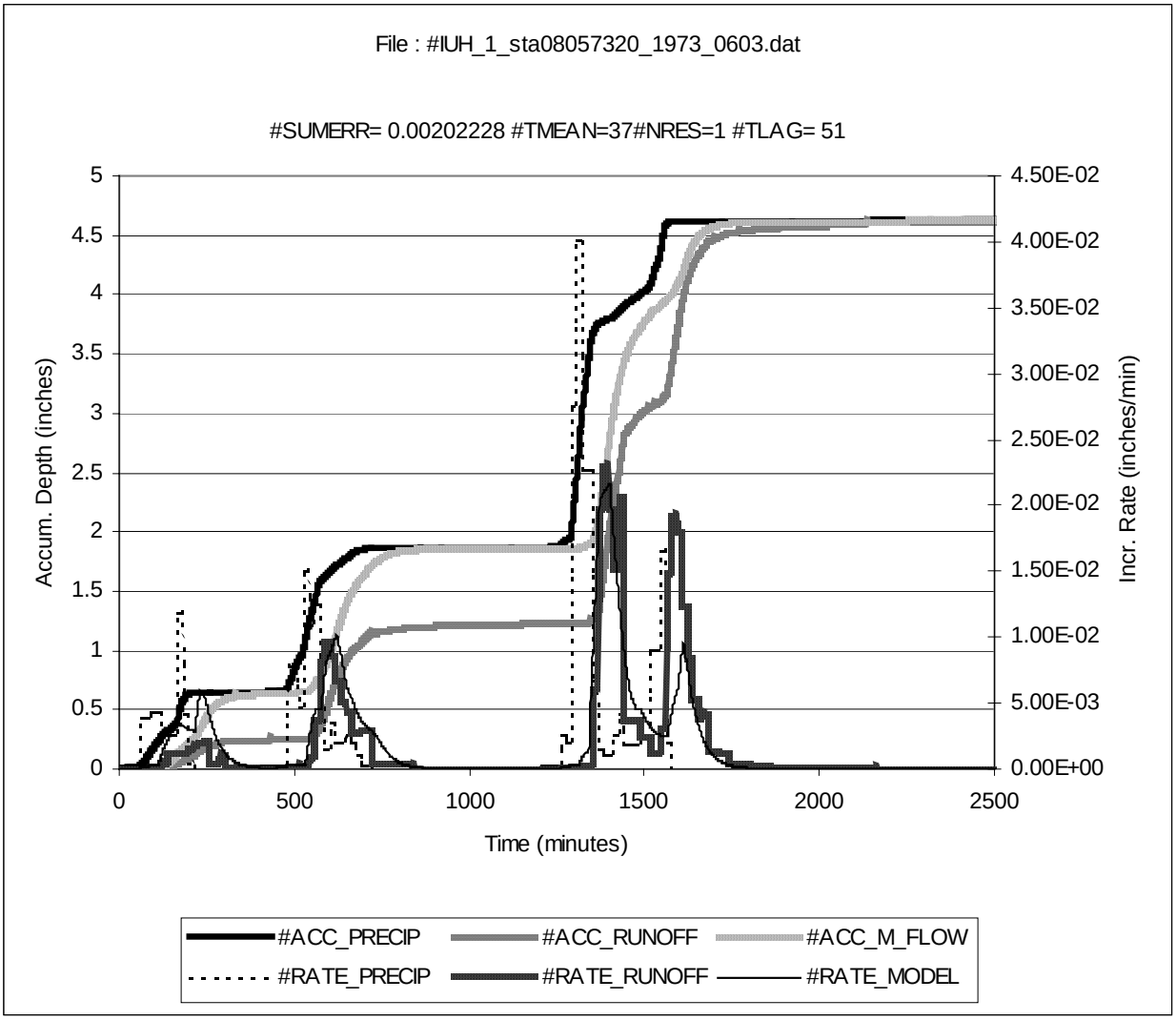

Figure 5.12. Observed and Modeled runoff rates and Accumulated runoff, Observed precipitation and precipitation rate.

CHAPTER 6

RESULTS ANALYSIS

Instantaneous unit hydrographs are estimated as a function of the parameters *N*, *t-bar* and *t-lag*. These parameters were analyzed for their dependencies on the location. Each station of every module has different parameters for each storm event. Statistical analysis was done to determine the extent of variation in the parameters.

6.1 DATA STRUCTURE

The whole data is divided into five modules (Austin, Dallas, San Antonio, Fort Worth, SmallRuralSheds). Each module has a number of watersheds designated by a station number. The storm events recorded are associated with their respective station name. The hydrographs observed for each storm event were modeled as explained in chapter 4. It can be noted that each modeled hydrograph is dependent on three parameters (*N, t_bar, t_lag*). The parameters showed some variations within and between the modules. The extent of variations is determined using statistics.

6.2 DATA ANALYSIS

The purpose of the results analysis is to find if the parameters are location specific. The analysis is focused towards comparison of data among several groups. In the present case the data analysis is divided into two parts. The first is the analysis between the stations within a module. This analysis was done for all the five modules.

The second part is the analysis between the different modules, which is dependent on the outcome of the analysis of the first part.

For comparisons among several groups of data two statistical analysis methods are generally used. Analysis of variance, a parametric test, which makes comparisons between more than two groups of data and the Kruskal-Wallis test, a nonparametric method more appropriate for the frequent situations where data do not follow a normal distribution.

The distribution of the current data in hand is not known and therefore a non-parametric test is selected. In order to compare between more than two groups of data, the Kruskal-Wallis test, a nonparametric test is generally used as opposed to ANOVA for the distribution of data is unknown. The Kruskal-Wallis test is a nonparametric one-way analysis of variance (ANOVA) test. The test returns the p-values for the null hypothesis that the medians of the groups are equal. A small p-value nearing zero implies that the data sets are likely to be different from each other, and the difference is not explainable by those values. Also, the means, medians and standard deviations were reported for each parameter at every station for all the modules.

6.3 ANALYSIS BETWEEN STATIONS

In this section the analysis is focused on the variation of governing parameters between the stations of a module under consideration. Analysis between the modules is dependent on the results of the analysis between the stations. If there is not much variation of the parameters between the stations in all the modules, the analysis can be

extended to the module level. The stations within a module are analyzed using the Kruskal-Wallis test as explained in the following section.

6.3.1 KRUSKAL-WALLIS TEST

The data is subjected to Kruskal-Wallis test and inferences are made from the p-value obtained. As mentioned earlier Kruskal-Wallis test returns a p-value for the null hypothesis that the medians of the groups are equal. Prior to the analysis it was observed that some stations did not have enough number of events for comparison. Stations having less than three entries were eliminated before performing the test. Table 6.1 gives a list of stations that have been eliminated for analysis due to insufficient number of events. It can be observed that all the stations are from the Austin module.

Table 6.1. Stations eliminated for analysis.

MODULE	Station number	Number of data entries
Austin	sta8158820	2
Austin	sta8158820	2
Austin	sta8158380	2
Austin	sta8158800	2
Austin	sta8158860	2

As a preliminary analysis, the means, medians and standard deviations were estimated for each station and these values are tabulated in Table 6.2. From the estimated means and medians it was observed that the data was represented more by the medians

rather than the means. So, it was more appropriate to compare the medians in the analysis.

The data was subjected to Kruskal-Wallis test. Matlab 6.1 was used to perform the Kruskal-Wallis test among the stations in a given module and between the modules. The p-values obtained from the test were tabulated in Table 6.2. The p-values indicate the existing differences among the different stations within each module.

Table 6.2. Means, medians and Kruskal-Wallis test probability (p-value).

Parameter Analyzed	**Mean**	**Median**	**Standard Deviation**	**Kruskal-Wallis probability**
Module : Austin				
N (Shape factor or reservoir number)	1.0854	1	0.4349	0.0243
t-bar	157.4523	79	258.1983	0
t-lag	64.8995	38	76.7352	0
Module : Dallas				
N (Shape factor or reservoir number)	1.2667	1	3.2963	0.5615
t-bar	98.0667	52.5	110.3941	0
t-lag	65.7708	43	74.3542	0
Module : Fort Worth				
N (Shape factor or reservoir number)	1.3264	1	1.8292	0.6577
t-bar	107.6839	66	119.7842	0
t-lag	33.9896	17	43.2915	0
Module : San Antonio				
N (Shape factor or reservoir number)	1.3768	1	1.0941	0.0359
t-bar	84.744	45	128.6344	4.02E-14
t-lag	61.9469	33	88.6778	0
Module : Small Rural Sheds				
N (Shape factor or reservoir number)	1.1443	1	0.877	0.4139
t-bar	305.8456	160	393.2034	0
t-lag	115.854	61	163.4453	0

The p-values from Table 6.1 can be used to understand the variation of the parameters between the stations. A p-value closer to zero indicates a significant difference between the groups considered. As expected there was no much variation in the parameter *N*, the shape factor, between the stations. Most of the values of parameter *N*, were between numbers 1 and 3, but occasionally there were values greater than 3.

Kruskal-Wallis test was then applied on *t-bar* and *t-lag* among the stations in each module. It can be seen from Table 6.2 that the p-value obtained was zero for all the modules for both *t-bar* and *t-lag*. From the values of 'p' it can be concluded that there is a significant variation of *t-bar* and *t-lag* between the stations in all the modules. The reasons for the variation observed may be due to the deviant behavior of one or more stations influencing the module as a whole. So, from the results of Kruskal-Wallis test it can be concluded that there is a significant difference between the station with respect to *t-bar* and *t-lag* but the test fails to identify the reasons for the observed differences between the stations.

In the present case it is not the intent to know if the stations differ with respect to the given parameter, but to know which of the stations differ from others. Further analysis in these lines can be done using multiple comparison tests.

6.3.2 MULTIPLE COMPARISON TEST

Multiple comparison tests compare all possible pairs of station medians and are performed only after the null hypothesis " all medians identical" has been rejected. In the present analysis for the parameters *t-bar* and *t-lag* the null hypothesis has been rejected.

Knowing the existing difference between the stations it is the intent to find which station differs from which other station. A multi comparison test was performed for all the modules. Matlab 6.1 has been used to perform the multi comparison test and the results were tabulated for each module. A statistical test method and a significance level, alpha, has to be chosen to compare the multi compare analysis between the stations in a given module.

In the present situation since the distribution of the parameter within a given station is not known, a non-parametric statistical test needs to be chosen. As in earlier case kruskal-wallis test has been chosen to compare the pairs of stations and a significance level, α of 0.05 has been chosen to perform the multi compare test. The results disclosed the possible stations that can be different from a given station of interest.

The results obtained from the multi compare tests has been used to prepare tables showing all possible stations different from each stations. The tables were prepared for all the five modules analyzed. The tables prepared were specific to each module and contains the stations with more than two recorded events of rainfall. Also in the tables a column showing the number of stations significantly different from the given stations is included.

Tables 6.3 through 6.12 in the following pages are the results of multi compare tests that have been done on the data sets. For each module two different tables one each for *t-bar* and *t-lag* were provided. Multi compare tests are not done for the parameter *N*, the shape factor as it was already determined that there was not much variation of *N* between the stations in any of the modules. In the following tables, '**' means 'significantly different at a significance level of 0.05' and a blank space denotes no

difference between the stations compared. The tables below can be used to understand the variations of the parameters between the stations.

From the analysis results it is evident that there are differences in the variation of parameters within a module. This eliminates the analysis between the modules. The table can be used to analyze the stations as clusters in the future analysis. It can be understood from the data analysis that a single IUH for Texas is a possibility by incorporating the geographic location corrections.

Table 6.3. Multi Comparison Test results for Austin *t-bar*.

Entry			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Station Number	Number of stations different	sta8155200	sta8155300	sta8158810	sta8158050	sta8158880	sta8154700	sta8158700	sta8156650	sta8156700	sta8156750	sta8156800	sta8158840	sta8157000	sta8157500	sta8158100	sta8158200	sta8158400	sta8158500	sta8158600	sta8155550	sta8159150	sta8158920	sta8158930	sta8158970
1	sta8155200	5									**	**			**	**			**							
2	sta8155300	5									**				**	**			**							
3	sta8158810	0																								
4	sta8158050	0																								
5	sta8158880	2							**												**					
6	sta8154700	2													**	**										
7	sta8158700	9					**			**	**	**	**		**	**			**			**				
8	sta8156650	2							**												**					
9	sta8156700	7	**	**					**								**	**			**					**
10	sta8156750	5	**	**					**												**					**
11	sta8156800	2							**												**					
12	sta8158840	2													**	**										
13	sta8157000	11	**	**				**	**					**			**	**			**		**		**	**
14	sta8157500	11	**	**				**	**					**			**	**			**		**		**	**
15	sta8158100	4									**				**	**			**							
16	sta8158200	4									**					**	**		**							
17	sta8158400	7	**	**					**								**	**			**					**
18	sta8158500	0																								
19	sta8158600	9					**			**	**	**	**		**	**			**			**				
20	sta8155550	2							**												**					
21	sta8159150	2													**	**										
22	sta8158920	0																								
23	sta8158930	2													**	**										
24	sta8158970	5									**	**			**	**			**							

Table 6.4. Multi Comparison Test results for Austin *t-lag*.

Entry			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
	Station Number	Number of stations different	sta8155200	sta8155300	sta8158810	sta8158050	sta8158880	sta8154700	sta8158700	sta8156650	sta8156700	sta8156750	sta8156800	sta8158840	sta8157000	sta8157500	sta8158100	sta8158200	sta8158400	sta8158500	sta8158600	sta8155550	sta8159150	sta8158920	sta8158930	sta8158970
1	sta8155200	0																								
2	sta8155300	8								**	**	**			**	**			**			**		**		
3	sta8158810	1														**										
4	sta8158050	1														**										
5	sta8158880	1																								**
6	sta8154700	0																								
7	sta8158700	0																								
8	sta8156650	6		**									**								**		**		**	**
9	sta8156700	6		**									**								**		**		**	**
10	sta8156750	4		**																	**		**			**
11	sta8156800	3								**	**					**										
12	sta8158840	0																								
13	sta8157000	5		**																	**		**		**	**
14	sta8157500	10		**	**	**							**				**	**			**		**		**	**
15	sta8158100	1														**										
16	sta8158200	1														**										
17	sta8158400	4		**																	**		**			**
18	sta8158500	0																								
19	sta8158600	8								**	**	**			**	**			**			**		**		
20	sta8155550	3		**																	**					**
21	sta8159150	7								**	**	**			**	**			**					**		
22	sta8158920	4		**																	**		**			**
23	sta8158930	4								**	**				**	**										
24	sta8158970	9					**			**	**	**			**	**			**			**		**		

Table 6.5. Multi Comparison Test results for Dallas *t-bar*.

Entry			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Station Number	Number of stations different	sta8057320	sta8055700	sta8057050	sta8057020	sta8057140	sta8061620	sta8057415	sta8057418	sta8057420	sta8057160	sta8055580	sta8055600	sta8057435	sta8057445	sta8057130	sta8061920	sta8061950	sta8057120	sta8056500	sta8057440	sta8057425
1	sta8057320	1																	**				
2	sta8055700	2							**										**				
3	sta8057050	3														**		**	**				
4	sta8057020	3														**		**	**				
5	sta8057140	0																					
6	sta8061620	2							**				**										
7	sta8057415	5		**					**						**			**	**				
8	sta8057418	0																					
9	sta8057420	1																	**				
10	sta8057160	2														**			**				
11	sta8055580	4						**								**		**	**				
12	sta8055600	1																	**				
13	sta8057435	0																					
14	sta8057445	7			**	**			**			**	**								**		**
15	sta8057130	1																	**				
16	sta8061920	5			**	**			**				**								**		
17	sta8061950	13	**	**	**	**			**		**	**	**	**			**				**	**	**
18	sta8057120	0																					
19	sta8056500	3														**		**	**				
20	sta8057440	1																	**				
21	sta8057425	2														**			**				

Table 6.6.Multi Comparison Test results for Dallas *t-lag*.

Entry			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	Station Number	Number of stations different	sta8057320	sta8055700	sta8057050	sta8057020	sta8057140	sta8061620	sta8057415	sta8057418	sta8057420	sta8057160	sta8055580	sta8055600	sta8057435	sta8057445	sta8057130	sta8061920	sta8061950	sta8057120	sta8056500	sta8057440	sta8057425
1	sta8057320	1																	**				
2	sta8055700	3							**				**						**				
3	sta8057050	0																					
4	sta8057020	1																	**				
5	sta8057140	1																	**				
6	sta8061620	1																	**				
7	sta8057415	5		**												**		**	**			**	
8	sta8057418	1																	**				
9	sta8057420	1																	**				
10	sta8057160	1																	**				
11	sta8055580	5		**												**		**	**			**	
12	sta8055600	1																	**				
13	sta8057435	0																					
14	sta8057445	2							**				**										
15	sta8057130	2																**	**				
16	sta8061920	4							**				**				**				**		
17	sta8061950	14	**			**	**	**	**	**	**	**	**	**			**				**	**	**	**
18	sta8057120	0																					
19	sta8056500	2																**	**				
20	sta8057440	2							**				**										
21	sta8057425	1																	**				

Table 6.7. Multi Comparison Test results for Fort Worth *t-bar*.

Entry			1	2	3	4	5	6	7	8
	Station Number	Number of stations different	sta8048550	sta8048600	sta8048820	sta8048850	sta8048520	sta8048530	sta8048530	staSSSC
1	sta8048550	4			**	**	**			**
2	sta8048600	3						**	**	**
3	sta8048820	4	**					**	**	**
4	sta8048850	4	**					**	**	**
5	sta8048520	4	**					**	**	**
6	sta8048530	4		**	**	**	**			
7	sta8048530	4		**	**	**	**			
8	staSSSC	5	**	**	**	**	**			

Table 6.8. Multi Comparison Test results for Fort Worth *t-lag*.

Entry			1	2	3	4	5	6	7	8
	Station Number	Number of stations different	sta8048550	sta8048600	sta8048820	sta8048850	sta8048520	sta8048530	sta8048530	staSSSC
1	sta8048550	3						**	**	**
2	sta8048600	3				**		**		**
3	sta8048820	3						**	**	**
4	sta8048850	4		**				**	**	**
5	sta8048520	3						**	**	**
6	sta8048530	5	**	**	**	**	**			
7	sta8048530	4	**		**	**	**			
8	staSSSC	5	**	**	**	**	**			

Table 6.9. Multi Comparison Test results for San Antonio *t-bar*.

Entry															
	Station Number	Number of stations different	sta8178300	sta8181000	sta8181400	sta8181450	sta8177600	sta8177700	sta8178555	sta8178600	sta8178620	sta8178640	sta8178645	sta8178690	sta8178736
1	sta8178300	3			**	**		**							
2	sta8181000	0													
3	sta8181400	4	**							**		**		**	
4	sta8181450	3	**									**		**	
5	sta8177600	1						**							
6	sta8177700	6	**				**			**		**		**	**
7	sta8178555	2										**		**	
8	sta8178600	2			**			**							
9	sta8178620	0													
10	sta8178640	4			**	**		**	**						
11	sta8178645	0													
12	sta8178690	4			**	**		**	**						
13	sta8178736	1						**							

Table 6.10. Multi Comparison Test results for San Antonio *t-lag*.

Entry			1	2	3	4	5	6	7	8	9	10	11	12	13
	Station Number	Number of stations different	sta8178300	sta8181000	sta8181400	sta8181450	sta8177600	sta8177700	sta8178555	sta8178600	sta8178620	sta8178640	sta8178645	sta8178690	sta8178736
1	sta8178300	7			**	**		**	**	**		**	**		
2	sta8181000	1												**	
3	sta8181400	3	**											**	**
4	sta8181450	3	**											**	**
5	sta8177600	0													
6	sta8177700	3	**											**	**
7	sta8178555	3	**											**	**
8	sta8178600	3	**											**	**
9	sta8178620	1												**	
10	sta8178640	3	**											**	**
11	sta8178645	3	**											**	**
12	sta8178690	9		**	**	**		**	**	**	**	**	**		
13	sta8178736	7				**	**	**	**	**		**	**		

Table 6.11. Multi Comparison Test results for Small rural sheds *t-bar*.

Entry			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Station Number	Number of stations different	sta8096800	sta8094000	sta8098300	sta8108200	sta8139000	sta8140000	sta8136900	sta8137000	sta8137500	sta8182400	sta8187000	sta8187900	sta8050200	sta8057500	sta8058000	sta8052630	sta8052700	sta8042650	sta8042700	sta8063200
1	sta8096800	6			**	**			**										**		**	**
2	sta8094000	5			**	**			**										**			**
3	sta8098300	10	**	**			**					**	**		**	**	**	**		**		
4	sta8108200	10	**	**			**					**	**		**	**	**	**		**		
5	sta8139000	6			**	**			**										**		**	**
6	sta8140000	3											**				**		**			
7	sta8136900	6	**	**			**						**			**	**					
8	sta8137000	3											**						**			**
9	sta8137500	0																				
10	sta8182400	4			**	**													**			**
11	sta8187000	8			**	**		**	**	**									**		**	**
12	sta8187900	1																	**			
13	sta8050200	4			**	**													**			**
14	sta8057500	6			**	**			**										**		**	**
15	sta8058000	7			**	**		**	**										**		**	**
16	sta8052630	4			**	**													**			**
17	sta8052700	14	**	**			**	**		**		**	**	**	**	**	**	**	**	**	**	
18	sta8042650	4			**	**													**			**
19	sta8042700	6	**				**						**			**	**		**			
20	sta8063200	11	**	**			**			**		**	**		**	**	**	**		**		**

Table 6.12. Multi Comparison Test results for Small rural sheds *t-lag*.

Entry			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	Station Number	Number of stations different	sta8096800	sta8094000	sta8098300	sta8108200	sta8139000	sta8140000	sta8136900	sta8137000	sta8137500	sta8182400	sta8187000	sta8187900	sta8050200	sta8057500	sta8058000	sta8052630	sta8052700	sta8042650	sta8042700	sta8063200
1	sta8096800	6				**			**	**									**		**	**
2	sta8094000	1														**						
3	sta8098300	1														**						
4	sta8108200	4	**												**	**	**					
5	sta8139000	2																	**			**
6	sta8140000	3																	**		**	**
7	sta8136900	4	**												**	**	**					
8	sta8137000	2	**													**						
9	sta8137500	0														**						
10	sta8182400	1														**						
11	sta8187000	3																	**		**	**
12	sta8187900	2																	**			**
13	sta8050200	5				**			**										**		**	**
14	sta8057500	9		**	**	**			**	**		**							**		**	**
15	sta8058000	5				**			**										**		**	**
16	sta8052630	1																	**			
17	sta8052700	9	**				**	**					**	**	**	**	**	**				
18	sta8042650	0																				
19	sta8042700	6	**					**					**		**	**	**					
20	sta8063200	8	**				**	**					**	**	**	**	**					

RESULTS AND CONCLUSIONS

CHAPTER 7

7.1 RESULTS

Small watersheds of central Texas have been analyzed for the applicability of the best suitable unit hydrograph method. The objectives proposed in the introduction chapter were achieved. The existing methods used by TxDOT for deriving a hydrograph from given rainfall were analyzed. Also, unit hydrograph methods currently being used by the TxDOT were examined. All the methods currently used by TxDOT were documented with a supporting literature review quoting the references as necessary.

The data obtained by USGS in hand written and typeset tables have been rechecked for the calculations of direct runoff values. The data has been digitized and a database was developed with different modules indicating the rainfall and runoff observed at different stations during the period of study. The database has the data in a consistent format.

Instantaneous unit hydrographs were developed for all the small watersheds of central Texas. A model is derived for the development of unit hydrographs for the observed rainfall and runoff over the watersheds. The model was applied for the whole of Central Texas and the model parameters were obtained. The model parameters given in Chapter 5 can be used to develop the Instantaneous Unit Hydrographs.

The model parameters showed a variation within the modules. Analysis showed that a given parameter showed a significant variation within a module when considered as a whole. There was no variation observed for the parameter *N*, the shape factor. Significant variations were observed for the other two parameters *t-bar* and *t-lag* between the stations. Multi

comparison analysis resulted in the stations in groups with a similar variation in the parameter with respect to a given station. The differences between the stations within the modules eliminated the analysis between the modules.

7.2 CONCLUSIONS

The consistent format of the data in the database can be readily used in any further study in Central Texas. Because all the data has been digitized into a database with a standard format it can be used in any computer program with less effort.

Unit hydrograph study has been done for the first time on the data that has been collected by the USGS over a period of approximately 20 years. Instantaneous unit hydrographs developed can be used for the future analysis in the same lines. The model parameters can be used to analyze the watersheds with similar properties. The model parameters obtained from the watershed showed a variation between the watersheds. Watershed and station have been used interchangeably in this thesis. Model parameters appear to be location specific indicating that a single unified hydrograph for central Texas cannot be inferred.

7.3 FUTURE WORK

The model parameters estimated can be related to the physical properties of the watersheds and can be checked for possible interrelationships. The relationship between the parameters and the physical properties can be used in extending the model to ungaged watersheds after verifying the gaged watersheds. Regional correlations are expected to allow a single discharge function to be parameterized by location for hydrograph analysis.

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APPENDIX.A

Table A.1. MODEL PARAMETERS FOR AUSTIN MODULE

Entry	Module	Watershed	Station name	StormName	SumSqErr	T_bar (min)	N_Res	T_lag (min)
1	Austin	BartonCreek	sta08155200	IUH_2_sta08155200_1978_0606	6.70E-06	147	5	1
2	Austin	BartonCreek	sta08155200	IUH_2_sta08155200_1979_0320	1.25E-04	487	1	268
3	Austin	BartonCreek	sta08155200	IUH_2_sta08155200_1980_0508	1.02E-05	2092	1	1
4	Austin	BartonCreek	sta08155200	IUH_2_sta08155200_1981_0303	9.91E-05	378	1	251
5	Austin	BartonCreek	sta08155200	IUH_2_sta08155200_1982_0513	3.21E-04	271	1	206
6	Austin	BartonCreek	sta08155200	IUH_2_sta08155200_1979_0521	8.45E-05	334	1	264
7	Austin	BartonCreek	sta08155300	IUH_2_sta08155300_1979_0320	9.94E-05	1061	1	534
8	Austin	BartonCreek	sta08155300	IUH_2_sta08155300_1979_0521	9.69E-05	1091	1	1
9	Austin	BartonCreek	sta08155300	IUH_2_sta08155300_1980_0508	4.92E-06	2330	1	217
10	Austin	BartonCreek	sta08155300	IUH_2_sta08155300_1982_0513	1.84E-04	344	1	329
11	Austin	BartonCreek	sta08155300	IUH_2_sta08155300_1984_1010	1.92E-04	54	1	92
12	Austin	BartonCreek	sta08155300	IUH_2_sta08155300_1985_0223	2.15E-04	314	1	356
13	Austin	BartonCreek	sta08155300	IUH_2_sta08155300_1986_0509	4.35E-04	91	3	413
14	Austin	BartonCreek	sta08155300	IUH_2_sta08155300_1986_0515	1.59E-04	883	1	387
15	Austin	BearCreek	sta08158810	IUH_2_sta08158810_1980_0512	5.42E-05	81	2	79
16	Austin	BearCreek	sta08158810	IUH_2_sta08158810_1980_0929	4.42E-05	239	1	118
17	Austin	BearCreek	sta08158810	IUH_2_sta08158810_1981_0610	1.70E-03	99	1	14
18	Austin	BearCreek	sta08158810	IUH_2_sta08158810_1982_0513	4.26E-04	19	2	53
19	Austin	BearCreek	sta08158810	IUH_2_sta08158810_1983_0520	3.67E-05	326	1	175
20	Austin	BearCreek	sta08158810	IUH_2_sta08158810_1985_0605	4.80E-04	19	1	104
21	Austin	BearCreek	sta08158810	IUH_2_sta08158810_1985_1127	5.74E-05	312	1	54
22	Austin	BearCreek	sta08158810	IUH_2_sta08158810_1986_0509	7.59E-05	85	1	71
23	Austin	BearCreek	sta08158820	IUH_2_sta08158820_1980_0512	1.77E-05	340	1	348
24	Austin	BearCreek	sta08158820	IUH_2_sta08158820_1983_0520	7.97E-05	909	1	408
25	Austin	BearCreek	sta08158825	IUH_2_sta08158825_1980_0512	8.55E-06	34	1	48
26	Austin	BearCreek	sta08158825	IUH_2_sta08158825_1983_0510	5.55E-05	17	2	147
27	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1976_0418	4.30E-04	153	1	70
28	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1979_0521	6.15E-04	99	1	62
29	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1979_0719	4.58E-04	105	1	52

	30	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1980_0425	7.24E-05	51	1	128
	31	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1981_0303	1.56E-04	60	1	75
	32	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1981_0523	2.89E-04	244	1	15
	33	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1982_0513	1.84E-04	167	1	35
	34	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1983_0604	1.05E-04	72	1	65
	35	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1984_1020	2.71E-04	70	1	83
	36	Austin	BoggyCreek	sta08158050	IUH_2_sta08158050_1985_0622	3.50E-04	19	2	78
	37	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1976_0525	1.20E-04	67	1	17
	38	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1977_0416	1.37E-04	106	1	101
	39	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1977_0919	7.25E-04	17	2	3
	40	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1978_0212	1.85E-04	62	1	61
	41	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1978_0502	1.33E-04	56	1	13
	42	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1981_0303	4.59E-04	98	1	87
	43	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1981_0524	3.13E-04	95	1	13
	44	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1981_0610	2.85E-03	246	1	2
	45	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1982_0513	1.24E-03	62	1	24
	46	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1983_0510	3.34E-04	44	1	23
	47	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1984_1011	6.59E-04	16	1	54
	48	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1985_0606	9.47E-04	62	1	38
	49	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1985_1014	7.56E-04	70	1	23
	50	Austin	BoggySouthCreek	sta08158880	IUH_2_sta08158880_1986_0515	6.80E-04	115	1	9
	52	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1979_0429	2.54E-05	605	1	8
	53	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1980_0327	5.95E-05	672	1	128
	54	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1980_0425	3.20E-05	559	1	39
	55	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1980_1016	1.16E-04	101	1	155
	56	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1981_0303	1.10E-04	194	1	107
	57	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1981_0523	7.88E-04	59	1	49
	58	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1981_0610	4.57E-04	477	1	31
	59	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1982_0513	9.57E-04	51	1	91
	60	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1983_0519	5.67E-05	96	1	30
	61	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1984_1020	4.29E-04	89	1	82
	62	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1985_0513	1.08E-04	23	1	1
	63	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1985_1019	3.83E-04	65	1	96

64	Austin	BullCreek	sta08154700	IUH_2_sta08154700_1986_0203	2.04E-04	188	1	22
65	Austin	LittleWalnutCreek	sta08158380	IUH_2_sta08158380_1985_1019	3.15E-04	39	1	6
66	Austin	LittleWalnutCreek	sta08158380	IUH_2_sta08158380_1986_0430	8.69E-04	52	1	72
67	Austin	OnionCreek	sta08158700	IUH_2_sta08158700_1980_0512	1.83E-05	800	1	290
68	Austin	OnionCreek	sta08158700	IUH_2_sta08158700_1983_0520	1.98E-05	1390	1	1
69	Austin	OnionCreek	sta08158700	IUH_2_sta08158700_1985_0223	1.54E-04	172	1	165
70	Austin	OnionCreek	sta08158700	IUH_2_sta08158700_1985_1127	4.48E-05	1491	1	219
71	Austin	OnionCreek	sta08158700	IUH_2_sta08158700_1986_0509	1.60E-04	239	1	245
72	Austin	OnionCreek	sta08158700	IUH_2_sta08158700_1987_0606	3.42E-04	389	1	1
73	Austin	OnionCreek	sta08158800	IUH_2_sta08158800_1980_0512	2.91E-05	1288	1	437
74	Austin	OnionCreek	sta08158800	IUH_2_sta08158800_1983_0520	5.82E-05	667	1	241
75	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1975_0711	1.59E-04	65	1	46
76	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1976_0418	3.50E-04	102	1	9
77	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1976_0525	1.83E-04	52	1	4
78	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1976_0902	1.65E-04	75	1	20
79	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1977_0415	1.08E-04	54	1	1
80	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1977_0419	6.26E-05	91	1	41
81	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1978_0212	2.99E-04	52	1	9
82	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1978_0502	1.01E-04	54	1	11
83	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1978_0511	1.25E-04	51	1	7
84	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1978_1231	8.47E-04	34	1	27
85	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1979_0521	2.47E-04	105	1	15
86	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1979_0719	6.16E-04	65	1	12
87	Austin	ShoalCreek	sta08156650	IUH_2_sta08156650_1982_0513	1.26E-03	64	1	10
88	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1976_0418	3.22E-04	84	1	27
89	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1976_0902	1.17E-04	80	1	12
90	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1977_0415	1.23E-04	46	1	1
91	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1977_0416	9.73E-05	70	1	11
92	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1977_0419	1.56E-04	148	1	14
93	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1978_0212	1.41E-04	18	2	3
94	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1978_0502	1.17E-04	37	1	13
95	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1978_0511	1.51E-04	33	1	16
96	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1978_1231	2.17E-04	43	1	35

	97	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1979_0521	2.51E-04	28	1	18
	98	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1979_0719	6.90E-04	49	1	23
	99	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1980_0512	2.00E-04	32	1	15
	100	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1981_0303	2.19E-04	20	1	22
	101	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1981_0523	1.94E-03	35	1	35
	102	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1981_0610	1.20E-03	181	1	1
	103	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1982_0513	6.67E-04	65	1	20
	104	Austin	ShoalCreek	sta08156700	IUH_2_sta08156700_1983_0510	1.03E-04	46	1	22
	105	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1976_0418	2.57E-04	86	1	35
	106	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1976_0525	1.57E-04	72	1	16
	107	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1976_0902	1.26E-04	77	1	25
	108	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1977_0415	1.65E-04	63	1	5
	109	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1977_0416	1.04E-04	83	1	26
	110	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1977_0419	1.78E-04	178	1	26
	111	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1978_0212	1.74E-04	42	1	19
	112	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1978_0502	1.26E-04	39	1	16
	113	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1978_0511	1.84E-04	36	1	19
	114	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1978_1231	1.87E-04	41	1	32
	115	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1979_0521	3.76E-04	44	1	19
	116	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1979_0719	4.84E-04	51	1	30
	117	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1980_0327	2.49E-04	68	1	18
	118	Austin	ShoalCreek	sta08156750	IUH_2_sta08156750_1980_0512	2.82E-04	48	1	2
	119	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1975_0428	4.19E-04	44	1	146
	120	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1975_0609	2.16E-04	84	1	132
	121	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1976_0418	2.57E-04	76	1	84
	122	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1976_0525	2.72E-04	68	1	49
	123	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1976_0902	7.82E-05	113	1	75
	124	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1977_0415	1.65E-04	78	1	25
	125	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1977_0416	1.19E-04	97	1	43
	126	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1977_0419	1.08E-04	89	1	194
	127	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1978_0502	1.73E-04	82	1	39
	128	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1978_0511	2.54E-04	37	2	230
	129	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1978_1231	2.41E-04	46	1	72

130	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1979_0521	1.01E-03	125	1	26
131	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1979_0719	3.56E-04	168	1	25
132	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1980_0327	3.24E-04	110	1	66
133	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1980_0512	3.59E-04	81	1	77
134	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1981_0303	3.31E-04	57	1	73
135	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1981_0523	1.22E-03	25	2	45
136	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1981_0610	1.19E-03	425	1	1
137	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1982_0513	1.18E-03	70	1	52
138	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1983_0510	1.35E-04	74	1	53
139	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1984_1007	2.38E-04	42	1	79
140	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1985_0513	3.79E-04	27	2	59
141	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1986_0430	3.02E-04	58	1	36
142	Austin	ShoalCreek	sta08156800	IUH_2_sta08156800_1986_0906	3.33E-04	52	1	39
143	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1979_0223	1.60E-04	150	1	22
144	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1979_0418	3.12E-04	123	1	3
145	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1980_0512	1.86E-04	320	1	39
146	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1981_0303	2.25E-04	112	1	77
147	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1981_0610	2.18E-03	96	1	41
148	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1982_0513	6.64E-04	71	1	53
149	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1983_0520	4.50E-05	45	1	43
150	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1985_0223	5.17E-04	98	1	53
151	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1985_0605	7.20E-04	542	1	37
152	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1985_1126	1.73E-04	797	1	1
153	Austin	SlaughterCreek	sta08158840	IUH_2_sta08158840_1986_0509	2.10E-04	87	1	38
154	Austin	SlaughterCreek	sta08158860	IUH_2_sta08158860_1981_0610	9.42E-04	101	1	138
155	Austin	SlaughterCreek	sta08158860	IUH_2_sta08158860_1982_0513	4.43E-04	73	1	175
156	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1967_0520	1.53E-04	9	2	45
157	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1967_0520	8.67E-05	104	1	18
158	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1967_0817	3.88E-04	40	1	25
159	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1967_0818	7.20E-05	61	1	23
160	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1967_1015	5.98E-04	44	1	91
161	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1968_0517	2.15E-04	63	1	2
162	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1968_0527	2.57E-04	51	1	29

	163	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1968_0709	2.40E-04	35	1	88
	165	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1969_0427	1.34E-04	49	1	40
	166	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1969_0508	2.07E-04	45	1	60
	167	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1970_0306	3.69E-04	57	1	25
	168	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1970_0307	2.26E-05	581	1	11
	169	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1970_0514	9.30E-05	49	1	15
	170	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1970_0515	2.34E-04	67	1	17
	171	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1971_0621	4.13E-04	50	1	11
	172	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1971_0726	7.19E-05	65	1	8
	173	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1971_0802	1.98E-04	53	1	51
	174	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1971_0803	4.68E-04	40	1	12
	175	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1971_1117	2.57E-04	43	1	72
	176	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1972_0501	5.16E-04	13	2	1
	177	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1972_1021	3.19E-04	39	1	19
	178	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1973_0708	1.28E-04	69	1	15
	179	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1973_0926	3.94E-04	44	1	25
	180	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1973_1011	1.04E-03	32	1	15
	181	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1973_1012	1.99E-04	90	1	25
	182	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1974_0509	2.74E-04	47	1	36
	183	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1974_0828	2.91E-04	44	1	37
	184	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1974_1123	4.59E-04	60	1	9
	185	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1975_0428	2.55E-04	46	1	22
	186	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1975_0523	3.24E-04	60	1	9
	187	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1976_0418	4.03E-04	75	1	19
	188	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1976_0525	4.52E-04	37	1	54
	189	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1977_0415	1.84E-04	46	1	30
	190	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1977_0416	1.74E-04	64	1	44
	191	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1978_0212	2.45E-04	49	1	21
	192	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1978_0502	2.64E-04	31	1	38
	193	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1978_0511	2.20E-04	33	1	26
	194	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1979_0429	2.12E-04	43	1	21
	195	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1979_0521	9.98E-04	53	1	10
	196	Austin	WallerCreek	sta08157000	IUH_2_sta08157000_1980_0512	3.13E-04	46	1	26

	197	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1967_0520	2.67E-04	26	1	23
	198	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1967_0520	7.20E-05	71	1	11
	199	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1967_0817	2.78E-04	42	1	20
	200	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1967_0818	7.76E-05	41	1	17
	201	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1967_1015	5.64E-04	50	1	62
	202	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1968_0517	2.39E-04	59	1	6
	203	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1968_0527	2.87E-04	44	1	7
	204	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1968_0709	3.44E-04	24	1	15
	206	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1969_0427	6.50E-05	55	1	45
	207	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1969_0508	8.63E-04	31	1	1
	208	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1970_0306	4.30E-04	47	1	24
	209	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1970_0307	3.67E-05	860	1	1
	210	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1970_0514	1.40E-04	26	2	51
	211	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1970_0515	2.40E-04	82	1	61
	212	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1971_0621	4.04E-04	17	2	1
	213	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1971_0726	3.62E-04	18	1	1
	214	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1971_0802	3.86E-04	47	1	1
	215	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1971_1117	3.71E-04	33	2	28
	216	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1972_0501	4.45E-04	21	1	11
	217	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1972_1021	3.93E-04	38	1	1
	218	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1973_0708	2.15E-04	71	1	1
	219	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1973_0926	4.24E-04	44	1	7
	220	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1973_1011	1.67E-03	35	1	47
	221	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1973_1012	3.30E-04	54	1	61
	222	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1974_0509	5.27E-04	23	2	17
	223	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1974_0828	2.98E-04	60	1	13
	224	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1974_1123	5.34E-04	65	1	7
	225	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1975_0428	2.62E-04	57	1	35
	226	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1975_0523	5.39E-04	33	1	1
	227	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1976_0418	3.86E-04	71	1	11
	228	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1976_0525	4.25E-04	46	1	40
	229	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1977_0415	2.51E-04	39	1	19
	230	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1977_0416	1.59E-04	64	1	36

	231	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1978_0212	1.53E-04	38	1	13
	232	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1978_0502	1.82E-04	39	1	5
	233	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1978_0511	2.10E-04	46	1	7
	234	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1979_0429	1.49E-04	38	1	10
	235	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1979_0521	9.10E-04	46	1	1
	236	Austin	WallerCreek	sta08157500	IUH_2_sta08157500_1980_0512	2.25E-04	65	1	9
	237	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1976_0418	1.56E-04	116	1	130
	238	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1976_0525	8.76E-05	70	1	61
	239	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1977_0415	3.60E-05	330	1	132
	240	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1977_0419	2.24E-05	151	1	44
	241	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1978_0410	1.22E-05	68	1	170
	242	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1978_1231	5.03E-05	65	1	100
	243	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1979_0320	2.49E-05	179	1	78
	244	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1980_0327	5.22E-05	137	1	110
	245	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1980_0508	7.54E-05	125	1	46
	246	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1981_0303	1.04E-04	149	1	55
	247	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1981_0610	5.53E-04	1614	1	1
	248	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1984_1020	2.32E-04	121	1	68
	249	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1985_0513	5.85E-05	131	1	1
	250	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1985_1019	1.14E-04	120	1	67
	251	Austin	WalnutCreek	sta08158100	IUH_2_sta08158100_1986_0906	3.79E-04	624	1	1
	252	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1976_0418	1.76E-04	123	1	160
	253	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1976_0525	6.20E-05	167	1	21
	254	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1977_0415	8.19E-05	664	1	24
	255	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1977_0419	9.14E-05	160	1	35
	256	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1978_0212	8.30E-05	79	1	40
	257	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1978_0410	5.24E-05	112	1	51
	258	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1978_0606	8.49E-05	82	1	12
	259	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1978_1231	6.14E-05	81	1	101
	260	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1979_0521	1.47E-04	91	1	142
	261	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1980_0327	1.05E-04	157	1	111
	262	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1980_0512	8.87E-05	105	1	58
	263	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1981_0303	2.10E-04	98	1	113

264	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1981_0610	8.46E-04	177	1	109
265	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1984_1020	3.84E-04	164	1	30
266	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1985_0513	1.52E-04	98	1	37
267	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1986_0203	2.27E-04	368	1	65
268	Austin	WalnutCreek	sta08158200	IUH_2_sta08158200_1986_0517	3.03E-04	103	1	19
269	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1976_0418	4.04E-04	90	1	29
270	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1976_0525	4.33E-04	65	1	17
271	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1977_0415	3.36E-04	50	1	24
272	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1977_0419	1.88E-04	36	2	17
273	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1979_0521	8.95E-04	22	2	11
274	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1979_0719	5.11E-04	20	2	3
275	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1980_0327	4.99E-04	66	1	29
276	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1980_0512	5.31E-04	63	1	19
277	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1981_0303	1.14E-03	49	1	24
278	Austin	WalnutCreek	sta08158400	IUH_2_sta08158400_1981_0523	2.75E-03	24	2	18
279	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1976_0418	2.18E-04	104	1	52
280	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1976_0525	2.90E-04	95	1	40
281	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1977_0415	2.76E-04	103	1	18
282	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1977_0416	1.71E-04	54	2	25
283	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1977_0419	1.96E-04	164	1	15
284	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1978_0212	2.43E-04	85	1	65
285	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1978_0502	1.18E-04	126	1	28
286	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1978_0511	1.82E-04	120	1	26
287	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1979_0521	9.61E-04	69	1	15
288	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1979_0719	2.26E-04	97	1	28
289	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1980_0327	2.17E-04	113	1	38
290	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1980_0512	2.79E-04	85	1	56
291	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1981_0303	3.17E-04	47	1	83
292	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1981_0523	2.33E-03	40	1	85
293	Austin	WalnutCreek	sta08158500	IUH_2_sta08158500_1981_0610	1.02E-03	99	1	30
294	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1974_1123	3.49E-04	151	1	146
295	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1975_0609	3.39E-04	140	1	108
296	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1976_0418	2.62E-04	161	1	146

297	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1976_0525	2.04E-04	99	1	43	
298	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1977_0415	1.43E-04	410	1	62	
299	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1977_0419	1.56E-04	270	1	45	
300	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1978_0502	6.01E-05	136	1	65	
301	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1978_0511	4.46E-05	148	1	73	
302	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1978_0606	5.73E-05	175	1	91	
303	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1978_1231	2.16E-04	1040	1	53	
304	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1979_0521	3.90E-04	90	1	106	
305	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1980_0327	9.17E-05	232	1	103	
306	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1980_0512	7.63E-05	152	1	108	
307	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1981_0303	1.84E-04	190	1	113	
308	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1981_0610	1.20E-03	198	1	99	
309	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1982_0513	1.27E-03	288	1	97	
310	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1983_0808	9.97E-05	165	1	116	
311	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1984_1020	4.60E-04	222	1	81	
312	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1985_0914	1.53E-04	60	1	101	
313	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1985_1019	1.61E-04	166	1	67	
314	Austin	WalnutCreek	sta08158600	IUH_2_sta08158600_1986_0203	7.54E-05	171	1	141	
315	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1977_0415	8.27E-04	84	1	21	
316	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1977_0416	6.39E-04	46	1	63	
317	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1979_0223	1.70E-04	73	1	23	
318	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1979_0521	5.06E-04	79	1	4	
319	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1981_0303	1.82E-04	89	1	6	
320	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1981_0523	2.55E-04	76	1	4	
321	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1982_0513	5.17E-04	67	1	24	
322	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1983_0510	1.21E-04	45	1	39	
323	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1984_1010	7.07E-04	40	1	35	
324	Austin	WestBouldinCreek	sta08155550	IUH_2_sta08155550_1985_0422	7.51E-05	40	1	16	
325	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1967_0430	2.85E-05	60	1	168	
326	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1967_0501	2.84E-04	73	1	93	
327	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1967_0520	4.16E-06	494	1	9	
328	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1967_0520	1.24E-05	158	1	114	
329	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1967_1015	1.36E-04	32	1	116	

	330	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1968_0517	4.74E-04	27	1	142
	331	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1968_0527	3.18E-04	50	1	133
	332	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1968_0709	1.62E-04	135	1	173
	333	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1969_0412	9.89E-05	767	1	1
	334	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1970_0306	3.82E-04	70	1	92
	335	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1970_0307	1.01E-04	467	1	33
	336	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1970_0515	1.83E-04	81	1	108
	337	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1970_1022	1.35E-05	41	1	6
	338	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1970_1023	1.24E-04	97	1	71
	339	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1971_1117	4.31E-04	77	1	69
	340	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1971_1205	6.97E-05	147	1	71
	341	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1972_0501	1.19E-04	51	1	28
	342	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1972_1021	5.70E-04	60	1	225
	343	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1973_0926	4.11E-04	549	1	76
	344	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1973_1011	3.99E-04	45	1	102
	345	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1973_1013	2.07E-04	96	1	80
	346	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1974_1123	4.53E-04	84	1	100
	347	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1975_0523	3.53E-04	269	1	82
	348	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1975_0609	2.24E-04	122	1	54
	349	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1976_0418	5.86E-04	117	1	102
	350	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1976_0525	1.96E-04	72	1	124
	351	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1977_0415	2.63E-04	440	1	104
	352	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1977_0416	1.83E-04	201	1	73
	353	Austin	WilbargerCreek	sta08159150	IUH_2_sta08159150_1977_0419	1.87E-04	113	2	29
	354	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1979_0223	1.50E-04	192	1	14
	355	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1979_0417	2.92E-04	97	1	15
	356	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1979_0521	1.01E-03	135	1	14
	357	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1980_0327	8.20E-05	255	1	19
	358	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1980_0507	5.03E-05	97	1	35
	359	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1981_0303	2.64E-04	155	1	26
	360	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1981_0523	8.24E-04	39	1	42
	361	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1981_0610	1.54E-03	111	1	10
	362	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1982_0513	3.74E-04	86	1	21

	363	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1983_0520	1.38E-04	50	1	39
	364	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1984_1010	3.37E-04	26	1	1
	365	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1985_0605	5.24E-04	21	1	32
	366	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1986_0509	2.60E-04	73	1	28
	367	Austin	WilliamsonCreek	sta08158920	IUH_2_sta08158920_1986_0515	2.66E-04	108	1	2
	368	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1976_0418	4.58E-04	126	1	114
	369	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1976_0525	2.90E-05	250	1	75
	370	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1977_0415	2.27E-04	112	1	158
	371	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1977_0416	1.01E-04	169	1	147
	372	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1978_0410	4.27E-05	19	2	49
	373	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1978_0502	3.56E-05	20	1	35
	374	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1978_0606	7.98E-05	157	1	30
	375	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1979_0418	1.82E-04	71	1	125
	376	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1979_0521	6.25E-04	131	1	103
	377	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1980_0327	1.12E-04	216	1	19
	378	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1980_0507	9.85E-05	120	1	32
	379	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1981_0303	3.01E-04	92	1	140
	380	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1981_0523	4.59E-04	62	1	120
	381	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1981_0610	1.09E-03	144	1	62
	382	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1982_0513	7.46E-04	131	1	58
	383	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1983_0520	1.20E-04	151	1	30
	384	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1984_1010	4.56E-04	54	1	50
	385	Austin	WilliamsonCreek	sta08158930	IUH_2_sta08158930_1985_0605	4.88E-04	89	1	63
	386	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1976_0418	2.76E-04	128	1	223
	387	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1976_0525	1.06E-04	200	1	1
	388	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1977_0415	1.13E-04	510	1	136
	389	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1978_0410	1.57E-05	190	1	125
	390	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1978_0502	2.95E-05	154	1	120
	391	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1978_0606	2.10E-05	177	1	219
	392	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1979_0418	1.37E-04	113	1	267
	393	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1979_0521	7.39E-04	190	1	191
	394	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1980_0327	6.25E-05	229	1	112
	395	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1980_0507	5.67E-05	235	1	82

396	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1981_0610	1.53E-03	249	1	112	
397	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1983_0520	7.13E-05	112	1	109	
398	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1984_1010	4.85E-04	49	1	188	
399	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1985_0605	2.38E-04	90	1	169	
400	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1985_1126	1.56E-04	603	1	396	
401	Austin	WilliamsonCreek	sta08158970	IUH_2_sta08158970_1986_0430	1.05E-03	3	7	222	

Table A.2. MODEL PARAMETERS FOR DALLAS MODULE

Entry	Module	Watershed	Station name	StormName	SumSqErr	T_bar (min)	N_Res	T_lag (min)
1	Dallas	AshCreek	sta08057320	IUH_2_sta08057320_1973_0603	2.022E-03	37	1	51
2	Dallas	AshCreek	sta08057320	IUH_2_sta08057320_1973_1030	1.903E-03	28	1	39
3	Dallas	AshCreek	sta08057320	IUH_2_sta08057320_1975_0527	5.493E-04	37	1	22
4	Dallas	AshCreek	sta08057320	IUH_2_sta08057320_1977_0327	2.490E-03	41	1	37
5	Dallas	AshCreek	sta08057320	IUH_2_sta08057320_1978_0520	9.453E-04	35	1	23
6	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1964_0920	1.477E-03	91	1	32
7	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1964_0927	2.448E-04	194	1	48
8	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1964_1117	1.570E-04	256	1	70
10	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1966_0209	1.042E-04	136	1	127
11	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1966_0428	4.878E-03	45	1	129
12	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1966_0429	8.687E-04	69	1	57
13	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1966_0430	5.771E-04	108	1	30
14	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1966_0501	3.561E-04	337	1	64
15	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1966_0617	2.889E-04	68	1	60
16	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1967_0420	3.833E-04	30	2	52
17	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1967_0530	3.823E-04	65	1	64
18	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1968_0319	3.989E-04	98	1	42
19	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1968_0422	1.976E-04	60	1	59
20	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1968_0512	2.420E-05	63	1	240
21	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1968_0813	7.839E-04	230	1	16
22	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1968_1009	2.140E-04	83	1	45
23	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1969_0504	2.105E-04	124	1	56
24	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1969_0506	1.145E-03	32	1	39
25	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1970_0425	5.237E-04	60	1	59
26	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1970_0831	5.219E-04	39	1	75
27	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1971_0814	9.404E-04	48	1	17
28	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1971_1003	4.569E-04	19	2	36
29	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1971_1018	7.866E-04	41	1	30
30	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1972_0712	3.076E-04	27	1	48
31	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1974_0607	5.459E-04	37	1	62
32	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1974_0916	5.777E-04	37	1	44
33	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1974_1030	4.395E-04	78	1	94

34	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1975_0131	5.176E-04	75	1	58
35	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1975_0407	4.908E-04	40	1	50
36	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1976_0526	2.267E-04	41	1	50
37	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1976_0618	3.535E-04	30	1	53
38	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1977_0326	6.009E-04	49	1	34
39	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1977_0612	1.981E-04	25	1	55
40	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1978_0323	6.059E-04	23	1	61
41	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1978_0528	1.066E-03	28	1	47
42	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1978_0804	4.188E-04	38	1	46
43	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1978_0821	7.966E-05	28	1	63
44	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1979_0330	1.193E-03	79	1	56
45	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1979_0503	1.879E-03	79	1	30
46	Dallas	BachmanBranch	sta08055700	IUH_2_sta08055700_1979_0717	2.052E-04	30	1	59
47	Dallas	CedarCreek	sta08057050	IUH_2_sta08057050_1974_0920	4.442E-03	5	1	33
48	Dallas	CedarCreek	sta08057050	IUH_2_sta08057050_1975_0527	1.282E-03	14	2	33
49	Dallas	CedarCreek	sta08057050	IUH_2_sta08057050_1977_0820	4.331E-04	23	1	21
50	Dallas	CoombsCreek	sta08057020	IUH_2_sta08057020_1973_0707	3.580E-03	36	1	11
51	Dallas	CoombsCreek	sta08057020	IUH_2_sta08057020_1974_0920	1.921E-03	26	1	51
52	Dallas	CoombsCreek	sta08057020	IUH_2_sta08057020_1975_0821	4.549E-04	17	1	26
53	Dallas	CoombsCreek	sta08057020	IUH_2_sta08057020_1976_0417	6.660E-04	29	1	51
54	Dallas	CoombsCreek	sta08057020	IUH_2_sta08057020_1977_0820	5.372E-04	39	1	45
55	Dallas	CoombsCreek	sta08057020	IUH_2_sta08057020_1979_0319	9.162E-04	38	1	27
56	Dallas	CoombsCreek	sta08057020	IUH_2_sta08057020_1979_0330	5.189E-04	48	1	25
57	Dallas	CottonWoodCreek	sta08057140	IUH_2_sta08057140_1973_0619	1.195E-03	50	1	22
58	Dallas	CottonWoodCreek	sta08057140	IUH_2_sta08057140_1974_0607	6.599E-04	36	1	28
59	Dallas	CottonWoodCreek	sta08057140	IUH_2_sta08057140_1975_0407	1.791E-04	54	1	24
60	Dallas	CottonWoodCreek	sta08057140	IUH_2_sta08057140_1975_0529	2.719E-04	52	1	25
61	Dallas	CottonWoodCreek	sta08057140	IUH_2_sta08057140_1976_0526	1.718E-04	121	1	61
62	Dallas	CottonWoodCreek	sta08057140	IUH_2_sta08057140_1978_0528	4.476E-04	48	1	49
63	Dallas	DuckCreek	sta08061620	IUH_2_sta08061620_1973_0619	4.226E-04	115	1	42
64	Dallas	DuckCreek	sta08061620	IUH_2_sta08061620_1974_0916	6.152E-04	89	1	17
65	Dallas	DuckCreek	sta08061620	IUH_2_sta08061620_1974_1030	7.708E-04	135	1	1
66	Dallas	DuckCreek	sta08061620	IUH_2_sta08061620_1976_0523	5.233E-04	57	1	4
67	Dallas	DuckCreek	sta08061620	IUH_2_sta08061620_1977_0326	7.985E-04	77	1	44
68	Dallas	DuckCreek	sta08061620	IUH_2_sta08061620_1978_0528	5.597E-04	74	1	43
69	Dallas	DuckCreek	sta08061620	IUH_2_sta08061620_1979_0330	6.577E-04	118	1	33

70	Dallas	DuckCreek	sta08061620	IUH_2_sta08061620_1979_0503	1.187E-03	91	1	27
71	Dallas	ElamCreek	sta08057415	IUH_2_sta08057415_1973_0310	1.466E-03	21	1	9
72	Dallas	ElamCreek	sta08057415	IUH_2_sta08057415_1974_0917	1.289E-03	28	1	17
73	Dallas	ElamCreek	sta08057415	IUH_2_sta08057415_1975_0506	3.959E-04	10	1	8
74	Dallas	ElamCreek	sta08057415	IUH_2_sta08057415_1976_0418	1.371E-03	17	1	20
75	Dallas	ElamCreek	sta08057415	IUH_2_sta08057415_1977_0327	1.329E-03	18	1	4
76	Dallas	ElamCreek	sta08057415	IUH_2_sta08057415_1978_0805	2.158E-04	6	1	13
77	Dallas	ElamCreek	sta08057415	IUH_2_sta08057415_1979_0330	6.193E-04	9	2	10
78	Dallas	ElamCreek	sta08057415	IUH_2_sta08057415_1979_0503	1.356E-03	20	1	5
79	Dallas	FiveMileCreek	sta08057418	IUH_2_sta08057418_1976_0526	5.662E-04	69	1	14
80	Dallas	FiveMileCreek	sta08057418	IUH_2_sta08057418_1977_0326	6.511E-04	71	1	35
81	Dallas	FiveMileCreek	sta08057418	IUH_2_sta08057418_1977_0820	4.897E-04	41	1	39
82	Dallas	FiveMileCreek	sta08057418	IUH_2_sta08057418_1977_1011	2.680E-04	89	1	1
83	Dallas	FiveMileCreek	sta08057418	IUH_2_sta08057418_1979_0330	5.203E-04	54	1	24
84	Dallas	FiveMileCreek	sta08057418	IUH_2_sta08057418_1979_0501	2.968E-04	50	1	24
85	Dallas	FiveMileCreek	sta08057418	IUH_2_sta08057418_1979_0503	2.264E-03	51	1	28
86	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1973_0707	1.858E-03	37	1	8
87	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1974_0920	7.666E-04	44	1	66
88	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1975_0407	3.742E-04	105	1	32
89	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1976_0418	7.618E-04	68	1	42
90	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1976_0703	8.018E-04	12	2	39
91	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1977_0326	6.225E-04	78	1	76
92	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1977_0820	3.253E-04	51	1	30
93	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1977_1011	9.039E-05	41	1	51
94	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1979_0319	1.747E-04	66	1	80
95	Dallas	FiveMileCreek	sta08057420	IUH_2_sta08057420_1979_0330	5.220E-04	93	1	50
96	Dallas	FloydBranch	sta08057160	IUH_2_sta08057160_1974_0916	1.151E-03	37	1	31
97	Dallas	FloydBranch	sta08057160	IUH_2_sta08057160_1974_0917	9.871E-04	32	1	32
98	Dallas	FloydBranch	sta08057160	IUH_2_sta08057160_1975_0407	3.100E-04	41	1	41
99	Dallas	FloydBranch	sta08057160	IUH_2_sta08057160_1975_0529	5.333E-04	46	1	50
100	Dallas	FloydBranch	sta08057160	IUH_2_sta08057160_1977_0326	8.672E-04	38	1	51
101	Dallas	FloydBranch	sta08057160	IUH_2_sta08057160_1978_0323	5.526E-04	33	1	37
102	Dallas	FloydBranch	sta08057160	IUH_2_sta08057160_1979_0503	1.699E-03	78	1	31
103	Dallas	FloydBranch	sta08057160	IUH_2_sta08057160_1979_0715	4.686E-04	17	2	36
104	Dallas	JoesCreek	sta08055580	IUH_2_sta08055580_1974_1030	9.853E-04	25	1	14
105	Dallas	JoesCreek	sta08055580	IUH_2_sta08055580_1975_0326	7.019E-04	16	1	4

106	Dallas	JoesCreek	sta08055580	IUH_2_sta08055580_1976_0526	9.796E-04	12	2	16
107	Dallas	JoesCreek	sta08055580	IUH_2_sta08055580_1977_0612	6.830E-04	25	1	18
108	Dallas	JoesCreek	sta08055580	IUH_2_sta08055580_1977_0907	4.844E-04	31	1	7
109	Dallas	JoesCreek	sta08055580	IUH_2_sta08055580_1978_0528	1.779E-03	23	1	4
110	Dallas	JoesCreek	sta08055580	IUH_2_sta08055580_1979_0503	2.027E-03	34	1	5
111	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1973_0511	6.516E-04	20	1	1
112	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1974_0920	4.440E-04	101	1	53
113	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1974_1030	2.969E-04	75	1	30
114	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1975_0609	4.759E-04	58	1	18
115	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1976_0526	2.111E-04	39	1	44
116	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1977_0612	5.512E-04	28	1	5
117	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1977_0907	2.076E-04	41	1	32
118	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1978_0528	1.763E-03	33	1	30
119	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1979_0330	8.004E-04	50	1	29
120	Dallas	JoesCreek	sta08055600	IUH_2_sta08055600_1979_0503	1.317E-03	46	1	12
121	Dallas	NewtonCreek	sta08057435	IUH_2_sta08057435_1976_0530	5.782E-04	132	1	45
122	Dallas	NewtonCreek	sta08057435	IUH_2_sta08057435_1977_0327	1.229E-03	53	1	43
123	Dallas	NewtonCreek	sta08057435	IUH_2_sta08057435_1979_0501	4.879E-04	45	1	47
124	Dallas	NewtonCreek	sta08057435	IUH_2_sta08057435_1979_0503	1.180E-03	56	1	57
125	Dallas	PrairieCreek	sta08057445	IUH_2_sta08057445_1976_0418	7.221E-04	316	1	15
126	Dallas	PrairieCreek	sta08057445	IUH_2_sta08057445_1976_0618	1.972E-04	118	1	122
127	Dallas	PrairieCreek	sta08057445	IUH_2_sta08057445_1977_0302	2.818E-04	169	1	91
128	Dallas	PrairieCreek	sta08057445	IUH_2_sta08057445_1977_0326	2.760E-04	213	1	52
129	Dallas	PrairieCreek	sta08057445	IUH_2_sta08057445_1977_0419	1.104E-04	195	1	130
130	Dallas	PrairieCreek	sta08057445	IUH_2_sta08057445_1978_0212	1.097E-04	176	1	108
131	Dallas	PrairieCreek	sta08057445	IUH_2_sta08057445_1979_0330	2.858E-04	162	1	106
132	Dallas	PrairieCreek	sta08057445	IUH_2_sta08057445_1979_0503	1.994E-04	239	1	8
133	Dallas	RushBranch	sta08057130	IUH_2_sta08057130_1973_0619	1.551E-03	96	1	12
134	Dallas	RushBranch	sta08057130	IUH_2_sta08057130_1973_1030	5.896E-04	82	1	17
135	Dallas	RushBranch	sta08057130	IUH_2_sta08057130_1975_0407	4.560E-04	40	1	37
136	Dallas	RushBranch	sta08057130	IUH_2_sta08057130_1976_0618	4.546E-04	29	1	19
137	Dallas	RushBranch	sta08057130	IUH_2_sta08057130_1977_0327	1.682E-03	17	1	19
138	Dallas	RushBranch	sta08057130	IUH_2_sta08057130_1978_0528	1.648E-03	24	1	21
139	Dallas	RushBranch	sta08057130	IUH_2_sta08057130_1979_0330	1.044E-03	57	1	27
140	Dallas	SouthMesquite	sta08061920	IUH_2_sta08061920_1973_0423	5.120E-04	140	1	93
141	Dallas	SouthMesquite	sta08061920	IUH_2_sta08061920_1974_0920	3.358E-04	143	1	50

142	Dallas	SouthMesquite	sta08061920	IUH_2_sta08061920_1975_0131	6.461E-04	116	1	128
143	Dallas	SouthMesquite	sta08061920	IUH_2_sta08061920_1975_0407	3.394E-04	136	1	111
144	Dallas	SouthMesquite	sta08061920	IUH_2_sta08061920_1976_0418	1.013E-03	73	1	93
145	Dallas	SouthMesquite	sta08061920	IUH_2_sta08061920_1977_0326	1.025E-03	92	1	99
146	Dallas	SouthMesquite	sta08061920	IUH_2_sta08061920_1978_0323	1.460E-04	120	1	109
147	Dallas	SouthMesquite	sta08061920	IUH_2_sta08061920_1978_1231	2.190E-04	244	1	61
148	Dallas	SouthMesquite	sta08061920	IUH_2_sta08061920_1979_0330	4.556E-04	175	1	43
149	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1969_0317	1.610E-04	391	1	243
150	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1969_0504	2.506E-04	256	1	372
151	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1969_0506	4.769E-04	433	1	103
152	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1970_0206	3.096E-04	257	1	358
153	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1970_0425	3.872E-04	565	1	77
154	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1970_0530	2.660E-04	552	1	138
155	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1970_1026	2.235E-04	530	1	97
156	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1971_0924	2.280E-04	588	1	142
157	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1971_1003	4.524E-04	213	1	358
158	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1971_1017	7.137E-04	290	1	99
159	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1971_1208	4.154E-04	400	1	137
160	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1973_0310	3.521E-04	211	1	221
161	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1973_0511	1.868E-04	435	1	333
162	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1973_0926	5.189E-04	268	1	275
163	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1973_1011	3.572E-04	427	1	133
164	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1973_1012	2.788E-04	307	1	179
165	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1974_0110	2.745E-04	239	1	197
166	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1974_0609	3.015E-04	310	1	168
167	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1974_0920	3.265E-04	270	1	312
168	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1974_1030	1.892E-04	270	1	349
169	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1975_0131	4.502E-04	286	1	194
170	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1975_0407	3.395E-04	406	1	226
171	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1976_0418	8.912E-04	232	1	215
172	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1976_0530	3.645E-04	323	1	280
173	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1977_0302	4.345E-04	207	1	256
174	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1977_0326	1.336E-03	277	1	63
175	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1978_0212	1.825E-04	258	1	261
176	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1978_0323	1.425E-04	254	1	329
177	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1979_0330	4.234E-04	226	1	176

178	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1979_0503	3.415E-04	222	1	226
179	Dallas	SouthMesquite	sta08061950	IUH_2_sta08061950_1977_0419	3.156E-04	221	1	329
180	Dallas	SpankyCreek	sta08057120	IUH_2_sta08057120_1973_1030	7.968E-04	86	1	28
181	Dallas	SpankyCreek	sta08057120	IUH_2_sta08057120_1975_0407	5.278E-04	45	1	45
182	Dallas	SpankyCreek	sta08057120	IUH_2_sta08057120_1975_0628	3.919E-04	70	1	124
183	Dallas	SpankyCreek	sta08057120	IUH_2_sta08057120_1977_0414	3.144E-04	78	1	98
184	Dallas	SpankyCreek	sta08057120	IUH_2_sta08057120_1978_0805	2.989E-04	20	1	30
185	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1964_1117	2.399E-04	69	1	44
186	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1965_0509	1.512E-03	38	1	59
187	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1966_0209	2.469E-04	40	2	46
188	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1966_0428	2.597E-03	30	1	109
189	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1966_0429	4.255E-04	66	1	13
190	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1966_0429	4.547E-04	75	1	23
191	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1966_0430	4.143E-04	77	1	40
192	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1966_0501	3.366E-04	65	1	49
193	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1966_0617	1.510E-04	52	1	49
194	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1967_0420	2.555E-04	33	1	27
195	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1967_0530	3.595E-04	34	2	50
196	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1968_0319	4.556E-04	60	1	13
197	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1968_0422	3.425E-04	30	1	93
198	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1968_0513	4.269E-04	46	1	59
199	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1968_0813	6.316E-04	54	1	10
200	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1968_1009	2.161E-04	46	1	20
201	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1969_0129	2.522E-04	40	1	24
202	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1969_0504	3.922E-04	44	1	25
203	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1969_0506	1.831E-03	29	1	50
204	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1969_1012	5.776E-04	42	1	19
205	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1970_0831	7.623E-04	59	1	9
206	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1971_0814	5.122E-04	36	1	54
207	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1971_1003	4.672E-04	30	1	42
208	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1971_1018	7.249E-04	58	1	27
209	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1973_0423	5.189E-04	43	1	55
210	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1973_0511	2.837E-04	41	1	13
211	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1973_0603	7.235E-04	37	1	8
212	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1973_1011	4.440E-04	46	1	26
213	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1973_1030	3.923E-04	43	1	61

214	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1974_0505	8.618E-04	23	1	35
215	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1974_0916	5.959E-04	40	1	17
216	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1974_1030	5.485E-04	29	2	49
217	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1975_0131	5.304E-04	73	1	23
218	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1975_0407	3.574E-04	24	2	13
219	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1976_0417	5.121E-04	38	1	31
220	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1976_0525	3.721E-04	26	1	37
221	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1977_0326	8.831E-04	58	1	25
222	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1977_0612	3.352E-04	32	1	24
223	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1978_0323	4.175E-04	44	1	20
224	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1979_0330	8.147E-04	72	1	27
225	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1979_0503	1.221E-03	58	1	4
226	Dallas	TurtleCreek	sta08056500	IUH_2_sta08056500_1979_0510	4.102E-04	47	1	32
227	Dallas	WhitesBranch	sta08057440	IUH_2_sta08057440_1976_0418	1.590E-03	55	1	63
228	Dallas	WhitesBranch	sta08057440	IUH_2_sta08057440_1976_0530	8.850E-04	124	1	53
229	Dallas	WhitesBranch	sta08057440	IUH_2_sta08057440_1977_0327	1.459E-03	11	2	82
230	Dallas	WhitesBranch	sta08057440	IUH_2_sta08057440_1979_0319	5.676E-04	12	1	131
231	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1973_0707	1.136E-03	43	1	7
232	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1975_0407	6.354E-04	56	1	40
233	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1975_0527	8.540E-04	35	1	30
234	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1976_0418	1.173E-03	57	1	31
235	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1976_0703	1.677E-03	27	1	43
236	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1977_0326	9.986E-04	28	1	57
237	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1977_0820	2.821E-04	16	2	23
238	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1978_0511	2.909E-04	42	1	19
239	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1979_0330	3.111E-04	53	1	26
240	Dallas	WoodyBranch	sta08057425	IUH_2_sta08057425_1979_0503	2.707E-03	64	1	62

Table A.3. MODEL PARAMETERS FOR FORTWORTH MODULE

Entry	Module	Watershed	Station name	StormName	SumSqErr	T_bar (min)	N_Res	T_lag (min)
1	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1969_0416	9.842E-04	45	1	28
2	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1969_0506	6.318E-04	67	1	17
3	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1969_0922	7.288E-04	62	1	4
4	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1969_1012	5.93E-04	75	1	28
5	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1970_0430	6.53E-04	47	1	30
6	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1970_0530	7.58E-04	38	1	17
7	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1970_0916	5.27E-04	40	1	5
8	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1970_1023	4.00E-04	27	1	38
9	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1971_0529	2.71E-04	10	2	21
10	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1971_0815	4.35E-04	44	1	37
11	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1971_1019	1.57E-03	36	1	64
12	FortWorth	DryBranch	sta08048550	***IUH_2_sta08048550_1971_1202	1.39E-03	4	12	116
13	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1971_1209	2.19E-03	125	1	16
14	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1973_0310	1.06E-04	41	1	39
15	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1973_0603	4.71E-04	42	1	31
16	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1973_0619	6.21E-04	40	1	38
17	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1973_0715	3.38E-04	76	1	41
18	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1973_1012	2.31E-04	56	1	113
19	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1974_0826	1.45E-03	43	1	15
20	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1974_0920	5.82E-04	65	1	17
21	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1975_0407	3.17E-04	57	1	26
22	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1975_0608	1.45E-04	35	1	24
23	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1975_0724	2.00E-03	96	1	22
24	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1976_0530	5.92E-04	66	1	21
25	FortWorth	DryBranch	sta08048550	IUH_2_sta08048550_1976_0716	1.36E-04	36	1	13
26	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1969_0416	3.94E-04	157	1	28
27	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1969_0506	2.74E-04	146	1	48
28	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1969_0922	2.38E-04	85	1	20
29	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1969_1012	1.52E-04	97	1	25
30	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1970_0430	2.28E-04	131	1	15
31	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1970_0530	3.26E-04	76	1	38
32	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1970_0916	1.67E-04	120	1	13

33	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1970_1023	1.58E-04	90	1	30
34	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1971_0529	1.64E-04	76	1	10
35	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1971_0815	2.08E-04	83	1	5
36	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1971_1019	2.57E-04	142	1	31
37	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1971_1202	1.27E-04	121	1	40
38	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1971_1209	1.63E-04	157	1	16
39	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1973_0310	1.83E-04	123	1	21
40	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1973_0603	3.17E-04	112	1	13
41	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1973_0619	3.91E-04	148	1	23
42	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1973_0715	3.11E-04	169	1	33
43	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1973_1012	9.91E-05	82	1	66
44	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1974_0826	4.21E-04	115	1	5
45	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1974_0920	2.48E-04	138	1	16
46	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1975_0407	2.50E-04	146	1	17
47	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1975_0724	4.16E-04	195	1	67
48	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1976_0530	2.72E-04	139	1	13
49	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1976_0716	1.29E-04	88	1	1
50	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1977_0327	6.16E-04	186	1	17
51	FortWorth	DryBranch	sta08048600	***IUH_2_sta08048600_1977_0521	5.38E-04	103	22	1
52	FortWorth	DryBranch	sta08048600	IUH_2_sta08048600_1977_0812	2.45E-04	94	1	1
53	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1969_0416	5.46E-04	185	1	109
54	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1969_0506	1.69E-03	605	1	26
55	FortWorth	LittleFossil	sta08048820	***IUH_2_sta08048820_1969_1228	7.28E-05	711	9	1
56	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1970_0916	6.21E-04	488	1	15
57	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1971_0529	2.14E-04	359	1	80
58	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1971_0806	1.10E-04	24	1	24
59	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1971_1019	1.43E-04	406	1	63
60	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1971_1202	8.57E-05	182	1	171
61	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1971_1208	3.44E-04	254	1	90
62	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1972_1021	1.42E-04	103	2	1
63	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1973_0310	1.19E-04	227	1	163
64	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1973_0715	2.03E-04	198	1	56
65	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1973_1012	1.56E-04	268	1	137
66	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1974_0826	1.53E-04	221	1	144
67	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1974_0920	2.01E-04	242	1	8
68	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1974_1109	2.14E-04	161	1	193

69	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1975_0725	4.42E-04	100	1	34
70	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1976_0530	2.44E-04	287	1	77
71	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1976_0716	2.81E-04	166	1	19
72	FortWorth	LittleFossil	sta08048820	IUH_2_sta08048820_1977_0211	6.25E-05	256	1	166
73	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1969_0314	1.64E-04	235	1	188
74	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1969_0416	2.12E-04	289	1	66
75	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1969_0506	2.93E-04	202	1	81
76	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1969_1228	1.36E-04	107	1	306
77	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1970_0430	3.27E-04	139	2	3
78	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1970_0716	1.12E-04	413	1	65
79	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1971_0529	5.21E-05	318	1	121
80	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1971_0815	8.93E-05	78	1	14
81	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1971_1019	2.78E-04	98	1	29
82	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1971_1202	8.54E-05	186	1	121
83	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1971_1208	3.25E-04	168	1	101
84	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1972_1021	8.12E-05	173	1	52
85	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1973_0310	7.43E-05	251	1	38
86	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1973_0715	1.92E-04	72	2	47
87	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1974_0826	8.75E-05	259	1	48
88	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1974_0920	2.34E-04	237	1	65
89	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1974_1030	3.48E-04	191	1	119
90	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1975_0407	2.74E-04	289	1	86
91	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1975_0724	8.54E-04	66	1	68
92	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1976_0530	1.02E-04	330	1	68
93	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1976_0716	4.88E-05	249	1	90
94	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1976_1029	3.18E-05	512	1	87
95	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1977_0327	6.76E-04	211	1	50
96	FortWorth	LittleFossil	sta08048850	IUH_2_sta08048850_1977_0521	2.02E-05	475	1	52
97	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1970_0430	1.39E-04	214	1	36
98	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1970_0530	2.55E-04	175	1	52
99	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1970_0916	7.77E-05	27	2	29
100	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1971_0729	1.24E-04	91	1	26
101	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1971_1019	6.58E-04	95	1	61
102	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1971_1208	3.28E-04	142	1	99
103	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1971_1209	2.21E-04	244	1	51
104	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1972_0429	9.73E-05	143	1	39

105	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1973_0310	9.91E-05	149	1	44
106	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1973_0417	1.09E-04	229	1	37
107	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1973_0603	6.32E-04	250	1	40
108	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1973_0728	2.21E-04	96	1	49
109	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1973_1011	1.33E-04	59	2	11
110	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1973_1012	1.33E-04	216	1	44
111	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1974_0612	1.26E-04	186	1	27
112	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1975_0523	8.76E-05	250	1	46
113	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1975_0608	3.64E-04	235	1	42
114	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1975_0610	1.54E-04	317	1	83
115	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1976_0419	3.99E-04	123	1	78
116	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1976_0530	8.64E-05	167	1	41
117	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1976_0919	7.95E-05	95	1	30
118	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1977_0302	9.31E-05	304	1	41
119	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1977_0327	7.44E-04	123	1	52
120	FortWorth	Sycamore	sta08048520	IUH_2_sta08048520_1977_0521	4.74E-05	85	1	47
121	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1970_0425	4.14E-04	20	1	4
122	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1970_0430	6.86E-04	20	1	1
123	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1970_0530	2.27E-04	12	1	17
124	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1970_0916	3.07E-04	11	1	1
125	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1971_0527	1.67E-04	5	2	12
126	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1971_0728	2.29E-04	6	2	6
127	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1971_0729	5.19E-04	18	1	12
128	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1971_0814	2.99E-04	17	1	6
129	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1971_1019	7.28E-04	48	1	12
130	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1971_1208	4.56E-04	31	1	1
131	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1971_1209	3.02E-04	47	1	2
132	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1972_0429	2.21E-04	12	1	9
133	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1973_0415	3.91E-04	16	1	2
134	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1973_0417	2.53E-04	24	1	4
135	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1973_0603	7.49E-04	18	1	12
136	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1973_0728	6.34E-04	35	1	9
137	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1973_1011	2.22E-04	14	1	1
138	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1974_0607	2.39E-04	6	2	8
139	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1974_0810	1.71E-04	8	1	10
140	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1975_0511	1.62E-04	11	1	10

141	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1975_0608	3.06E-04	18	1	7
142	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1975_0915	3.09E-04	4	2	12
143	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1976_0419	2.96E-04	30	1	7
144	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1976_0703	3.06E-04	19	1	3
145	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1976_0829	2.46E-04	9	2	5
146	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1977_0327	1.15E-03	38	1	6
147	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1977_0612	1.73E-04	12	1	2
148	FortWorth	Sycamore	sta08048530	IUH_2_sta08048530_1977_0727	2.40E-04	4	1	1
149	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1970_0425	3.67E-04	23	1	5
150	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1970_0530	2.23E-04	26	1	4
151	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1970_0916	2.94E-04	16	1	1
152	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1971_0527	2.35E-04	14	1	5
153	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1971_0728	2.98E-04	10	1	8
154	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1971_0729	7.08E-04	24	1	7
155	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1971_0814	4.32E-04	18	1	8
156	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1971_1019	8.06E-04	40	1	7
157	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1971_1208	5.91E-04	26	1	5
158	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1971_1209	3.54E-04	34	1	6
159	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1972_0429	2.30E-04	6	2	5
160	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1973_0415	3.19E-04	10	1	9
161	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1973_0417	2.92E-04	22	1	9
162	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1973_0603	8.12E-04	14	1	13
163	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1973_0728	9.41E-04	31	1	10
164	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1973_1011	3.71E-04	13	1	7
165	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1974_0607	4.82E-04	6	2	10
166	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1974_0810	2.20E-04	3	3	8
167	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1975_0511	2.77E-04	6	1	16
168	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1975_0608	4.09E-04	17	1	12
169	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1975_0915	6.37E-04	6	1	16
170	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1976_0419	3.63E-04	20	1	12
171	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1976_0703	3.82E-04	14	1	6
172	FortWorth	Sycamore	sta08048540	IUH_2_sta08048540_1976_0829	2.16E-04	12	2	2
173	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1970_0530	7.37E-04	5	1	1
174	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1970_0916	7.89E-04	15	1	4
175	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1971_0527	7.10E-04	5	2	1
176	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1971_0728	9.15E-04	9	1	1

177	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1971_0729	9.36E-04	20	1	2
178	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1971_1019	2.53E-03	29	1	1
179	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1971_1208	1.27E-03	21	1	5
180	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1971_1209	7.25E-04	22	1	5
181	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1972_0429	7.72E-04	10	1	1
182	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1973_0415	8.10E-04	6	2	9
183	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1973_0603	1.82E-03	15	1	5
184	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1973_0728	3.21E-03	19	1	8
185	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1973_1011	1.78E-03	10	2	2
186	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1974_0607	1.53E-03	10	1	11
187	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1974_0810	7.22E-04	2	5	5
188	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1975_0511	8.11E-04	8	1	1
189	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1975_0608	8.77E-04	19	1	11
190	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1975_0915	1.06E-03	6	1	12
191	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1976_0419	2.53E-03	13	1	12
192	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1976_0703	1.38E-03	6	1	6
193	FortWorth	Sycamore	staSSSC	IUH_2_staSSSC_1976_0829	6.33E-04	11	1	3

Table A.4. MODEL PARAMETERS FOR SANANTONIO MODULE

Entry	Module	Watershed	Station number	StormName	SumSqErr	T_bar (min)	N_Res	T_lag (min)
1	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_0314	3.630E-06	459	5	1
2	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_0503	5.755E-04	22	1	25
3	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_0515	1.504E-04	27	1	17
4	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_0824	3.54E-04	8	2	3
5	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_1005	2.89E-04	5	2	25
6	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_1012	1.77E-04	21	1	13
7	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1970_0514	1.29E-04	31	1	7
8	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1970_0522	1.14E-04	19	1	18
9	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1970_0528	8.60E-05	55	1	18
10	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1971_0524	6.03E-05	6	2	17
11	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1971_0613	1.43E-04	13	1	15
12	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1971_0801	2.04E-04	12	2	30
13	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1972_0427	7.55E-04	12	1	22
14	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1973_0415	9.15E-04	12	1	16
15	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1973_0612	4.03E-04	24	1	13
16	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1973_0926	8.16E-04	38	1	7
17	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1973_1011	4.03E-04	7	3	5
18	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1974_0830	5.61E-04	16	2	9
19	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1975_0508	3.37E-03	8	1	1
20	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1975_0610	7.53E-04	50	1	8
21	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1975_0624	1.62E-04	67	1	21
22	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1976_0404	3.86E-04	11	2	9
23	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1976_0506	9.82E-04	21	1	17
24	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1976_0829	9.66E-04	17	1	22
25	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1977_0419	7.10E-04	52	1	17
26	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1977_0521	1.36E-03	68	1	10
27	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1977_0531	2.25E-04	88	1	1
28	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1977_0601	1.78E-04	50	1	11
29	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1978_0801	4.09E-04	41	1	6
30	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1979_0321	1.67E-04	50	1	28

31	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1970_0526	5.00E-04	20	1	102	
33	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1972_0506	3.68E-04	45	1	40	
34	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1972_0511	2.51E-04	75	1	38	
35	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1973_0417	3.11E-04	44	1	42	
36	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1973_0716	1.18E-03	29	1	62	
37	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1978_1105	1.06E-04	155	1	28	
38	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1978_1231	7.64E-05	9	4	309	
39	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1979_0110	9.39E-05	76	1	216	
40	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1979_0320	2.02E-04	199	1	14	
41	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1969_0516	5.03E-05	303	1	114	
42	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1970_0523	2.53E-05	472	1	101	
43	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1970_0526	4.20E-04	18	1	158	
44	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1971_0801	1.85E-05	810	2	149	
45	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1971_0812	4.89E-05	206	1	212	
46	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1971_0813	8.72E-05	171	1	137	
47	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1972_0507	3.53E-04	33	1	102	
48	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1973_0716	1.68E-03	59	1	49	
49	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1973_0916	2.38E-04	82	2	63	
50	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1973_0926	2.74E-04	422	1	60	
51	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1974_0912	1.68E-04	79	1	118	
52	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1976_0417	4.38E-04	55	2	118	
53	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1976_0506	1.03E-04	189	1	63	
54	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1976_1023	3.57E-04	492	1	35	
55	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1981_0612	2.21E-04	106	1	106	
56	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1969_0824	6.00E-04	23	1	148	
57	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1970_0316	9.40E-05	42	1	72	
58	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1970_0514	5.79E-04	25	2	30	
59	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1970_0526	1.96E-04	32	2	82	
60	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1971_0524	2.14E-04	52	1	97	
61	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1971_0622	9.97E-04	22	2	36	
62	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1971_0910	2.34E-04	64	1	93	
63	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1972_0507	4.36E-04	60	1	56	
64	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1972_0510	3.51E-04	62	1	72	

65	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1972_0803	4.83E-04	66	2	44	
66	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1972_0926	4.64E-04	59	1	70	
67	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1973_0415	5.76E-04	76	1	66	
68	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1973_0612	4.53E-04	73	1	23	
69	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1973_0926	7.03E-04	112	1	51	
70	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1974_0509	2.43E-04	61	1	77	
71	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1974_0807	7.89E-04	78	1	29	
72	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1974_1123	2.06E-04	200	1	101	
73	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1975_0508	2.54E-04	86	1	71	
74	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1975_1025	2.14E-04	36	2	58	
75	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_0520	2.47E-04	76	1	42	
76	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_0616	1.62E-04	44	2	54	
77	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_0919	4.03E-04	36	1	33	
78	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_0928	3.64E-04	76	1	54	
79	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_1004	6.16E-05	97	1	67	
80	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_1019	1.70E-04	61	2	62	
81	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1977_0509	2.01E-04	78	1	1	
82	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1977_0912	3.64E-04	65	1	47	
83	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1978_0907	4.46E-04	94	1	41	
84	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1979_0419	1.88E-04	69	1	139	
85	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1970_0526	3.42E-04	40	2	27	
86	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1972_0507	1.24E-03	45	1	54	
87	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1972_0511	4.17E-04	55	1	25	
88	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1973_0926	1.03E-03	19	2	41	
89	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1973_1011	6.34E-04	85	1	72	
90	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1974_0808	5.94E-04	160	1	3	
91	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1974_0830	8.63E-04	36	2	59	
92	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1975_0508	1.58E-04	8	1	1	
93	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1975_0610	1.44E-03	509	1	1	
94	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1977_1101	1.13E-03	40	1	73	
95	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1978_0913	5.16E-03	21	2	5	
96	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1981_0612	3.83E-03	39	1	390	
97	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_0503	4.09E-05	158	1	13	

98	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_0516	6.15E-05	488	1	171	
99	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_0824	5.44E-05	128	1	99	
100	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_1005	4.52E-05	125	1	32	
101	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_1012	3.77E-05	178	1	40	
102	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1970_0526	7.69E-05	355	1	46	
103	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1978_0422	1.85E-04	103	1	42	
104	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1978_0913	8.76E-04	42	2	13	
105	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1978_1105	1.84E-04	132	1	85	
106	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1971_0416	1.09E-05	67	2	78	
107	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1971_0801	8.66E-05	988	1	8	
108	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1971_0812	2.23E-05	161	1	75	
109	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1972_0507	1.92E-03	578	1	705	
110	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1973_0612	4.03E-04	127	1	130	
111	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1973_0916	3.16E-04	224	1	56	
112	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1973_0926	3.90E-04	137	1	77	
113	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1973_1011	2.61E-04	260	1	76	
114	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1974_0807	1.94E-04	50	1	110	
115	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1974_0828	4.62E-05	94	1	17	
116	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1975_0508	2.29E-04	113	1	29	
117	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1976_0506	8.44E-04	142	1	44	
118	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1976_1004	1.11E-04	152	1	24	
119	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1977_0419	2.24E-04	227	1	4	
120	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1977_1021	7.01E-04	117	1	72	
121	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1977_1101	6.10E-04	118	1	23	
122	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1978_0410	1.91E-04	114	1	26	
123	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1978_0502	1.69E-04	131	1	217	
124	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1979_0420	2.70E-04	46	2	34	
125	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1979_0601	9.30E-04	101	1	76	
126	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1979_0605	4.37E-04	84	1	121	
127	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1979_0705	5.50E-04	32	1	186	
128	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1980_0513	7.85E-04	46	1	48	
129	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1980_0810	3.50E-04	36	1	219	
130	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1969_0516	8.57E-04	17	2	103	

131	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1969_0826	4.91E-05	18	2	152	
132	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1970_0526	7.34E-05	55	2	136	
133	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1971_0801	2.80E-06	17	3	403	
134	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1971_0804	1.41E-04	4	1	208	
135	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1971_1205	4.81E-04	122	1	100	
136	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1972_0507	9.97E-04	54	1	1	
137	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1972_0511	1.98E-03	40	1	44	
138	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1973_0611	6.69E-04	34	1	68	
139	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1973_0716	5.64E-04	103	1	51	
140	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1973_0926	2.20E-04	38	1	87	
141	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1973_1011	2.57E-04	40	2	135	
142	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1975_0428	1.54E-04	11	2	257	
143	SanAntonio	SaladoCreek	sta08178620	IUH_2_sta08178620_1981_0423	3.93E-05	116	1	188	
144	SanAntonio	SaladoCreek	sta08178620	IUH_2_sta08178620_1981_0529	1.32E-05	53	2	57	
145	SanAntonio	SaladoCreek	sta08178620	IUH_2_sta08178620_1981_0612	1.84E-04	3	5	515	
146	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1976_0507	3.09E-04	28	1	82	
147	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1976_0526	6.92E-05	14	1	99	
148	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1976_0928	1.57E-04	10	2	80	
149	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1977_1101	4.10E-03	43	1	53	
150	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1978_0913	4.78E-04	16	2	106	
151	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1979_0110	2.04E-04	6	4	278	
152	SanAntonio	SaladoCreek	sta08178640	***IUH_2_sta08178640_1979_0601	2.87E-04	5	10	58	
153	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1976_0507	3.92E-04	70	1	193	
154	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1976_0526	1.05E-04	55	1	129	
155	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1976_0706	4.62E-04	32	1	124	
156	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1979_0110	2.49E-04	32	1	308	
157	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1979_0601	2.20E-04	114	1	51	
158	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1969_0604	4.84E-04	14	1	4	
159	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1969_1005	4.40E-04	6	1	14	
160	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1969_1012	3.90E-04	13	1	14	
161	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1970_0306	1.91E-04	7	2	9	
162	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1970_0523	3.74E-04	13	1	6	
163	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1970_0526	1.07E-03	16	1	8	

164	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1970_0925	5.87E-04	11	1	5	
165	SanAntonio	SaladoCreek	sta08178690	***IUH_2_sta08178690_1971_0801	2.28E-04	3	9	11	
166	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1971_0922	2.96E-03	2	7	5	
168	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1972_0506	3.28E-03	482	1	1	
169	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1972_0803	5.28E-04	13	1	12	
170	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1973_0916	1.29E-03	12	1	8	
171	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1973_0926	1.53E-03	8	2	4	
172	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1973_1011	6.87E-04	24	1	6	
173	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1974_0509	8.90E-04	27	1	11	
174	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1974_0808	2.14E-03	1	1	1	
175	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1974_1123	2.38E-03	46	1	1	
176	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1975_0430	1.16E-03	23	2	16	
177	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1975_0508	1.93E-03	24	1	2	
178	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_0404	1.09E-03	18	1	4	
179	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_0506	7.79E-04	28	1	7	
180	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_0616	1.17E-03	21	1	3	
181	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_0818	3.66E-04	20	1	5	
182	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_1004	9.62E-04	36	1	1	
183	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_1015	6.18E-04	57	1	11	
184	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_1019	9.92E-04	63	1	6	
185	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1977_0419	1.35E-03	75	1	1	
186	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1977_0623	7.72E-04	20	2	3	
187	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1977_1101	2.28E-03	19	2	1	
188	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_0422	4.47E-03	30	1	1	
189	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_0606	3.76E-03	33	1	1	
190	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_0907	1.35E-03	21	1	6	
191	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_0913	4.12E-03	38	1	3	
192	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_1126	1.32E-03	38	1	2	
193	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1979_0315	8.76E-04	120	1	1	
194	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1979_0429	2.56E-03	92	1	1	
195	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1979_0601	1.08E-03	44	1	1	
196	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1979_0705	7.82E-04	82	1	15	
197	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1981_0529	1.75E-03	57	1	1	

	198	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1972_0505	4.51E-04	20	1	3	
	199	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1972_0507	9.52E-04	41	1	6	
	200	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1973_0625	6.97E-04	29	1	1	
	201	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1973_0916	6.46E-04	23	1	2	
	202	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1973_0926	1.51E-03	64	1	24	
	203	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1973_1011	8.98E-04	46	1	18	
	204	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1974_0807	1.40E-03	48	1	1	
	205	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1974_1123	6.30E-04	37	1	1	
	206	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1975_0508	6.62E-04	52	1	7	
	207	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1976_0506	1.20E-03	41	1	28	
	208	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1976_0526	1.81E-03	22	1	35	
	209	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1976_0928	1.42E-03	17	2	8	

Table A.4. MODEL PARAMETERS FOR SANANTONIO MODULE

Entry	Module	Watershed	Station number	StormName	SumSqErr	T_bar (min)	N_Res	T_lag (min)
1	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_0314	3.630E-06	459	5	1
2	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_0503	5.755E-04	22	1	25
3	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_0515	1.504E-04	27	1	17
4	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_0824	3.54E-04	8	2	3
5	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_1005	2.89E-04	5	2	25
6	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1969_1012	1.77E-04	21	1	13
7	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1970_0514	1.29E-04	31	1	7
8	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1970_0522	1.14E-04	19	1	18
9	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1970_0528	8.60E-05	55	1	18
10	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1971_0524	6.03E-05	6	2	17
11	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1971_0613	1.43E-04	13	1	15
12	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1971_0801	2.04E-04	12	2	30
13	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1972_0427	7.55E-04	12	1	22
14	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1973_0415	9.15E-04	12	1	16
15	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1973_0612	4.03E-04	24	1	13
16	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1973_0926	8.16E-04	38	1	7
17	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1973_1011	4.03E-04	7	3	5
18	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1974_0830	5.61E-04	16	2	9
19	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1975_0508	3.37E-03	8	1	1
20	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1975_0610	7.53E-04	50	1	8
21	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1975_0624	1.62E-04	67	1	21
22	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1976_0404	3.86E-04	11	2	9
23	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1976_0506	9.82E-04	21	1	17
24	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1976_0829	9.66E-04	17	1	22
25	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1977_0419	7.10E-04	52	1	17
26	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1977_0521	1.36E-03	68	1	10
27	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1977_0531	2.25E-04	88	1	1
28	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1977_0601	1.78E-04	50	1	11
29	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1978_0801	4.09E-04	41	1	6
30	SanAntonio	AlazanCreek	sta08178300	IUH_2_sta08178300_1979_0321	1.67E-04	50	1	28

31	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1970_0526	5.00E-04	20	1	102	
33	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1972_0506	3.68E-04	45	1	40	
34	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1972_0511	2.51E-04	75	1	38	
35	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1973_0417	3.11E-04	44	1	42	
36	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1973_0716	1.18E-03	29	1	62	
37	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1978_1105	1.06E-04	155	1	28	
38	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1978_1231	7.64E-05	9	4	309	
39	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1979_0110	9.39E-05	76	1	216	
40	SanAntonio	LeonCreek	sta08181000	IUH_2_sta08181000_1979_0320	2.02E-04	199	1	14	
41	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1969_0516	5.03E-05	303	1	114	
42	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1970_0523	2.53E-05	472	1	101	
43	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1970_0526	4.20E-04	18	1	158	
44	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1971_0801	1.85E-05	810	2	149	
45	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1971_0812	4.89E-05	206	1	212	
46	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1971_0813	8.72E-05	171	1	137	
47	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1972_0507	3.53E-04	33	1	102	
48	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1973_0716	1.68E-03	59	1	49	
49	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1973_0916	2.38E-04	82	2	63	
50	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1973_0926	2.74E-04	422	1	60	
51	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1974_0912	1.68E-04	79	1	118	
52	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1976_0417	4.38E-04	55	2	118	
53	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1976_0506	1.03E-04	189	1	63	
54	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1976_1023	3.57E-04	492	1	35	
55	SanAntonio	LeonCreek	sta08181400	IUH_2_sta08181400_1981_0612	2.21E-04	106	1	106	
56	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1969_0824	6.00E-04	23	1	148	
57	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1970_0316	9.40E-05	42	1	72	
58	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1970_0514	5.79E-04	25	2	30	
59	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1970_0526	1.96E-04	32	2	82	
60	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1971_0524	2.14E-04	52	1	97	
61	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1971_0622	9.97E-04	22	2	36	
62	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1971_0910	2.34E-04	64	1	93	
63	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1972_0507	4.36E-04	60	1	56	
64	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1972_0510	3.51E-04	62	1	72	

65	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1972_0803	4.83E-04	66	2	44	
66	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1972_0926	4.64E-04	59	1	70	
67	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1973_0415	5.76E-04	76	1	66	
68	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1973_0612	4.53E-04	73	1	23	
69	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1973_0926	7.03E-04	112	1	51	
70	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1974_0509	2.43E-04	61	1	77	
71	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1974_0807	7.89E-04	78	1	29	
72	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1974_1123	2.06E-04	200	1	101	
73	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1975_0508	2.54E-04	86	1	71	
74	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1975_1025	2.14E-04	36	2	58	
75	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_0520	2.47E-04	76	1	42	
76	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_0616	1.62E-04	44	2	54	
77	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_0919	4.03E-04	36	1	33	
78	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_0928	3.64E-04	76	1	54	
79	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_1004	6.16E-05	97	1	67	
80	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1976_1019	1.70E-04	61	2	62	
81	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1977_0509	2.01E-04	78	1	1	
82	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1977_0912	3.64E-04	65	1	47	
83	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1978_0907	4.46E-04	94	1	41	
84	SanAntonio	LeonCreek	sta08181450	IUH_2_sta08181450_1979_0419	1.88E-04	69	1	139	
85	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1970_0526	3.42E-04	40	2	27	
86	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1972_0507	1.24E-03	45	1	54	
87	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1972_0511	4.17E-04	55	1	25	
88	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1973_0926	1.03E-03	19	2	41	
89	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1973_1011	6.34E-04	85	1	72	
90	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1974_0808	5.94E-04	160	1	3	
91	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1974_0830	8.63E-04	36	2	59	
92	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1975_0508	1.58E-04	8	1	1	
93	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1975_0610	1.44E-03	509	1	1	
94	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1977_1101	1.13E-03	40	1	73	
95	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1978_0913	5.16E-03	21	2	5	
96	SanAntonio	OlmosCreek	sta08177600	IUH_2_sta08177600_1981_0612	3.83E-03	39	1	390	
97	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_0503	4.09E-05	158	1	13	

98	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_0516	6.15E-05	488	1	171	
99	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_0824	5.44E-05	128	1	99	
100	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_1005	4.52E-05	125	1	32	
101	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1969_1012	3.77E-05	178	1	40	
102	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1970_0526	7.69E-05	355	1	46	
103	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1978_0422	1.85E-04	103	1	42	
104	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1978_0913	8.76E-04	42	2	13	
105	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1978_1105	1.84E-04	132	1	85	
106	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1971_0416	1.09E-05	67	2	78	
107	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1971_0801	8.66E-05	988	1	8	
108	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1971_0812	2.23E-05	161	1	75	
109	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1972_0507	1.92E-03	578	1	705	
110	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1973_0612	4.03E-04	127	1	130	
111	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1973_0916	3.16E-04	224	1	56	
112	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1973_0926	3.90E-04	137	1	77	
113	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1973_1011	2.61E-04	260	1	76	
114	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1974_0807	1.94E-04	50	1	110	
115	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1974_0828	4.62E-05	94	1	17	
116	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1975_0508	2.29E-04	113	1	29	
117	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1976_0506	8.44E-04	142	1	44	
118	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1976_1004	1.11E-04	152	1	24	
119	SanAntonio	OlmosCreek	sta08177700	IUH_2_sta08177700_1977_0419	2.24E-04	227	1	4	
120	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1977_1021	7.01E-04	117	1	72	
121	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1977_1101	6.10E-04	118	1	23	
122	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1978_0410	1.91E-04	114	1	26	
123	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1978_0502	1.69E-04	131	1	217	
124	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1979_0420	2.70E-04	46	2	34	
125	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1979_0601	9.30E-04	101	1	76	
126	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1979_0605	4.37E-04	84	1	121	
127	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1979_0705	5.50E-04	32	1	186	
128	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1980_0513	7.85E-04	46	1	48	
129	SanAntonio	OlmosCreek	sta08178555	IUH_2_sta08178555_1980_0810	3.50E-04	36	1	219	
130	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1969_0516	8.57E-04	17	2	103	

131	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1969_0826	4.91E-05	18	2	152	
132	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1970_0526	7.34E-05	55	2	136	
133	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1971_0801	2.80E-06	17	3	403	
134	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1971_0804	1.41E-04	4	1	208	
135	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1971_1205	4.81E-04	122	1	100	
136	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1972_0507	9.97E-04	54	1	1	
137	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1972_0511	1.98E-03	40	1	44	
138	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1973_0611	6.69E-04	34	1	68	
139	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1973_0716	5.64E-04	103	1	51	
140	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1973_0926	2.20E-04	38	1	87	
141	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1973_1011	2.57E-04	40	2	135	
142	SanAntonio	SaladoCreek	sta08178600	IUH_2_sta08178600_1975_0428	1.54E-04	11	2	257	
143	SanAntonio	SaladoCreek	sta08178620	IUH_2_sta08178620_1981_0423	3.93E-05	116	1	188	
144	SanAntonio	SaladoCreek	sta08178620	IUH_2_sta08178620_1981_0529	1.32E-05	53	2	57	
145	SanAntonio	SaladoCreek	sta08178620	IUH_2_sta08178620_1981_0612	1.84E-04	3	5	515	
146	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1976_0507	3.09E-04	28	1	82	
147	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1976_0526	6.92E-05	14	1	99	
148	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1976_0928	1.57E-04	10	2	80	
149	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1977_1101	4.10E-03	43	1	53	
150	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1978_0913	4.78E-04	16	2	106	
151	SanAntonio	SaladoCreek	sta08178640	IUH_2_sta08178640_1979_0110	2.04E-04	6	4	278	
152	SanAntonio	SaladoCreek	sta08178640	***IUH_2_sta08178640_1979_0601	2.87E-04	5	10	58	
153	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1976_0507	3.92E-04	70	1	193	
154	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1976_0526	1.05E-04	55	1	129	
155	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1976_0706	4.62E-04	32	1	124	
156	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1979_0110	2.49E-04	32	1	308	
157	SanAntonio	SaladoCreek	sta08178645	IUH_2_sta08178645_1979_0601	2.20E-04	114	1	51	
158	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1969_0604	4.84E-04	14	1	4	
159	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1969_1005	4.40E-04	6	1	14	
160	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1969_1012	3.90E-04	13	1	14	
161	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1970_0306	1.91E-04	7	2	9	
162	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1970_0523	3.74E-04	13	1	6	
163	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1970_0526	1.07E-03	16	1	8	

164	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1970_0925	5.87E-04	11	1	5	
165	SanAntonio	SaladoCreek	sta08178690	***IUH_2_sta08178690_1971_0801	2.28E-04	3	9	11	
166	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1971_0922	2.96E-03	2	7	5	
168	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1972_0506	3.28E-03	482	1	1	
169	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1972_0803	5.28E-04	13	1	12	
170	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1973_0916	1.29E-03	12	1	8	
171	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1973_0926	1.53E-03	8	2	4	
172	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1973_1011	6.87E-04	24	1	6	
173	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1974_0509	8.90E-04	27	1	11	
174	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1974_0808	2.14E-03	1	1	1	
175	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1974_1123	2.38E-03	46	1	1	
176	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1975_0430	1.16E-03	23	2	16	
177	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1975_0508	1.93E-03	24	1	2	
178	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_0404	1.09E-03	18	1	4	
179	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_0506	7.79E-04	28	1	7	
180	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_0616	1.17E-03	21	1	3	
181	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_0818	3.66E-04	20	1	5	
182	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_1004	9.62E-04	36	1	1	
183	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_1015	6.18E-04	57	1	11	
184	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1976_1019	9.92E-04	63	1	6	
185	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1977_0419	1.35E-03	75	1	1	
186	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1977_0623	7.72E-04	20	2	3	
187	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1977_1101	2.28E-03	19	2	1	
188	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_0422	4.47E-03	30	1	1	
189	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_0606	3.76E-03	33	1	1	
190	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_0907	1.35E-03	21	1	6	
191	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_0913	4.12E-03	38	1	3	
192	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1978_1126	1.32E-03	38	1	2	
193	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1979_0315	8.76E-04	120	1	1	
194	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1979_0429	2.56E-03	92	1	1	
195	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1979_0601	1.08E-03	44	1	1	
196	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1979_0705	7.82E-04	82	1	15	
197	SanAntonio	SaladoCreek	sta08178690	IUH_2_sta08178690_1981_0529	1.75E-03	57	1	1	

	198	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1972_0505	4.51E-04	20	1	3	
	199	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1972_0507	9.52E-04	41	1	6	
	200	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1973_0625	6.97E-04	29	1	1	
	201	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1973_0916	6.46E-04	23	1	2	
	202	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1973_0926	1.51E-03	64	1	24	
	203	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1973_1011	8.98E-04	46	1	18	
	204	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1974_0807	1.40E-03	48	1	1	
	205	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1974_1123	6.30E-04	37	1	1	
	206	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1975_0508	6.62E-04	52	1	7	
	207	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1976_0506	1.20E-03	41	1	28	
	208	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1976_0526	1.81E-03	22	1	35	
	209	SanAntonio	SaladoCreek	sta08178736	IUH_2_sta08178736_1976_0928	1.42E-03	17	2	8	

Table A.5. MODEL PARAMETERS FOR SMALL-RURAL-SHEDS MODULE

Entry	Module	Watershed	Subwatershed	Station Name	StormName	SumSqErr	T_bar (min)	N_Res	T_lag (min)
1	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1959_1003	3.10E-04	310	3	446
2	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1959_1215	2.36E-04	23	2	17
3	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1960_1206	2.56E-04	751	1	1
4	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1961_0106	2.10E-04	739	2	1
5	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1961_0205	2.13E-04	182	1	24
6	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1961_0608	1.91E-04	36	1	19
7	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1961_1121	4.04E-05	47	1	71
8	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1962_0427	8.04E-06	337	1	1
10	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1962_0601	2.97E-05	30	1	36
11	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1962_0628	1.73E-06	51	1	8
12	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1962_0630	8.53E-05	42	1	52
13	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1964_0318	1.19E-06	624	1	1
14	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1964_0425	6.08E-07	484	1	22
15	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1964_0426	1.15E-05	55	2	30
16	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	***IUH_2_sta08096800_1964_0615	2.90E-05	248	8	1
17	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1965_0121	7.36E-05	116	1	79
18	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1965_0329	4.89E-04	93	1	52
19	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1965_0509	3.82E-06	185	1	3
20	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1965_0510	1.59E-04	37	1	3
21	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1966_0208	2.83E-04	39	1	20
22	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1966_0424_0055	1.82E-04	31	1	32
24	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1966_0425	9.81E-05	300	1	9
25	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1966_0520	2.21E-04	125	1	4
26	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1966_0521	2.07E-04	72	1	4
27	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1967_0916	3.21E-06	5	1	1
28	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1967_0917	2.08E-05	80	1	51
29	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1967_1109	8.95E-05	92	1	75
30	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1968_0623	3.21E-05	137	1	73
31	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1968_0702	5.99E-05	83	1	119

32	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1968_0708	1.35E-04	35	1	67
33	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1969_0322	1.03E-04	62	1	49
34	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1969_0412	2.28E-04	145	1	38
35	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1969_0417	7.43E-05	157	1	16
36	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1969_0505	1.64E-04	92	1	15
37	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1969_1205	1.23E-04	57	1	57
38	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1970_0223	1.36E-04	42	1	36
39	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1970_0306	1.98E-04	111	1	42
40	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1970_0307	1.32E-04	149	1	14
41	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1970_0316	1.27E-04	87	1	17
42	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1971_0725	1.36E-04	37	1	60
43	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1971_1117	3.75E-04	35	1	29
44	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1971_1209	6.66E-05	166	1	12
45	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1973_0324	2.26E-04	51	1	70
46	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1973_0525	1.44E-04	62	1	40
47	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1973_0603	5.39E-04	49	1	40
48	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1973_1011	1.47E-04	45	1	43
49	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1974_1031	3.28E-04	39	1	107
50	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1974_1123	1.04E-04	215	1	47
51	SmallRuralSheds	BrasosBasin	CowBayou	sta08096800	IUH_2_sta08096800_1975_0201	2.34E-04	86	1	64
52	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1959_1003	1.18E-03	73	1	38
53	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1961_0106	1.04E-04	53	1	182
54	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1961_0204	4.57E-05	496	1	57
55	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1961_0709	1.58E-04	107	1	68
56	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1961_1009	2.32E-04	215	1	51
57	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1962_0907	2.92E-04	70	1	63
58	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1962_1008	1.81E-04	261	1	35
59	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1963_1108	2.84E-04	58	1	73
60	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1964_0421	2.93E-04	84	1	93
61	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1964_0920	3.50E-05	1	1	1
63	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1965_0208	1.26E-04	260	1	66
64	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1965_0515	2.92E-04	78	1	78
65	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1966_0430	2.14E-04	57	1	40

66	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1966_0613	2.29E-04	135	1	71
67	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1967_0914	7.33E-05	97	1	68
68	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1967_0916	1.54E-05	111	1	187
69	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1968_0118	5.18E-05	60	1	141
70	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1968_0119	1.75E-04	134	1	74
71	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1968_0320	5.06E-04	60	1	54
72	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1968_0509	2.28E-05	9	2	6
73	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1968_0510	2.25E-04	272	1	64
74	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1968_0512	9.83E-04	29	2	39
75	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1969_0412	1.87E-04	44	1	163
76	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1969_0506	8.24E-05	171	1	97
77	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1969_0727	3.94E-04	114	1	60
78	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1969_1228	5.72E-05	193	1	127
79	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1970_0303	8.97E-05	145	1	73
80	SmallRuralSheds	BrasosBasin	Green	sta08094000	IUH_2_sta08094000_1971_0528	3.67E-03	51	1	1
81	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1964_0924	1.87E-04	508	1	37
82	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1965_0120	1.54E-03	111	2	100
83	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1965_0425	1.36E-05	288	1	1
84	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1965_0516	6.35E-04	277	1	178
85	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1965_0528	9.92E-04	137	1	110
86	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1966_0424_0000	5.48E-04	103	1	422
87	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1966_0424_1600	1.70E-04	477	1	108
88	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1968_0708	1.05E-03	1640	1	1
89	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1968_1126	5.10E-05	591	1	895
90	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1968_1130	1.55E-04	407	1	380
91	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1969_0412	1.57E-04	1659	1	1
92	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1969_1029	1.00E-05	1564	1	1
93	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1970_0206	4.36E-05	493	1	139
94	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1970_0926	6.40E-05	222	1	897
95	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1970_1023	5.21E-05	437	1	85
96	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1971_0508	1.10E-05	792	1	1
97	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1971_0527	4.87E-06	544	1	1
98	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1971_1208	2.23E-04	644	1	58

99	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08098300	IUH_2_sta08098300_1972_0501	4.84E-05	521	1	548
100	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1964_0924	2.73E-05	772	1	561
101	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1965_0121	3.43E-04	28	2	338
102	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1965_0425	3.60E-05	198	1	271
103	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1965_0516	6.26E-04	362	1	314
104	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1965_0517	5.10E-05	242	1	428
105	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1965_0518	5.70E-05	290	1	243
106	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1965_0528	2.45E-04	433	1	165
107	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1966_0424	4.37E-04	570	1	244
108	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1968_0708	1.05E-03	2549	1	1
110	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1968_1130	8.44E-05	301	1	505
111	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1969_0411	3.30E-04	2003	1	1
112	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1969_1029	2.06E-05	1474	1	1
113	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1970_0206	9.63E-05	390	1	247
114	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1970_0926	6.18E-05	753	1	796
115	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1970_1022	1.30E-05	565	1	1
116	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1971_0508	4.30E-05	549	1	1
117	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1971_0527	2.09E-05	431	1	1
118	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1971_1117	2.33E-04	239	1	483
119	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1972_0429	3.78E-05	193	1	414
120	SmallRuralSheds	BrasosBasin	Pond-Elm	sta08108200	IUH_2_sta08108200_1972_0501	5.25E-05	420	1	716
121	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1960_0104	6.91E-05	85	2	71
122	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1960_1207	4.43E-05	68	1	80
123	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1961_0106	8.13E-05	197	1	38
124	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1961_0204	1.74E-05	1271	1	1
125	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1961_0615	9.62E-05	56	1	66
126	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1962_1008	4.55E-05	53	1	91
127	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1963_0517	4.43E-05	90	1	21
128	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1963_0530	1.57E-04	40	1	47
129	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1963_0914	2.49E-05	1032	2	152
130	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1964_0527	7.31E-05	69	1	21
131	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1964_0528	1.77E-04	54	1	41
132	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1964_0919	7.66E-05	37	1	40

134	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1964_0921	1.68E-04	101	1	26
135	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1965_0208	1.63E-04	62	1	82
136	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1965_0509	2.41E-05	108	1	34
137	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1966_0914	1.35E-04	46	1	22
138	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1967_0817	1.21E-04	39	1	63
139	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1967_0914	7.84E-05	69	1	45
140	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1967_1007	7.03E-05	50	1	62
141	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1968_0409	4.26E-05	90	1	45
142	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1968_0509	8.49E-05	40	1	9
144	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1969_0506	1.34E-04	57	1	53
145	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1969_0823	4.73E-05	69	1	39
146	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1969_0824	7.32E-05	63	1	32
147	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1971_0726	1.21E-03	19	1	72
148	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1971_0727	2.95E-04	67	1	89
149	SmallRuralSheds	ColoradoBasin	Deep	sta08139000	IUH_2_sta08139000_1971_0801	8.62E-04	31	1	61
150	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1960_0104	1.24E-04	121	1	446
151	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1960_1207	8.24E-05	11	1	177
152	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1961_0106	1.81E-05	639	1	43
153	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1961_0204	3.53E-05	244	1	1
154	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1961_0615	3.45E-05	850	1	8
155	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1962_1008	1.85E-04	62	1	31
156	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1963_0505	2.03E-04	104	1	44
157	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1963_0517	5.35E-05	216	1	13
158	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1963_0530	2.88E-05	325	1	22
159	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1963_0914	3.73E-05	52	1	35
160	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1964_0527	1.36E-04	116	1	13
161	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1964_0528	4.59E-05	298	1	24
163	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1964_0920	5.42E-05	140	1	28
164	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1964_0921	1.72E-03	58	1	22
165	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1965_0208	6.69E-05	96	2	54
166	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1965_0509	1.58E-05	262	1	19
167	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1966_0914	4.58E-05	332	1	35
168	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1967_0819	3.88E-05	248	1	99

169	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1967_0914	5.70E-05	332	1	104
170	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1967_0916	2.22E-04	157	1	76
171	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1967_1007	1.46E-05	315	1	67
172	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1968_0527	2.27E-05	262	1	91
174	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1969_0506	6.85E-05	315	1	31
175	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1969_0823	9.77E-05	91	1	56
176	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1969_0824	1.76E-05	268	1	8
177	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1971_0726	8.53E-05	49	1	136
178	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1971_0727	3.45E-04	249	1	1
179	SmallRuralSheds	ColoradoBasin	Deep	sta08140000	IUH_2_sta08140000_1971_0801	6.31E-04	51	1	76
180	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1966_0908	4.62E-05	198	1	58
181	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1966_0918	2.98E-05	228	1	76
182	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1967_0512	1.74E-04	182	1	96
183	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1967_0914	1.60E-04	207	1	211
184	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1967_0921	4.42E-05	312	1	93
185	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1968_0118	1.28E-05	1	1	1
186	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1968_0119	1.38E-04	387	1	158
187	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1968_0319	1.07E-04	368	1	116
188	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1968_0320	1.45E-04	317	1	54
189	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1969_0506	2.23E-05	487	1	95
190	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1969_0603	4.14E-05	297	1	161
191	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1969_0910	8.56E-05	370	1	259
192	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1970_0601	2.87E-05	393	1	135
193	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1971_0801	1.59E-05	118	1	217
194	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1971_0813	1.00E-04	485	1	419
195	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1971_0922	1.59E-04	822	1	167
196	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1971_1018	7.88E-05	451	1	196
197	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1971_1019	4.67E-05	903	1	80
198	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1972_0420	2.38E-05	160	1	125
199	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1973_0422	1.47E-05	173	1	72
200	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1973_0423	8.36E-05	265	1	68
201	SmallRuralSheds	ColoradoBasin	Mukewater	sta08136900	IUH_2_sta08136900_1973_0424	1.96E-05	311	1	27
202	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1961_0603	4.46E-04	92	1	123

203	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1961_0605	2.16E-06	1	1	1
204	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1961_0615	1.65E-04	130	1	147
205	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1961_1009	4.17E-05	248	1	53
206	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1962_0907	3.82E-05	101	1	90
207	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1962_1012	9.80E-05	220	1	71
208	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1963_0519	1.95E-04	90	1	658
209	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1963_0530	4.83E-05	195	1	117
210	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1963_0616	6.82E-05	174	1	80
211	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1964_0420	2.88E-04	32	1	192
212	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1964_0422	5.54E-05	213	1	74
213	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1964_0423	4.85E-04	120	1	66
214	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1964_0424	1.32E-04	189	1	51
215	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1964_0919	1.76E-04	163	1	38
216	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1964_1116	4.89E-04	262	1	83
217	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1965_0509	2.55E-04	237	1	77
218	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1965_1108	3.06E-04	90	2	54
219	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1966_0908	3.46E-05	106	1	58
220	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1966_0918	5.22E-05	173	1	35
221	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1967_0512	1.15E-04	75	1	99
222	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1967_0921	5.87E-05	234	1	31
223	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1968_0118	2.78E-05	162	1	182
224	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1968_0119	1.98E-04	171	1	111
225	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1968_0319	3.33E-04	160	1	110
226	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1968_0616	9.76E-05	219	1	24
227	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1969_0506	1.85E-05	241	1	68
228	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1969_0603	1.94E-04	191	1	140
229	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1969_0910	1.71E-04	142	1	154
230	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1970_0601	1.16E-04	193	1	14
231	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1971_0801	9.87E-05	39	1	293
232	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1971_0813	1.10E-04	159	1	135
233	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1971_0922	5.44E-04	259	1	89
234	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1971_1018	8.45E-05	462	1	77
235	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1971_1019	1.12E-04	257	1	66

236	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1972_0420	6.32E-05	99	1	32
237	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1973_0422	3.60E-05	186	1	24
238	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1973_0423	3.08E-04	228	1	103
239	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137000	IUH_2_sta08137000_1973_0424	2.22E-05	341	1	11
240	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137500	***IUH_2_sta08137500_1959_1003	1.31E-04	151	16	1316
241	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137500	IUH_2_sta08137500_1960_0104	1.09E-04	1892	1	1
242	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137500	IUH_2_sta08137500_1960_0113	3.40E-05	412	1	423
243	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137500	IUH_2_sta08137500_1961_0106	4.74E-05	39	1	1
244	SmallRuralSheds	ColoradoBasin	Mukewater	sta08137500	IUH_2_sta08137500_1961_0215	6.75E-05	320	1	259
245	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1961_1112	1.38E-04	145	1	150
246	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1963_1108	5.57E-05	143	1	133
247	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1963_1109	7.64E-06	555	1	1
248	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1964_0130	5.90E-05	94	1	99
249	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1964_0318	1.02E-04	124	1	101
250	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1964_1104	7.76E-05	114	1	168
251	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1965_0204	2.14E-05	104	1	214
252	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1965_0330	6.98E-06	517	2	117
253	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	***IUH_2_sta08182400_1965_0925	1.73E-06	1	9	1
254	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1965_1202	1.62E-04	42	1	212
255	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1967_0919	6.14E-04	347	1	1
256	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1967_1107	1.86E-05	45	1	1
257	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1967_1109	9.45E-05	163	1	164
258	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1968_0118	4.68E-04	42	1	90
259	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1968_0119	2.98E-04	102	1	44
260	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1968_1126	1.21E-04	456	1	204
261	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1968_1130	1.45E-04	126	1	239
262	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1969_0213	1.17E-04	180	1	60
263	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1969_1006	1.41E-04	131	1	138
264	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1969_1012	3.06E-05	200	1	100
265	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1969_1205	2.47E-06	15	1	1
266	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1970_0523	9.20E-05	136	1	143
267	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1970_0526	1.29E-04	198	1	44
268	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1970_0528	2.36E-04	211	1	44

269	SmallRuralSheds	SanAntonioBasin	Calaveras	sta08182400	IUH_2_sta08182400_1971_0802	5.01E-04	75	4	221
270	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1959_1003	4.28E-05	2	1	1
271	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1960_0113	9.92E-05	51	1	95
272	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1960_0828	1.24E-04	153	1	63
273	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1960_1024	1.40E-03	12	2	14
274	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1960_1120	1.60E-04	98	1	11
275	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1960_1230	4.88E-05	81	1	115
276	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1961_0205	1.49E-04	112	1	51
277	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1962_0601	5.11E-04	55	1	46
278	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1962_0602	3.16E-05	128	1	42
279	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1962_1202	1.31E-04	43	1	42
280	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1962_1220	2.38E-03	5	1	54
281	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1963_0625	1.66E-03	2	2	27
282	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1963_1127	1.50E-04	125	1	116
283	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1963_1212	6.40E-06	76	1	14
285	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1964_0808	8.51E-04	17	2	45
286	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1965_0204	1.98E-04	94	1	92
287	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1965_0216	3.08E-04	67	1	45
288	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1965_0511	2.68E-04	60	1	50
289	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1965_0519	3.92E-04	62	1	26
290	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1965_1018	8.33E-05	26	1	36
291	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1967_0919	1.70E-03	41	1	23
292	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1968_0507	1.08E-03	35	1	54
293	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1968_0511_0030	3.14E-04	91	1	24
294	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1968_0511_1155	6.52E-05	89	1	93
295	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1968_0512	3.93E-04	79	1	28
296	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1969_0603	9.03E-05	129	1	47
297	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1969_0604	4.40E-05	133	1	52
298	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1970_0526	6.06E-05	133	1	60
299	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1970_0528	7.30E-05	53	2	41
300	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1970_0531	2.56E-04	80	1	58
301	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187000	IUH_2_sta08187000_1971_0910	1.35E-04	27	1	44
302	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1962_1202	6.05E-05	129	1	43

303	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1962_1220	1.15E-05	232	1	52
304	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1963_0625	1.16E-04	78	1	61
305	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1963_1127	4.13E-05	124	1	109
306	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1963_1212	5.28E-06	27	1	1
307	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1964_0318	4.11E-05	64	2	17
308	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1964_0808	3.61E-05	70	1	127
309	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1965_0204	7.40E-05	118	1	188
310	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1965_0216	1.88E-04	212	1	182
311	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1965_0511	1.09E-04	118	1	41
312	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1965_0519	1.19E-03	91	1	51
313	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1966_0917	4.12E-05	99	1	65
314	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1967_0919	3.38E-03	75	1	27
315	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1968_0507	3.99E-06	440	1	1
316	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1968_0511_0000	3.23E-04	173	1	161
317	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1968_0511_0245	5.15E-05	153	1	1
318	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1968_0511_1200	8.62E-05	361	1	13
319	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1969_0314	3.15E-05	531	4	1
320	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1969_0504	5.33E-05	554	1	27
321	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1970_0528	3.39E-05	274	1	27
322	SmallRuralSheds	SanAntonioBasin	Escondido	sta08187900	IUH_2_sta08187900_1970_0531	1.12E-04	207	1	28
323	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1961_0325	1.33E-04	184	1	71
324	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1961_0330	6.74E-05	212	1	21
325	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1962_0423	6.30E-05	969	1	1
326	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1962_0618	2.52E-04	60	1	11
327	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1962_0906	6.26E-04	126	1	36
328	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1962_1126	5.17E-04	17	3	30
329	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1963_0530	1.05E-04	46	1	32
330	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1964_0915	1.52E-04	66	1	120
331	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1964_0920	3.84E-04	50	1	40
332	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1964_0922	1.58E-03	61	1	77
333	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1964_0927	1.54E-04	142	1	38
334	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1964_1116	8.06E-05	445	1	135
335	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1964_1117	1.03E-03	83	1	16

336	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1965_0121	3.22E-04	13	1	1
337	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1965_0613	1.89E-04	123	1	68
338	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1965_0919	8.66E-04	17	2	52
339	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1965_0921	2.32E-04	10	3	44
340	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1965_1018	1.77E-04	62	1	35
341	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1966_0208	6.56E-04	56	1	10
342	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1967_0530_0145	7.96E-05	9	1	6
343	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1967_0530_1500	4.12E-04	100	1	12
344	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1968_0118	3.36E-05	546	1	108
345	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1968_0120	2.86E-05	244	1	103
346	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1968_0121	2.71E-05	827	1	1
347	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1968_0311	1.06E-04	489	1	63
348	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1968_0319	2.20E-05	375	1	45
349	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1968_0320	5.70E-04	1181	1	1
350	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1969_0322	4.16E-04	65	1	27
351	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1969_0504	3.67E-05	802	1	1
352	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1969_0506	6.10E-04	65	1	21
353	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1970_0418	5.21E-04	28	1	23
354	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1970_0425	1.21E-03	320	1	62
355	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1970_0430	2.82E-04	90	1	23
356	SmallRuralSheds	TrinityBasin	ElmFork	sta08050200	IUH_2_sta08050200_1970_0925	1.25E-03	18	1	1
357	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1960_0728	1.40E-04	54	1	14
358	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1960_0826	2.17E-04	64	1	48
359	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1961_0106	7.35E-05	1462	1	1
360	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1961_0430	1.04E-03	50	1	5
361	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1962_0423	1.43E-04	209	1	8
362	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1962_0906	5.28E-05	162	1	18
363	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1963_0527	1.55E-04	88	1	18
364	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1963_0530	1.65E-04	84	1	9
365	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1964_0422	4.41E-04	40	1	16
366	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1964_0916	2.07E-04	57	2	17
368	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1964_1117	6.46E-04	112	1	8
369	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1965_0208	4.73E-04	219	1	24

370	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1965_0527	3.56E-04	60	1	1
371	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1966_0423	5.49E-04	37	1	1
372	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1966_0427	1.31E-03	52	1	17
373	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1966_0429	5.16E-04	70	1	10
374	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1966_0430	1.92E-03	33	1	2
375	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1967_0530_0000	5.55E-05	2	5	6
376	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1967_0530_0700	3.46E-04	78	1	17
377	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1967_0904	4.23E-06	812	1	560
378	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1967_0905	1.16E-04	145	1	1
379	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1968_0319	1.03E-03	89	1	9
380	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1968_0418	3.68E-04	72	1	18
381	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1968_0516	3.97E-04	102	1	11
382	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1969_0221	1.79E-04	115	1	32
383	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1969_0506	4.41E-04	79	1	20
384	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1969_0514	3.41E-04	31	2	15
385	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1969_0517	4.64E-04	62	1	33
386	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1969_0623	1.85E-04	78	1	10
387	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1970_0302	3.37E-04	159	1	18
388	SmallRuralSheds	TrinityBasin	Honey	sta08057500	IUH_2_sta08057500_1970_0601	9.82E-05	192	1	5
389	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1959_1215	2.98E-04	189	1	55
390	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1960_0203	6.50E-05	196	1	42
391	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1960_0525	4.69E-04	45	1	36
392	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1960_0608	2.77E-04	36	1	31
393	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1961_0106	1.16E-04	324	1	58
394	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1961_0430	7.95E-04	45	1	34
395	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1962_0423	3.18E-04	745	1	19
396	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1962_0906	3.27E-04	233	1	33
397	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1963_0527	5.31E-04	88	1	32
398	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1963_0530	2.69E-04	39	1	25
399	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1964_0422	5.55E-04	36	1	24
400	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1964_0916	4.14E-04	81	1	63
401	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1964_0920	2.02E-03	51	1	39
402	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1964_1117	7.23E-04	41	1	8

403	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1965_0208	4.93E-04	72	1	1
404	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1965_0527	8.68E-04	13	2	33
405	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1966_0423	1.08E-03	16	1	39
406	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1966_0427	1.34E-03	30	1	28
407	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1966_0429	9.80E-04	32	1	27
408	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1966_0430	9.95E-04	35	1	18
409	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1967_0530_0200	2.86E-05	171	1	51
410	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1967_0530_1700	6.14E-04	38	1	22
412	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1967_0905	1.11E-04	142	1	61
413	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1969_0623	2.54E-04	26	2	30
414	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1970_0302	3.07E-04	59	1	27
415	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1970_0425	1.25E-03	20	1	12
416	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1970_0430	1.89E-04	31	1	21
417	SmallRuralSheds	TrinityBasin	Honey	sta08058000	IUH_2_sta08058000_1970_0601	2.15E-04	23	1	29
418	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1966_0423	3.69E-04	617	1	144
419	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1966_0427	5.28E-04	150	1	29
420	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1966_0830	7.80E-05	197	1	3
421	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1967_0420	4.10E-04	10	1	47
422	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1967_0530	1.18E-03	22	1	23
423	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1968_0319	8.27E-04	145	1	22
424	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1968_0422	4.76E-04	122	1	67
425	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1968_0509	2.16E-04	87	1	98
426	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1968_0510	3.40E-04	183	1	55
428	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1969_0220	4.08E-04	75	1	36
429	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1969_0506	4.22E-04	95	1	51
430	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1969_1228	3.70E-04	260	1	34
431	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1970_0425	1.02E-03	82	1	8
432	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1970_0430	1.88E-04	213	1	63
433	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1971_1117	1.06E-03	67	1	30
434	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1973_0102	1.30E-04	248	1	138
435	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1973_0730	2.29E-04	89	1	95
436	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1973_0926	4.47E-04	187	1	81
437	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1973_1011	2.52E-04	236	1	72

438	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1973_1030	2.76E-04	164	1	69
439	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1974_0924	1.24E-04	158	1	168
440	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1974_1030	1.29E-03	47	1	25
441	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1975_0407	4.39E-04	113	1	33
442	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1975_0514	1.55E-04	129	1	128
443	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1975_0608	4.56E-04	79	1	64
444	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1975_0609	1.97E-04	155	1	21
445	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1976_0419	6.71E-04	46	1	28
446	SmallRuralSheds	TrinityBasin	LittleElm	sta08052630	IUH_2_sta08052630_1976_0506	3.01E-04	220	1	67
447	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1959_1003	2.14E-04	2409	1	1
448	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1959_1103	1.87E-04	824	1	414
449	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1959_1215	4.32E-05	744	1	846
450	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1960_0718	8.45E-06	291	1	298
451	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1960_0719	2.52E-05	515	1	129
452	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1960_0724	3.78E-05	1483	1	159
453	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1960_0728	2.69E-05	734	1	570
454	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1961_0106	1.58E-04	601	1	1
455	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1961_0911	2.28E-05	2326	5	1
456	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1962_0422	1.97E-04	1368	1	1
457	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1962_0427	5.37E-05	1022	1	413
458	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1962_0629	1.31E-04	762	1	371
459	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1962_0906	3.45E-04	628	1	610
460	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1962_1124	4.04E-06	403	1	676
461	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1962_1126	6.05E-05	897	1	666
462	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1963_0426	5.47E-05	205	1	1
463	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1963_0428	1.30E-04	1102	1	354
464	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1963_0527	4.97E-05	907	1	689
465	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1963_0530	1.16E-04	782	1	801
466	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1964_0422	1.37E-04	506	1	237
467	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1964_0424	8.40E-05	962	1	1
468	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1964_0426	1.08E-05	985	1	724
469	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1964_0920	4.65E-04	115	1	1
470	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1964_0922	6.36E-05	985	1	356

471	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1964_1117	4.61E-04	1029	1	8
472	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1965_0208	8.56E-05	492	1	623
473	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1965_0613	1.56E-04	896	1	516
474	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1965_0921	8.96E-04	695	1	1
475	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1966_0423	9.49E-05	2502	1	782
476	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1966_0427	5.49E-04	951	1	307
477	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1966_0830	1.45E-05	792	1	1
478	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1967_0420	3.86E-05	946	1	854
479	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1967_0530	5.46E-04	370	1	363
480	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1968_0319	2.41E-04	879	1	308
481	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1968_0422	8.12E-05	1270	1	184
482	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1968_0509	4.00E-05	881	1	550
483	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1968_0510	5.77E-05	429	1	1
484	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1968_0512	1.15E-04	1169	1	332
485	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1969_0220	9.09E-05	972	1	373
486	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1969_0506	3.16E-04	981	1	130
487	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1969_1228	9.84E-05	759	1	479
488	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1970_0425	2.57E-04	639	1	469
489	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1970_0430	1.41E-04	1536	1	231
490	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1971_1117	1.49E-04	1535	1	127
491	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1971_1208	2.05E-04	896	1	347
492	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1973_0102	2.16E-05	560	1	1
493	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1973_0730	2.59E-05	1017	1	426
494	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1973_0926	2.87E-04	1070	1	726
495	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1973_1030	7.28E-05	1569	1	570
496	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1974_0421	7.64E-05	1044	1	423
497	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1974_0924	8.53E-05	1280	1	587
498	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1974_1030	3.94E-04	776	1	199
499	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1975_0407	1.14E-04	1123	1	76
500	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1975_0529	9.61E-05	1301	1	318
501	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1975_0608	1.93E-04	2000	1	116
502	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1976_0418	9.95E-05	1282	1	1
503	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1976_0526	9.34E-05	895	1	391

504	SmallRuralSheds	TrinityBasin	LittleElm	sta08052700	IUH_2_sta08052700_1976_0530	5.17E-05	1289	1	217
505	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1973_0729	2.13E-05	184	1	1
506	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1973_0730	1.15E-04	81	1	60
507	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1973_1012	1.63E-04	78	1	107
508	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1974_0829	8.83E-05	393	1	24
509	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1974_1030	3.57E-04	75	1	61
510	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1975_0502	2.58E-04	117	1	75
511	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1975_0826	4.87E-05	133	1	39
512	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1976_0419	5.49E-05	59	1	103
513	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1976_0919	2.69E-04	96	1	139
514	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1977_0326	5.09E-04	54	1	119
515	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1977_0523	1.18E-04	203	1	21
516	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1978_0409	1.95E-04	73	1	62
517	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1978_0805	1.15E-04	88	1	114
518	SmallRuralSheds	TrinityBasin	North	sta08042650	IUH_2_sta08042650_1979_0417	3.08E-05	160	1	127
519	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1959_1003	7.60E-04	303	1	100
520	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1962_0609_0000	1.04E-04	132	1	155
521	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1962_0609_2400	7.25E-04	174	1	78
522	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1962_0727	2.24E-04	124	1	177
523	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1962_0905	3.09E-05	1091	1	1
524	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1962_0907	1.34E-04	171	1	173
525	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1962_1126	1.03E-04	294	1	84
526	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1963_0426	2.35E-04	219	1	167
527	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1963_0428	2.98E-04	271	1	123
528	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1963_0527	3.72E-06	311	1	41
529	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1963_1119	1.07E-04	52	1	122
530	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1964_0529	1.84E-04	217	1	37
532	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1964_1117	1.35E-04	81	2	66
533	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1964_1118	1.05E-04	177	1	104
534	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1965_0512	1.11E-04	178	1	155
535	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1965_0513	4.37E-05	229	1	180
536	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1965_0518	4.25E-05	139	1	105
537	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1965_0918	2.61E-04	174	1	88

538	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1967_0529_0000	8.37E-05	146	1	232
539	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1967_0529_2400	2.24E-05	155	1	154
540	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1967_0530	1.12E-04	244	1	72
541	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1967_0705	6.67E-05	25	2	714
542	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1967_0921	2.70E-05	175	1	61
543	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1968_0118	7.10E-06	142	5	128
544	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1968_0119	2.96E-05	70	1	331
545	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1968_0121	7.19E-06	555	1	116
546	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1968_0311	4.37E-05	584	1	225
547	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1968_0605	5.66E-05	255	1	84
548	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1968_0708	3.20E-05	128	1	220
549	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1968_0718	3.29E-05	148	1	171
550	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1969_0307	2.68E-05	64	2	185
551	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1969_0314	1.71E-04	1120	3	1
552	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1969_0323	5.10E-05	215	1	147
553	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1969_0504	3.22E-04	193	1	113
554	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1969_0506	1.85E-04	254	1	83
555	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1969_1228	5.85E-05	163	1	208
556	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1970_0306	7.70E-06	674	1	471
557	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1970_0425	1.56E-04	222	1	94
558	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1970_0429	4.09E-05	374	1	266
559	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1970_0430	2.15E-04	230	1	66
560	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1971_0922	5.80E-05	193	1	89
561	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1972_0427	2.27E-05	172	1	86
562	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1972_0511	2.29E-04	132	1	1
563	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1973_0728	1.71E-06	133	1	1
564	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1973_0730	4.85E-05	100	1	109
565	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1973_1012	1.08E-04	278	6	141
566	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1974_0829	1.46E-04	238	1	41
567	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1974_1030	2.37E-04	366	1	73
568	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1975_0502	1.06E-04	489	1	77
569	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1975_0826	4.72E-05	115	1	28
570	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1976_0419	2.87E-05	94	1	83

571	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1976_0919	1.95E-04	270	1	131
572	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1977_0326	1.64E-04	651	1	79
573	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1977_0523	3.06E-04	207	1	41
574	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1978_0409	2.00E-04	219	1	122
575	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1978_0805	3.12E-05	91	1	131
576	SmallRuralSheds	TrinityBasin	North	sta08042700	IUH_2_sta08042700_1979_0417	2.02E-05	188	1	96
577	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1959_1003	6.58E-04	271	1	124
578	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1959_1215	1.84E-04	155	1	386
579	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1959_1231	3.29E-04	2238	1	32
580	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1960_0104	9.05E-05	258	1	208
581	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1960_1018	1.80E-04	254	1	271
582	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1960_1206	4.33E-04	272	1	219
583	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1961_0215	2.47E-04	288	1	180
584	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1961_0617	3.77E-04	195	1	226
585	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1961_1121	5.33E-04	395	1	94
586	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1962_0427	4.33E-04	284	1	128
587	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1962_0528	3.89E-05	272	1	183
588	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1965_0509	9.01E-05	430	1	117
589	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1965_0514	2.46E-04	425	1	177
590	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1965_0516	2.40E-04	614	1	1
591	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1966_0417	2.46E-04	439	1	85
592	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1966_0422	3.55E-04	468	1	54
593	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1967_0417	5.62E-05	856	1	106
594	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1967_0611	1.65E-04	793	1	50
595	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1967_1029	3.84E-04	476	1	198
596	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1967_1109	2.52E-04	269	1	287
597	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1968_0310	2.31E-04	351	1	144
598	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1968_0426	3.28E-04	337	1	209
599	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1968_0509	1.01E-03	133	1	296
600	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1968_0602	3.41E-04	373	1	197
601	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1968_0623	4.20E-04	105	1	305
602	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1969_0404	1.90E-04	468	1	193
603	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1969_0505	1.61E-04	653	1	63

604	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1969_0506	2.96E-05	109	1	1
605	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1970_0224	1.27E-04	857	1	86
606	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1970_0301	1.05E-04	1218	1	60
607	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1970_0306	7.47E-05	1194	1	124
608	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1970_0916	2.56E-04	738	1	192
609	SmallRuralSheds	TrinityBasin	PinOak	sta08063200	IUH_2_sta08063200_1971_1210	3.88E-04	314	1	131