Developing a Large Woody Debris Budget for the Lower San Antonio River

By
Alex Brown, Matthew McBroom, Yanli Zhang

Presented to
Texas Water Development Board

In Fulfillment of
TWDB Contract No
1104831140

Final Report

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Introduction

Large woody debris (LWD) and woody debris jams are important components to the aquatic ecosystem of rivers and streams throughout the United States, but only relatively recently has their importance been recognized. Prior to the understanding that LWD played such a pivotal role in aquatic biotic diversity, wood in rivers was seen as a nuisance and was removed during the 19th and 20th centuries to improve navigation (Dolloff, 1993) and reduce flooding (Montgomery *et al.*, 2003).

LWD has been shown to be valuable for providing aquatic invertebrates and fish communities with feeding and cover habitat (Benke and Wallace, 1990; Bilby 1984). LWD and woody debris jams also serve as an influence on channel morphology and channel hydraulics necessary to maintain a complex riverine system (Hart, 2003; Abbe and Montgomery, 1996; 2003). The majority of studies of LWD and woody debris jams are from high gradient, forested watersheds that have a lower amount of anthropogenic influences and are predominantly focused toward river hydraulics and physical impact of LWD in streams. Fewer studies have examined low gradient rivers and streams that are highly impacted by anthropogenic influences such as a rapid increase in urbanization and increased water demand.

Factors influencing input, export, and decay of LWD in rivers are not clearly understood in the southeastern United States. LWD can come directly from river bank riparian vegetation because of natural mortality, bank erosion, or windthrow. LWD can also be imported from upstream sources due to flooding or other natural disasters. Export of LWD can involve downstream transport of floating pieces during high flow events, pieces becoming deposited out of the bank-full channel during a flooding event, or because of decay breaking down the wood. Under natural conditions it is believed that a natural balance of import and export would exist over the long term however, it is not known to what extent management has affected LWD dynamics.

Developing a LWD budget, which is a current estimate of input rates, retention rates, and export rates for LWD within the Lower San Antonio River, will be extremely useful for natural resource managers in the future. The data collected and analyzed in this study will represent the current land use and streamflow conditions in the river. It is not known if current conditions represent natural LWD input, export, and decay rates.

Importance of Large Woody Debris in a River System

Biological Importance

LWD is a fundamental component of habitat for a variety of aquatic species; all pieces of LWD that intersect the bank-full profile of a stream can influence the channel habitat and morphology (Dolloff, 1993). LWD can have varied impacts on the invertebrate communities of streams, especially if stable inorganic substrates are a limiting factor (Wallace *et al.*, 1993). Frequently, woody debris is the most stable substrate available in some streams: it provides attachment sites for feeding, concealment sites, pupation sites for larvae, and resting sites for adult invertebrates (Wallace *et al.*, 1993). Submerged LWD in the Ogeechee River in Mississippi has been found to provide stable areas for aquatic invertebrates to establish colonies and maintain populations. LWD might represent up to 50% of the total surface area for the benthic habitat (Benke and Wallace, 1990). LWD improves invertebrate abundance and biomass, which provide an enhancement to higher trophic levels that feed on the invertebrate communities (Wallace *et al.*, 1993).

LWD also provide cover habitat for fish; in an Alaskan stream a 80% decrease in the Dolly Varden char population was observed following debris removal (Bilby, 1984). Along with providing direct cover and concealment locations for fish, LWD is a critical element in pool formation in streams. Just as individual pieces of LWD are important sites for aquatic invertebrates and fish, conglomerations involving several pieces of LWD are equally important and provide larger areas for organisms to utilize. LWD is the main structural components of a log jam and are essential to the creation of complex habitat. Several fish species need a heterogeneous habitat that includes pools with greater depth and lower flow, especially during droughts or floods (Dolloff, 1993). In streams with modified channels or that lack adequate LWD input, pool habitats are reduced, resulting in the potential of the aquatic ecosystem to be less adaptable to extreme events (Dolloff, 1993).

When a woody debris jam first forms, it may degrade fish habitat by allowing sediment to accumulate or erode; however, over the long term, log jams create a varied and complex environment ideal for aquatic habitat (Hogan and Bird, 1998). The addition of a LWD jam in the Little Topashaw Creek, North Central Mississippi, increased the blacktail shiner (Cyprinella venusta) and largemouth bass (Micropterus salmoides) populations in an incised bend (He *et al.,* 2009). LWD and woody debris jams also affect the local riparian forest structure and serve to manipulate the succession of bankside vegetation by forcing changes in channel morphology (Abbe and Montgomery, 1996).

Structural Importance

The geomorphology of any given stream is based on a combination of factors that interact over time; impacts to any of these factors have the potential to greatly influence the natural processes of a stream. LWD impacts the channel morphology directly by diverting stream flow, eroding stream banks, and trapping sediments. When LWD enters a stream it will begin to immediately affect local flow patterns by influencing sediment scour-fill patterns, developing pools and point bars, which create a more heterogeneous and complex stream ecosystem (Dolloff, 1993). An Appalachian headwater stream surrounded by old-growth forest had higher occurrences LWD obstructions, with longer residence times than a stream surrounded by 80-year old forest that had been previously logged. The old-growth forest produced LWD that was larger and maintained higher level of sediment storage than the relatively younger 80-year old logged stand (Hart, 2003). Sediment storage was found to be almost 25 times higher in the stream that had old-growth forest as a source of woody debris input compared to the previously logged 80 year old forest. Hart (2003) also found that the channel cross-sections 1 m upstream of LWD were wider and shallower than the reach-average cross-sections. During periods of flooding, LWD can deflect the flow and slow the velocity of water, dampening flood peaks in downstream areas (Dolloff, 1993).

The complex structure of debris jams is more hydraulically efficient in causing morphological change than does a single large log (Manners and Doyle, 2008). In coastal Washington, LWD jams form scour pools and point bars and are a principle mechanism for controlling reach-level habitat diversity. LWD jams can act as hydraulic control structures, diverting flow in different directions and affecting local geomorphology at a larger scale than individual pieces of LWD. Large sized trees are needed to create stable jam structures that can maintain a healthy aquatic ecosystem over several decades (Abbe and Montgomery, 1996).

Debris Jam Structure, Formation, and Classification

A woody debris jam is a structure composed of interacting pieces of LWD and woody debris that influence river hydraulics and sediment transport affecting channel morphology (Figure 1). The influence a woody debris jam has on channel morphology is proportional on the relative size of the jam compared to the stream and the residence time of the jam (Hogan and Bird, 1998). Log jams contain three types of LWD: key members, racked members, and loose debris (Abbe and Montgomery, 2003).

Woody debris jams can be categorized by the physical structure of the jam and how the main key members of the jam were originally deposited. Key member pieces of LWD form the foundation of most woody debris jams and serve to anchor the jam into place; racked LWD are pieces that may be lodged against some form of obstruction in the channel; loose LWD are pieces that fill voids in a jam structure and add to the overall volume of the jam, but do not provide any significant structural support (Abbe and Montgomery, 1996; 2003).

Figure 1. Due to bank erosion an eastern cottonwood tree fell into the river and has created a LWD jam at the Charco site, picture taken facing downstream on July 18, 2011.

Initial woody debris jam formation begins with the deposition of key members. Key members can either remain where they initially entered the stream channel or they can be transported downstream some distance. The position of the key members is used to classify the jam structure. A key member that falls perpendicular to the flow in a straight reach of a stream may begin to form a flow deflection jam when racked LWD pieces begin to catch on the initial key member. LWD can also be transported downstream if it does not initially become lodged in either the bed sediment or on some other obstruction and may become lodged on the outer bend of a meander forming a meander jam. Meander jams typically form because the current velocity increase on the outer edge and the increased flow deposits the LWD. Meander jams act as armor to protect the bank from erosion (Abbe and Montgomery, 1996; 2003).

LWD Input and Export

Sources of LWD Input

The narrow band of land adjacent to both sides of the river is known as the riparian zone and is responsible for a large majority of LWD in streams (Dolloff, 1993). LWD can enter a stream through a variety of natural and anthropogenic processes. Past and present land use has a large impact on the input of LWD into streams as well as insects and diseases affecting riparian tree species (Dolloff, 1993). Trees along the banks of a river can have their root systems undercut due to bankside erosion, which greatly reduce the stability of the tree. An undercut root system exposes the tree to an increased chance for windthrow and bank collapse (Dolloff, 1993). McClure *et al.* (2004) suggested that in steep gradient forested watersheds, 15.2 meter buffer zones following a logging operation, may not prevent windthrow from increasing LWD loading more than unharvested areas.

Periodic large scale flooding along rivers and streams is a potential source for LWD to enter into the riverine system (Palik *et al.*, 1998; Golladay and Battle, 2005). Over time frequent flooding can potentially lead to decreases in future sources of LWD along certain reaches within a river (Palik *et al.*, 1998).

Transport of LWD Instream

LWD transport can be extremely variable between different stream systems and even within the same stream along different reaches; pieces have the potential to remain in the same position for many years or can be transported downstream during the next high flow event (Dolloff, 1993). Some factors affecting LWD transport include: channel width, stream flow, piece size, and wood physical properties (Curran, 2010; Dollof, 1993; Wohl and Goode, 2008;). Increased discharge of rivers during high flow and flood events increases the power of the river, allowing for increased transport of LWD downstream. Wohl and Goode (2008) found that longer pieces of LWD had higher residence times in headwater streams in Colorado. Longer pieces of LWD have a greater chance of becoming lodged against obstructions within the stream channel, allowing these pieces to stay in the same position for extended periods of time. Curran (2010) found that on the Lower San Antonio River in a 72 km study reach, all of the LWD jams that were inventoried had moved within four years, concluding that LWD is very mobile within some low-gradient rivers (Figure 2 and 3).

Depending upon the size of the stream, LWD will have varied accumulation patterns and localized effects on the stream morphology. Intermediate sized streams have enough power to float LWD pieces, but some LWD may still span the width or almost the width of the stream and accumulations will form at channel constrictions or on point bars (Dolloff, 1993). Within large streams LWD will collect on the outside of a bend where velocities are greater, along point bars, and along the edges of the stream in straighter sections (Dolloff, 1993).

Figure 2. An example of a meander jam created by highly mobile LWD at the Calaveras site, picture taken facing downstream on July 11, 2011.

Figure 3. An example of a flow deflection jam created by a fallen tree combined with highly mobile LWD at the Floresville site, picture taken facing downstream on August 23, 2011.

Sources of LWD Export

In Oregon, three streams were analyzed by adding woody debris to the streams to observe the movement of debris through the stream; it was found that small woody debris was washed downstream during periodic higher flow events and that some larger debris was also transported downstream due to the increased flow (Keim *et al.*, 2000). High flow events, especially flooding events, can transport large quantities of LWD downstream (Palik *et al.*, 1998).

LWD can be lost as a result from decay and structural weakness, breaking larger pieces into smaller more mobile pieces. Loss of mass occurs incrementally over a period of time until a critical point in the strength of the LWD is reached, leading to structural failure of the piece (Benda and Sias, 2003).

Bankside Vegetation

Source of Future LWD

In a study of eastern Kentucky forested watersheds, a riparian buffer zone of 15.2 meters may not have been effective in preventing an immediate increase in woody debris compared to an unharvested control forest. Within the steep gradient streams, even with the riparian buffer, there was in increase in the woody debris loading as much as 18 years following a harvesting operation. Possible increases could have come from windthrow of buffer edge trees (McClure *et al.*, 2004). As a result of human activity LWD loading could increase, potentially altering the natural cycle of bankside vegetation.

Geomorphic differences among river reaches result in differing patterns of LWD recruitment. During flooding events on a creek in Georgia, stream reaches that were constrained by riparian landform elevations had the highest level of tree mortality and debris recruitment, compared to stream reaches that were unconstrained (floodplains) (Golladay and Battle, 2005). The upstream reach of the creek had more flow constriction resulting in greater velocity: this was observed by the higher number of LWD pieces oriented parallel to the bank. Different orientation patterns of LWD suggest differing forms of input into the riverine system. Bankside trees in the floodplain were likely to enter into the river through undercutting of the bank or bank collapse into the active channel. There is a source-sink relationship between constrained river reaches and unconstrained river reaches. It appears that constrained reaches of streams are a large source for LWD while unconstrained reaches are debris sinks that evenly disperse LWD throughout higher order reaches (Palik *et al.*, 1998; Golladay and Battle, 2005). This suggests that protection of key areas upstream of higher order rivers may be essential to maintaining levels of LWD for the future.

Bankside vegetation is also important for riparian area ecosystem health, and late successional stands (basal area > 30 m^2 ha^{-1}) provide important habitat for a wide variety of animals in the southeastern United States. However, very few riparian areas meet this criteria and are in need of restoration (Rheinhardt *et al.*, 2009).

LWD Decay

Rates of Decay

There have been relatively few studies that have looked at decay rates of wood within streams and along stream banks; little is known about decay rates in natural conditions (Hart, 2003). It is understood that under aerobic conditions, decomposition of wood is more rapid than anaerobic conditions, thus LWD that is submerged will decay at slower rates than bankside LWD (Bilby *et al.*, 1999). Benke and Wallace (1990) found that in swamps of the Ogeechee River, estimates of woody debris mass were lower than would be expected in a swamp in this region due to wood washing into the river and because of rapid decomposition under warm, humid conditions.

Wood immersed in water exhibits slower rates of decay than terrestrial wood, which indicates LWD that is submerged within the stream channel throughout the year will decay slower than LWD that is periodically wetted and dried (Bilby *et al.*, 1999). Under submerged conditions wood decay will slow over time with the decomposition affecting the outer portion of the wood (Bilby *et al.*, 1999).

Decomposition of woody debris is often expressed as a negative exponential decay rate of function as:

$$X = X_o e^{-kt} \quad (1)$$

Where; X_o is the initial mass, density, or volume of wood, k is the decay rate constant, t is the amount of time in years, and X is the quantity of material left (Scherer 2004). In a study by Spies *et al.* (1988) terrestrial decay rate constants of LWD in Douglas-fir forests in the Pacific Northwest were estimated at 0.029 yr^{-1}. Bilby *et al.* (1999) estimated decay rate constants between 0.026 – 0.038 yr^{-1} for submerged LWD in western Washington. Based on the cooler climate in that region of the country decay rates would be expected to be lower than in the hotter and more humid southeastern portion of the United States. Harmon *et al.* (1986) found rates of decay ranging from 0.004-0.520 yr^{-1} depending upon the species in temperate ecosystems. Due to climate differences of the Pacific Northwest and the southern United States, a higher value of 7% mass loss per year was used in this study. Benda and Sias (2003) utilize the mass loss per year to equate volume loss per year due to structural weakness and breakup of LWD once it has lost a critical amount of mass.

LWD Loading

Developing a LWD Budget

LWD dynamics in and around rivers and streams is a very complex process with a large number of variables, especially depending upon regional variations. Developing a LWD budget will require estimates of inputs and outputs into a riverine system (Figure 4). Benda and Sias (2003) developed a general balance equation for LWD in a river system based on input, output, and decay. They define the mass balance of LWD in a unit length of the channel as:

$$\Delta S_c = \lfloor L_i - L_o + Q_i/\Delta x - Q_o/\Delta x - D \rfloor \Delta t, \quad (2)$$

the change in storage (ΔS_c) within a reach length (Δx) for a given period of time (Δt). Storage of wood within a channel is affected by lateral wood recruitment (L_i); loss of wood due to overbank deposition or the abandonment of jams (L_o); fluvial transport into (Q_i) and out of (Q_o) a reach segment; and in situ decay (D). This equation can be applicable to any number of rivers because of the broad nature of the equation and has

been used in the southeastern United States to develop a LWD budget on the lower Sabine River in Texas (McBroom, 2010).

Total lateral wood recruitment can be calculated using the following equation:

$$L_i = I_m + I_f + I_{be} + I_s + I_c, \quad (3)$$

where L_i is the total lateral recruitment rate of LWD for a given unit length per year, I_m is the rate of forest natural mortality recruitment, I_f is the recruitment rate of trees following fires or windstroms, I_{be} is the recruitment rate of trees from bankside erosion, I_s is the recruitment rate of LWD from landslides and avalanches, and I_e is the input rate from the exhumation of buried LWD or the abandonment of LWD jams (Benda and Sias, 2003). Based on topography and regional characteristics the following variables were not examined in this study and excluded from the final calculations, I_f, I_s, and I_e.

The input from natural tree mortality can be defined by the following equation from Benda and Sias (2003):

$$I_m = \lfloor B_L M H P_m \rfloor N, \quad (4)$$

where I_m is the recruitment rate of natural forest mortality, B_L volume of standing live biomass per unit area, M is the mortality rate as a percent, H is the average stand height, P_m is the average fraction of tree stem length that becomes in-channel LWD as a percent, and N is the number of contributing banks.

The input from bank erosion can be defined by the following equation from Benda and Sias (2003):

$$I_{be} = \lfloor B_L E P_{be} \rfloor N, \quad (5)$$

where I_{be} is the recruitment rate of LWD from bank erosion, B_L volume of standing live biomass per unit area, E is the mean bank erosion rate, P_{be} is the average fraction of tree stem length that becomes in-channel LWD as a percent, and N is the number of contributing banks.

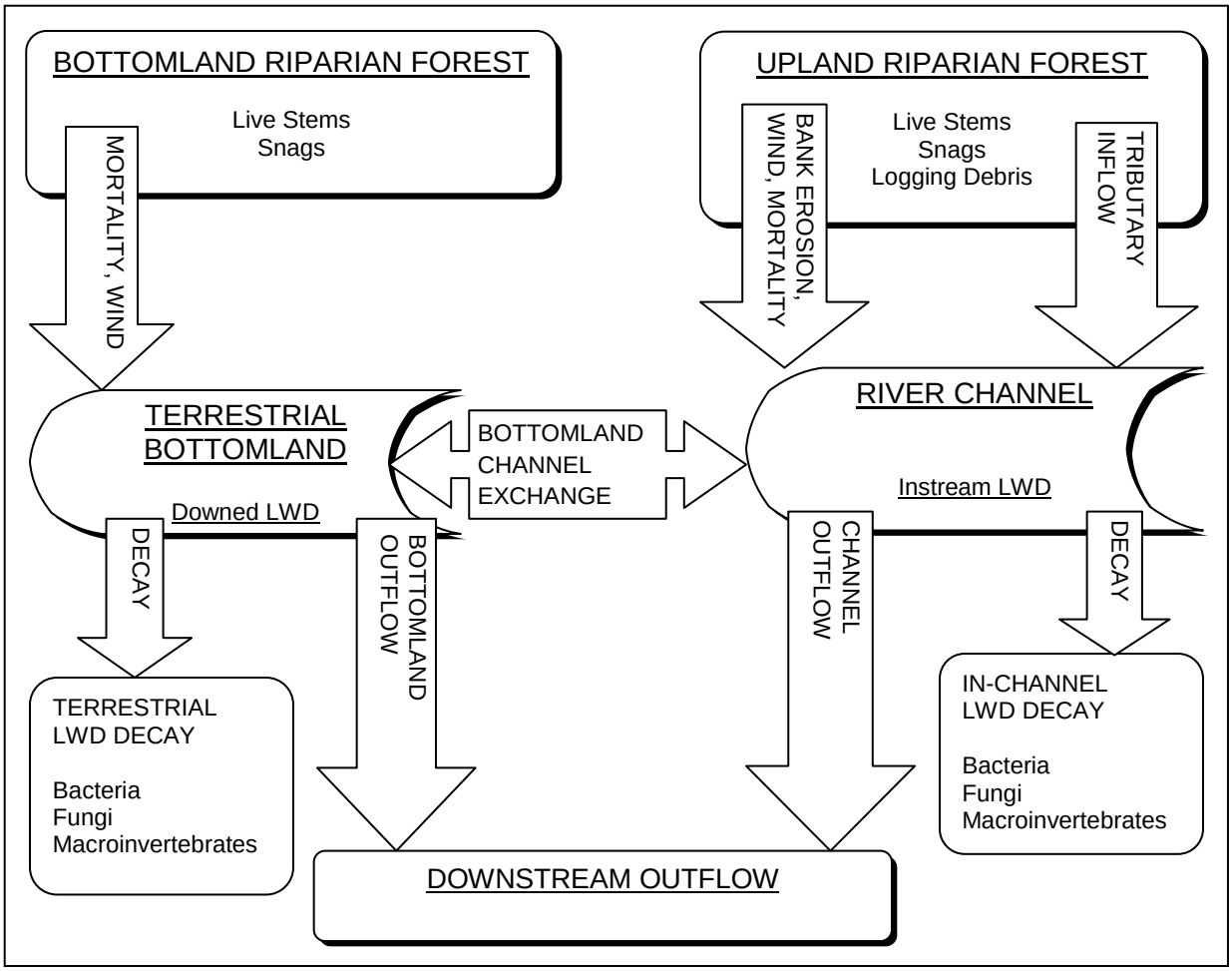

Figure 4. A basic conceptual LWD model developed for southern rivers (McBroom 2010).

Study Area

General

This study was conducted along the Lower San Antonio River; extending southeast from the United States Geologic Survey (USGS) streamflow gages at Elmendorf (08181800) until the river empties into the Guadalupe River. Total river length is 420 km with a total drainage area of 10,707 km^2. There were a total of six study sites along the river on both private and public land. The six study sites were located, starting with the most upstream and progressing downstream, near the towns of: Calaveras, Floresville, Falls City, Charco, Goliad, and McFaddin (Figure 5).

The Lower San Antonio River sub-basin encompasses portions of seven counties in south, central Texas. The Lower San Antonio River has shifted from a springflow driven system to a system that is strongly influenced by year-round wastewater treatment plant discharges and a mix of rural and urban land uses (TIFP, 2012). The rapid development in the basin has resulted in increased water demands that have been supplemented with groundwater from the Edwards Aquifer which has led to an increase in base flows in the San Antonio River (TIFP, 2012).

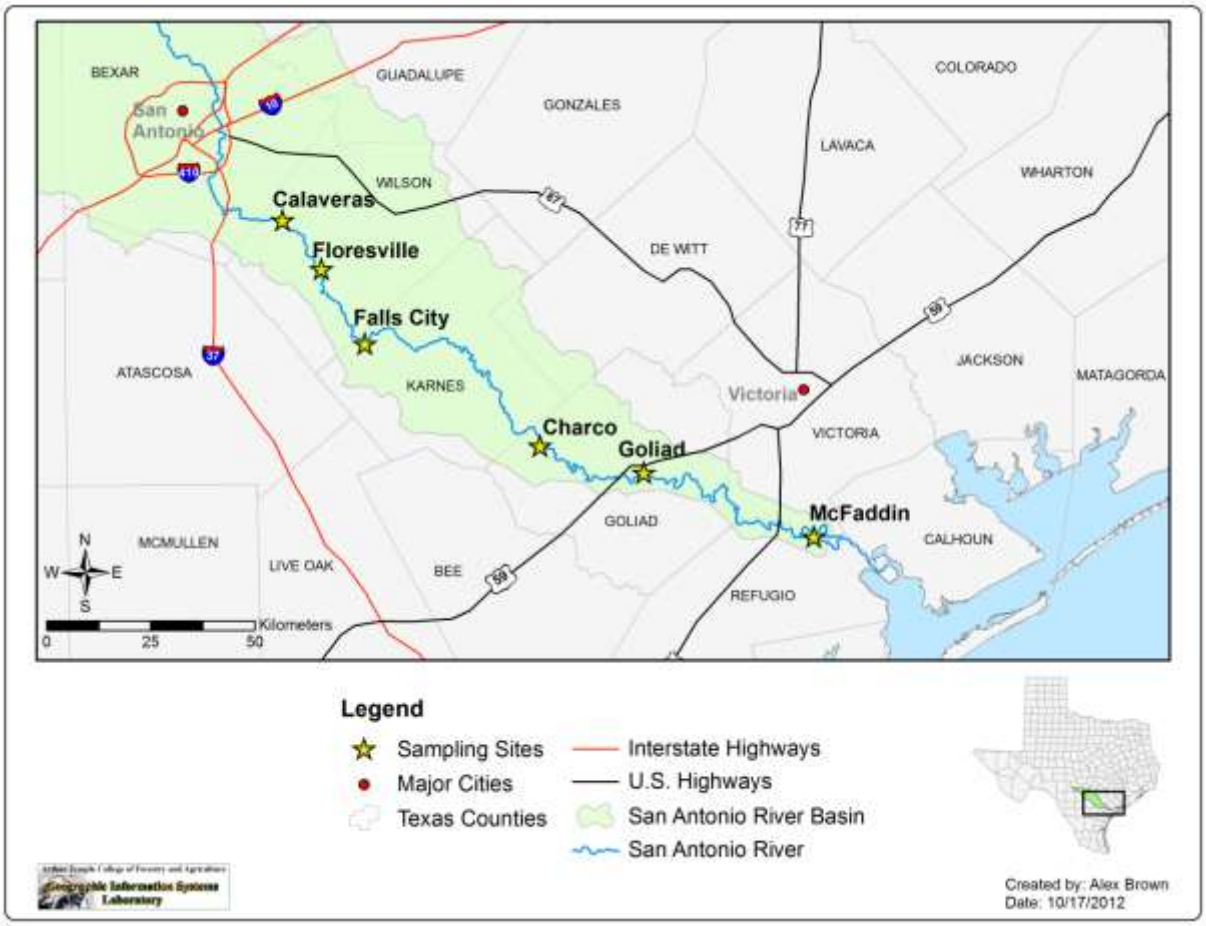

Figure 5. Map of the six large woody debris sampling sites located along the Lower San Antonio River in Texas.

Study Sites

The most upstream study site was near Calaveras, Texas. The starting point (29.21995°N, 98.265433°W) was approximately 0.9 km uspstream of the Farm-to-Market Road 775 bridge, adjacent to the Helton-San Antonio River Nature Park (Figure 6). The river had fairly steep banks (Figure 7). The northern bank of the river was San Antonio River Authority owned property and was previously a pecan (*Carya illinoinensis*) orchard while the southern bank was a mixture of pasture and scrub. This site was inventoried June 28-29; July 6-7; and July 11, 2011.

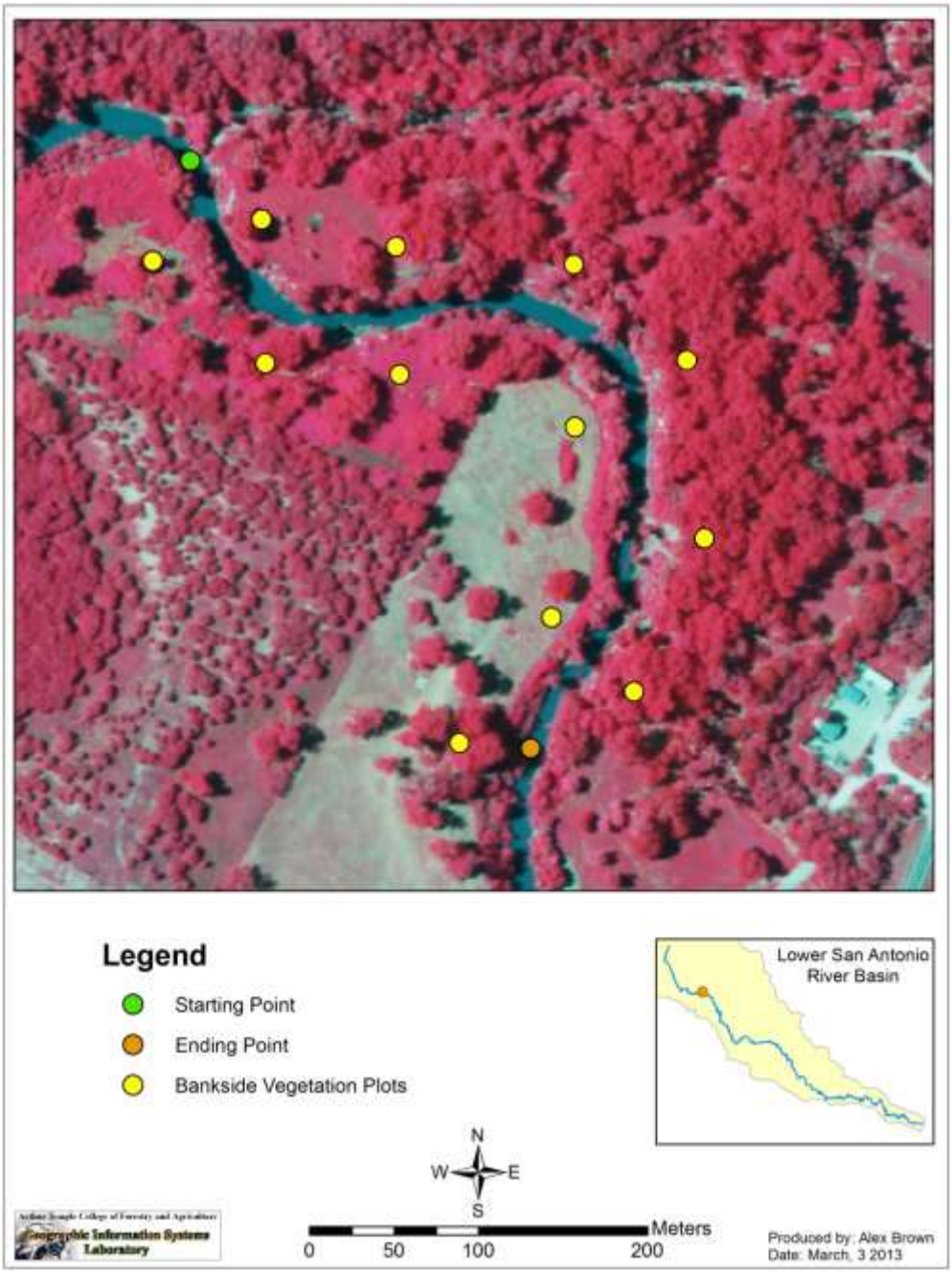

Figure 6. Map of the Calaveras study site, showing the beginning point, ending point, and twelve bankside vegetation sampling plots overlaid onto a color-infrared aerial photography.

Figure 7. View looking downstream at the Calaveras site, picture taken on June 22, 2011.

The next site downstream was near Floresville, Texas. The starting point (29.108416°N, 98.169897°W) was located approximately 0.7 km downstream from the Highway 97 bridge (Figure 8). The river had fairly steep banks. The northern bank of the river was a mixture of forest and pasture while the southern bank was all forested within the study reach (Figure 9). This site was inventoried August 23-26, 2011.

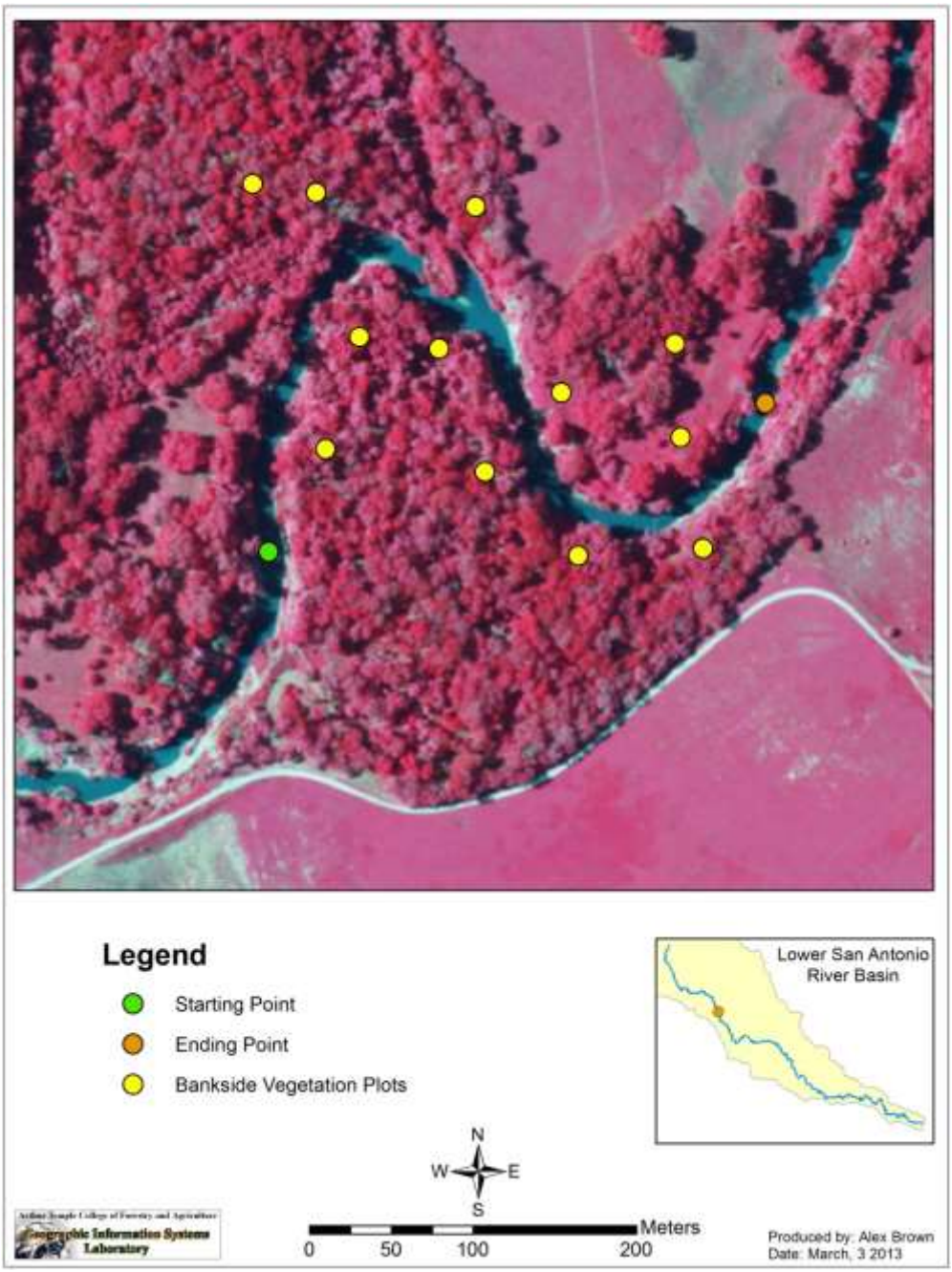

Figure 8. Map of the Floresville study site, showing the beginning point, ending point, and twelve bankside vegetation sampling plots overlaid onto a color-infrared aerial photography.

Figure 9. View looking downstream at the Floresville site, picture taken on August 23, 2011.

The next site downstream was near Falls City, Texas. The starting point (28.947983°N, 98.064683°W) was located approximately 0.4 km downstream from the Highway 791 bridge (Figure 10). The river had low banks with exposed bedrock within river channel (Figure 11). Both river banks were private land that was predominantly pasture with a narrow band of riparian vegetation adjacent to the river channel. Cattle were present and visibly accessing the river for drinking. This site was inventoried June 22-23 and on June 27, 2011.

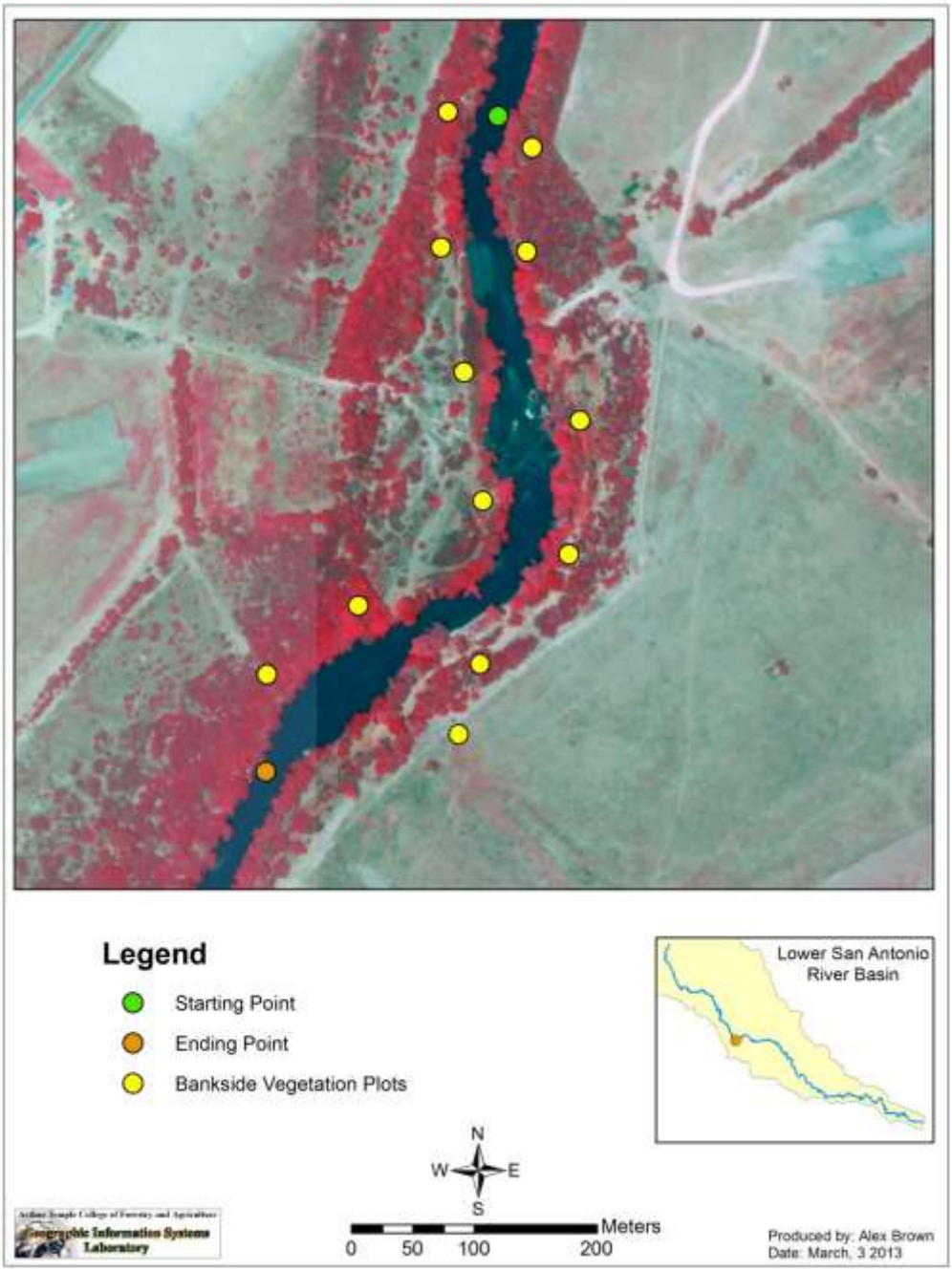

Figure 10. Map of the Falls City study site, showing the beginning point, ending point, and twelve bankside vegetation sampling plots overlaid onto a color-infrared aerial photography.

Figure 11. View looking downstream over exposed bedrock at the Falls City site, picture taken on June 27, 2011.

The next site downstream was near Charco, Texas. The starting point (28.719783°N, 97.640267°W) was located approximately 2.0 km downstream from the Highway 239 bridge (Figure 12). The northern bank had steep slopes with areas of more gradual slopes (Figure 13). The southern bank had extremely steep slopes and in many cases the bank was a near vertical wall. Active erosion was visible. Both river banks were private land and were predominantly pasture with a narrow band of riparian vegetation adjacent to the river channel. This site was inventoried July 12-13 and July 18-20, 2011.

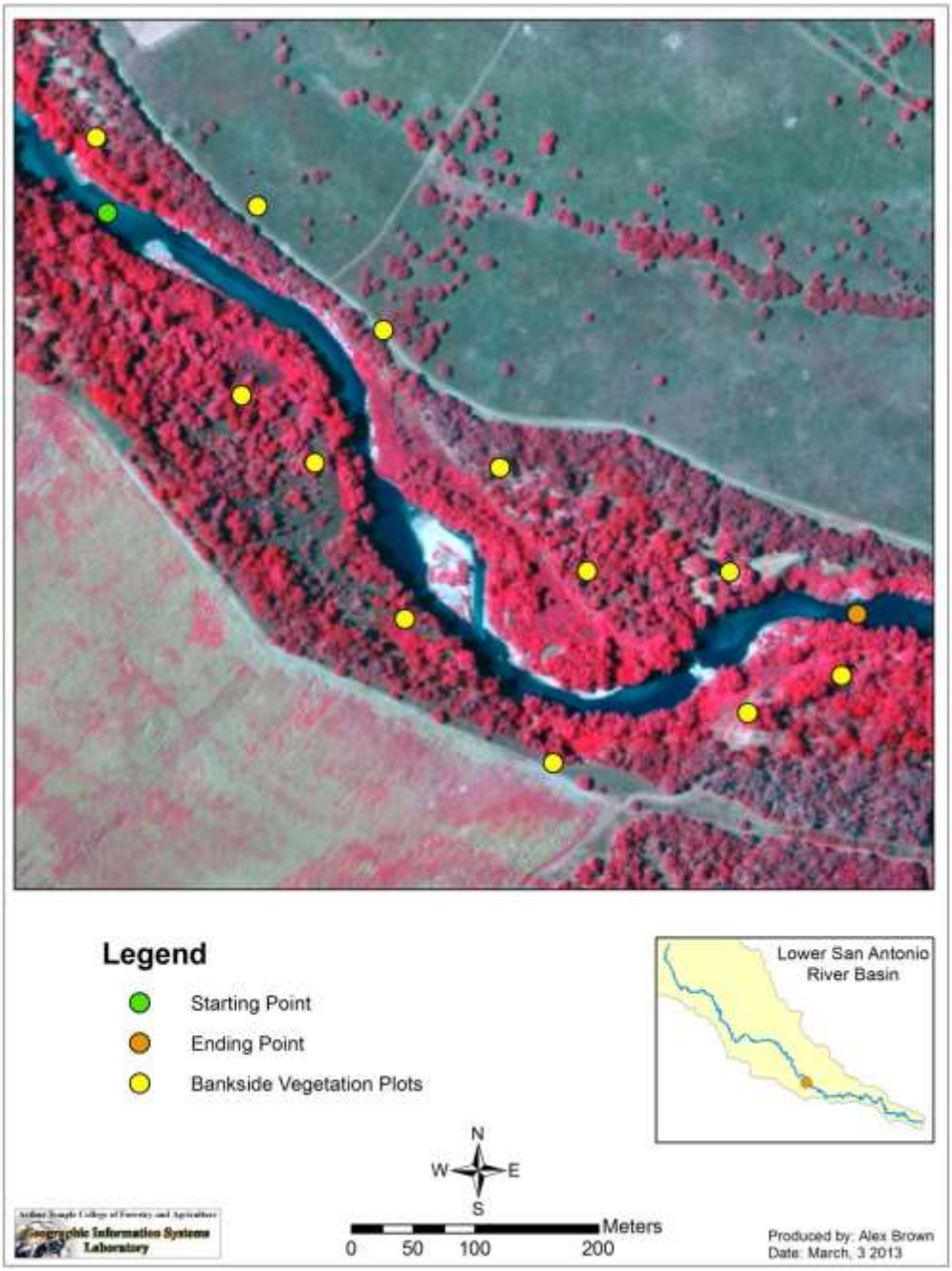

Figure 12. Map of the Charco study site, showing the beginning point, ending point, and twelve bankside vegetation sampling plots overlaid onto a color-infrared aerial photography.

Figure 13. View looking downstream at the Charco site, picture taken on July 12, 2011.

The next site downstream was near Goliad, Texas. The starting point (28.650017°N, 97.383633°W) was located approximately 0.1 km downstream from the U.S. Highway 183 bridge (Figure 14). The northern bank was within Goliad State Park and had steep slopes that were all forested (Figure 15). The southern bank was private property with steep slopes and was a mixture of pasture and forest. This site was inventoried June 8-9 and June 15-16, 2011.

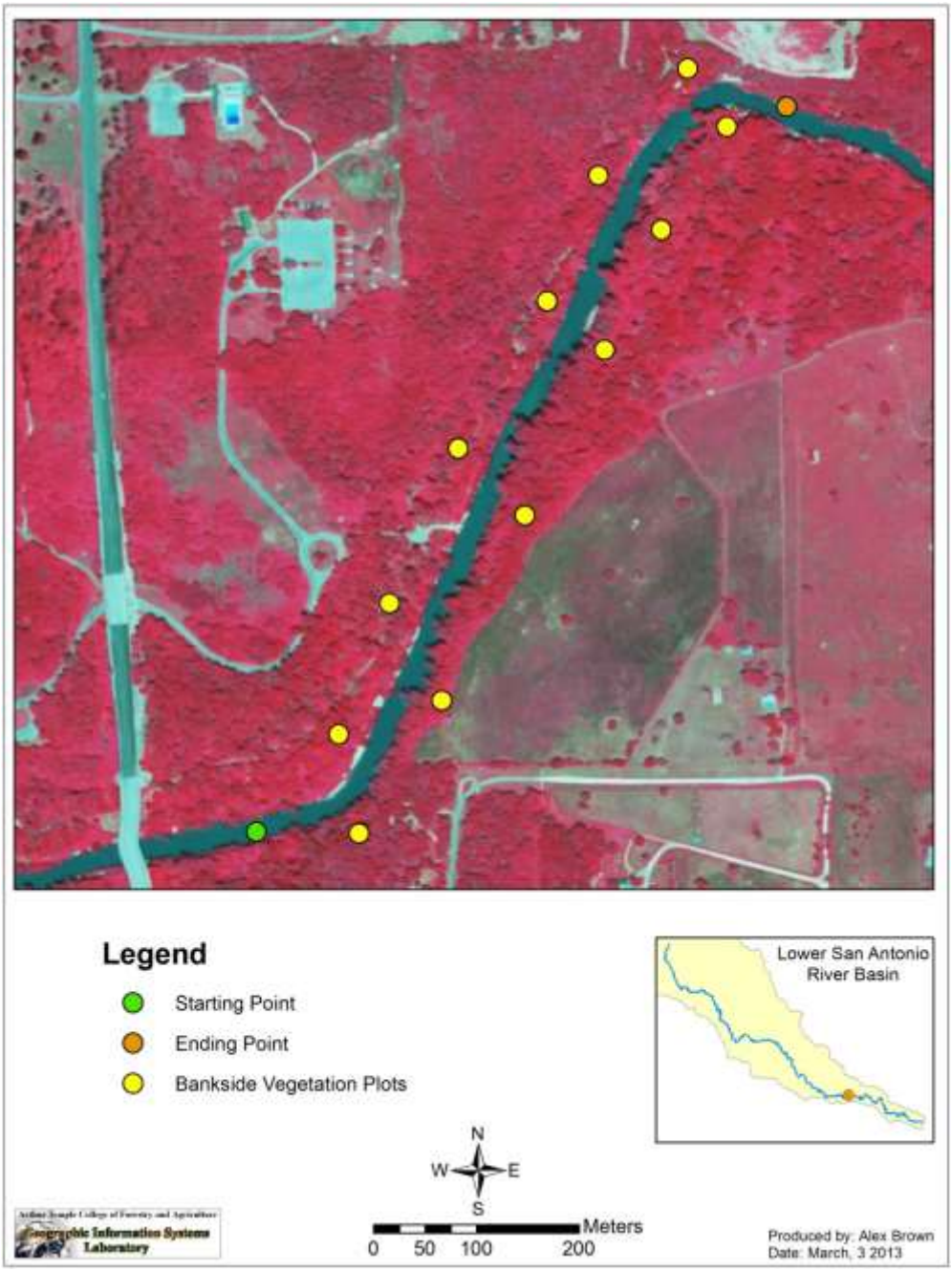

Figure 14. Map of the Goliad study site, showing the beginning point, ending point, and twelve bankside vegetation sampling plots overlaid onto a color-infrared aerial photography.

Figure 15. View looking downstream at the Goliad site, picture taken on June 8, 2011.

The final site was near McFaddin, Texas. The starting point (28.505044°N, 96.967925°W) was located approximately 10.5 km downstream from the U.S. Highway 77 bridge (Figure 16). Both banks at this site were low. The flood plain was relatively flat with minor elevation differences. The northern bank will often become inundated. The property on either side of the river is privately owned. This site previously had all the woody debris from the river removed between April 28, 2008 and January 20, 2009. It appears, from aerial photographs, that by April 24, 2010 a large volume of woody debris returned to this 2.6 km stretch of the river (Figure 17). This site was inventoried July 26-28, 2011.

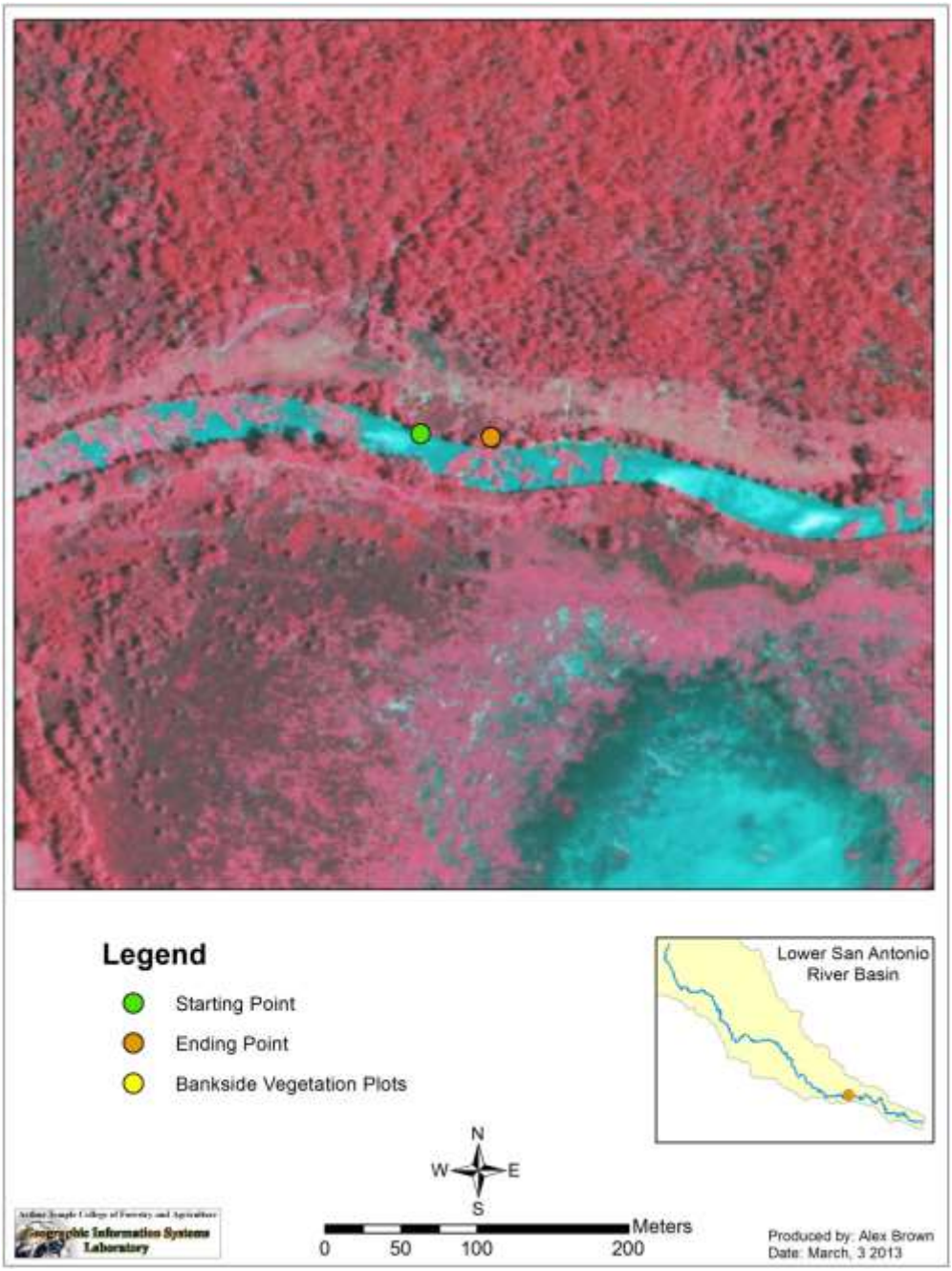

Figure 16. Map of the McFaddin study site, showing the beginning and ending points overlaid onto a color-infrared aerial photography.

Figure 17. View looking across the river at the right bank at the McFaddin site, picture taken on July 26, 2011.

Field Methods

LWD Analysis

At each study site a river meander bend was pre-selected using aerial photography and AcrGIS software. A river meander bend included two full river bends and was at least 20 times as long as the river was wide. All LWD that was located within the bankfull channel along each river meander bend was tallied. This was a one time inventory of the LWD and all field sampling was completed in one summer.

The access points for each sampling site were often steep and rugged which made deploying a small boat with a motor unfeasible. In addition, the river was extremely low and at the majority of the sites large portions of each river meander bend were wadeable with some sections of the water too shallow for any motorboats. For these reasons field sampling was conducted using a canoe and a kayak. The ability to wade in the river allowed for the discovery and inventory of submerged LWD at some of the sites.

Data and samples were collected the same way at each of the six study sites. LWD inventory needed to take place during a period of low flow to ensure the greatest number of pieces would be sampled. The Lower San Antonio River's lowest base flow conditions occur during the hotter and dryer summer months. Sampling was performed from June 2011 to August 2011. Weather conditions were closely monitored prior too sampling to ensure no rainstorms had occurred immediately prior to sampling. Flash flooding was a large safety concern and rain upstream could have quickly raised the river stage submerging LWD.

GPS coordinates were taken at the beginning and ending points of each study site and used to create detailed maps of each sampling site. LWD that was within the bankfull channel of the river with a minimum diameter of 10 cm (4 in) and a minimum length of 1.4 m (4.5 ft) were inventoried. A unique identification number was assigned to each piece of LWD. Log butt and top diameters were measured to the nearest 0.25 cm (0.1 in) using either a steel diameter tape or a set of aluminum calipers. Log length was measured to the nearest 0.1 m (0.5 ft) using a tape.

At some of the sites large tree with large limbs had fallen into the river and were inventoried using a slightly different technique. In order to more accurately estimate the volume and mass of a deciduous tree, the tree was measured in individual sections. A unique identification number was given to each component limb and recorded. The tree was divided into sections based on the natural branching of limbs. Only limbs that were consistent with the 10 cm minimum diameter and 1.4 m length were measured. The volumes of each section were calculated and then summed together to get a more accurate estimate of volume.

LWD species was recorded when possible, but frequently due to decay it was not possible under field conditions and the species field was left blank. If a piece of LWD was not identified in the field, an attempt was made to identify the log based on the wood sub-sample taken.

The level of decay of each piece of LWD was visually estimated based on five categories (Table 1). A level 1 estimate indicated no decay is visible on the piece and bark and branches were present. A level 2 estimate indicated a piece still had all the bark but branches were absent. A level 3 estimate indicated trace amounts of bark were on the piece with some abrasion of the wood. A level 4 estimate indicated bark was absent, there were some openings in the wood, and the wood had darkened in color. A level 5 estimate indicated bark was absent, the piece was irregular in shape, and the wood had darkened in color.

Table 1. Degree of decay classes for instream large woody debris based on visual estimate (McBroom, 2010; Ringer, 2009; Hyatt and Naiman, 2001).

Decay Class	Characteristics
I	No visual decay, bark intact, branches present
II	Bark intact, branches absent
III	Traces of bark remain, some surface abrasion
IV	Bark absent, darkened wood, some holes in wood
V	Bark absent, darkened wood, heavily decayed, irregular shape

The presence of branches and/or the presence of a root wad were recorded with a yes or no in order to compare the potential mobility of different pieces of LWD (McBroom, 2010; Ringer, 2009; Hyatt and Naiman, 2001).

Bank orientation was determined based on three categories: bank orientation of 0° designated that the butt of the piece is facing upstream with the piece generally parallel to the bank; an orientation of 90° designated the piece is perpendicular to the bank with either the butt end or the top end on the bank; and an orientation of 180° will indicate the butt of the piece is facing downstream (Robison and Beschta, 1990).

Potential sources for each piece were classified into five categories: windthrow, an entire tree with roots attached was blown over; windsnap, a section of a tree was broken and fell off due to wind or other natural forces; cut, an obvious clean flat surface at the end of a piece of LWD, bank erosion, or unknown. LWD origin was classified into three classes; local riparian, upstream import, or unknown. Each LWD piece measured was categorized as a fallen tree, an individual piece, or associated with a specific debris

jam for later volume comparisons. Finally, stage contact was documented for each LWD piece using four categories (Table 2). The categories for stage contact were: zone 1 indicated the piece is within low base flow contact with the water in the river; zone 2 indicated the piece is within the bankfull channel but not immediately touching the water; zone 3 indicated the piece extends over the bankfull channel; zone 4 indicated the piece is beyond the bank-full channel.

Table 2. Large woody debris proximity to water based on degree of stage contact, divided into four zones (McBroom, 2010; Ringer, 2009).

Zone	Description
1	Low base flow contact with the river
2	Within bankfull channel but not in contact with low base flow
3	Extending over bankfull channel
4	Beyond the bankfull channel

An attempt was made to retrieve a sub-sample from every piece of LWD measured for decay analysis, however; due to a variety of circumstances, not every piece of LWD inventoried had a corresponding sub-sample. Some of the challenges included: pieces of LWD submerged below the water surface, equipment malfunction, and the sheer quantity of pieces at the McFaddin site. Sub-samples were taken to best represent inner and outer layers of wood and were collected using a handsaw, a hatchet, a battery powered reciprocating saw, or a chainsaw. Each sub-sample was placed in a plastic bag and marked with the LWD identification number.

Woody Debris Jam Analysis

Along each study site LWD conglomerated into LWD jams. In order to better describe the different LWD jam dynamics all LWD jams that fell within the study site were analyzed and classified. LWD jam measurements were assessed to the nearest 0.3 m (1 ft) and included: river width at each jam, width of the debris jam perpendicular to flow, length of the debris jam parallel to flow, and height of the debris jam above the water level. The relative size of the LWD jam compared to the size of the river determines how the jam influences the morphology of the river system (Hogan and Bird, 1998). GPS coordinates of each jam location were recorded at the center of each jam. All the LWD jams were given a unique identification number.

Debris jams were classified into the following five categories: flow deflection jam, bar apex jam, meander jam, bar top jam, and other (Table 3). A flow deflection jam is a combination jam that was identified by having these features: key members directly from the bank, key members may be rotated anywhere from 90° to 0°, racked and loose

debris has accumulated, jam forces the river to flow around depositing sediment behind the structure and creating scour pools in front of the jam (Abbe and Montgomery, 1996; 2003). A bar apex jam is a transport jam that was identified by having these features: key member located in the middle of the river (usually on the toe of a point bar) parallel to flow, racked members are accumulated slightly angled to the flow, and normal members are accumulated perpendicular to the key member, a sand bar may be visible downstream of the jam. A meander jam is a transport jam that was identified by having these features: key members are generally parallel to the flow and have be deposited by floating downstream, racked members accumulate against the key members, usually (but not always) found on the outer bank of a river bend and armor the bank and reduce erosion. A bar top (unstable) jam is a transport jam that was identified by having these features: no obvious key member to anchor the structure, random accumulation of loose debris, usually consisting of smaller woody debris, may be deposited on banks or on top of point bars during high flow events, will be washed away during a high flow event. A final category will contain other jam types that do not fit into the above four classifications.

Table 3. Woody debris jam characteristic descriptions and classification categories based on visual inspection (Abbe and Montgomery, 1996; 2003).

Debris Jam Class	Characteristics
Flow Deflection Jam	Key members directly from the bank, racked and loose debris accumulation, jam forces the river to flow around
Bar Apex Jam	Key member in the middle of the river parallel to flow, accumulated LWD slightly angled to the flow, a sand bar may be visible downstream of the jam
Meander Jam	Key members generally parallel to the flow deposited by floating downstream, usually (but not always) found on the outer bank of a river bend and armor the bank and reduce erosion
Bar-top (Unstable) Jam	No obvious key member to anchor the structure, random accumulation of smaller loose woody debris deposited on banks or on point bars, will likely be washed away during a high flow event
Other	Any jam that cannot be classified into the other jam categories

Each jam was also evaluated on the integrity of the structure based on visual inspection. There were four categories for jam integrity (Table 4). A rating of very solid indicated the jam consists of strong LWD pieces with no rot, the jam has stable anchors, and the jam is tightly packed with debris (Hogan and Bird, 1998). A rating of solid indicated the jam consists of strong LWD, is made up of smaller main pieces, minor voids exist within the structure, and that overall stability is lessened compared to a very solid rating. A rating of weak indicated the jam consists mainly of rotten LWD, smaller woody debris, poor anchors, and is a loosely packed structure. A rating of very weak indicated the jam consists of loosely packed pieces with no obvious anchor and little if any overall stability.

Table 4. Woody debris jam structural integrity characteristic descriptions and classification categories, based on field observations (Hogan and Bird, 1998).

Debris Jam Integrity	Characteristics
Very Solid	Jam consists of strong LWD pieces with no rot, stable anchors, and tightly packed with debris
Solid	Jam consists of strong LWD that are smaller, minor voids exist within the structure, and overall stability is less compared to a very solid rating
Weak	Jam consists mainly of rotten LWD, smaller woody debris, poor anchors, and is a loosely packed structure
Very Weak	Jam consists of loosely packed pieces with no obvious anchor and little if any overall stability

The presence of any visible sediment wedge, upstream bank erosion, or point bar associated with a debris jam was recorded with a yes or no. If there was a point bar and any vegetation was growing on it, an approximate age of that plant was taken, if possible. All debris jams had photographs taken from multiple views for record keeping and possible volume estimates.

Sub-Sample Analysis

Each sub-sample taken in the field was weighed to determine the wet mass to the nearest tenth of a gram. The sub-samples were placed into marked paper bags and dried in an oven at 100° Celsius to constant mass. The sub-samples were reweighed to determine dry mass.

An attempt was made to identify the species of each sub-sample based on wood identification properties from Hoadley (1990). However, due to similarities among several species of trees and varying levels of decay, certain general groupings were created if a specific species could not be positively identified: white oaks, red oaks, eastern cottonwood/ black willow, hickories, and unknown.

In order to estimate the mass of LWD at each site density of the LWD would be required. Density calculations require mass and volume. Direct volume calculations for irregularly shaped sub-samples were not a viable option. Volume was measured indirectly using the Archimedes Principle to measure displacement of water. When fully submerged under water the volume of water displaced is equal to the volume of a solid object. The porous nature of wood, especially decayed wood, required that all the sub-samples be sealed in a thin layer of paraffin wax to prevent moisture absorption and to prevent volumetric changes. The sub-samples were weighed prior to wax sealing and after wax sealing. The prior to wax sealing mass was used for volume calculations and it was assumed that the wax did not affect the volume of each sub-sample significantly.

A 400 mL beaker was placed inside of an aluminum pan and filled to the very top. A wash bottle was used to raise the water level to just before breaking the water's surface tension. A metal probe was inserted into each wax coated sub-sample and then used to immerse the sample into the water. Displaced water was collected in the overflow pan and was poured into a graduated cylinder and measured to the nearest millimeter. Sub-sample density was calculated using the mass of each sample prior to wax sealing and the displacement volume:

(prior to wax sealing sample mass) / (displacement volume) = density

Sub-sample analysis provided a more detailed estimate of mass and volume per unit reach taking into account varying degrees of decay. Sub-sample analysis also provided an estimate of decay within each study site.

Bankside Vegetation

An inventory of the trees along the banks of the river was performed at all of the six sites to calculate total volume of standing timber. At each study site, inventory plots of 0.04 hectare (1/10th acre) and 0.004 hectare (1/100th acre) were nested and established 15.25 m (50 ft) perpendicular from the banks of the river. In the 0.04 hectare plot all living trees with a minimum diameter at breast height (DBH) of 10 cm (4 in) were tallied. DBH was recorded to the nearest 0.25 cm (0.1 in), total tree height to the nearest 0.3 m (1 ft), and distance from the bank to the nearest 0.3 m (1 ft). In the 0.004 hectare plot all LWD had the top and butt diameters recorded to the nearest 0.25 cm, length to the nearest 0.1 m, and distance from the bank to the nearest 0.3 m. The Instruments used for the inventory were: a 50 m measuring tape, a steel diameter tape, a set of aluminum calipers, and a clinometer.

Volume for the standing vegetation was calculated using the United States Department of Agriculture Forest Service General Technical Report SFS-138, titled "Southern Forest Inventory and Analysis Volume Equation User's Guide" (Oswalt and Conner, 2011). The total cubic-foot volume from ground level to tip was calculated and then converted to m^3.

Statistical Analysis

Chi-square tests were used to analyze the categorical data collected to evaluate if there was a uniform distribution. No LWD research has been done on the San Antonio River, so no a-priori assumptions about distributions can be made. The chi-square tests were used to examine ten categories within individual sites. The categories were: degree of decay, branch presence, potential source, origin, bank orientation, root wad presences, piece position, stage contact, debris jam classification, and debris jam integrity. SAS was used to calculate the chi-square test with the following hypotheses:

Degree of decay
H_o: There is a uniform distribution of degree of decay in the LWD.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

Branch Presence
H_o: There is a uniform distribution of branch presence in the LWD.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

Potential Source
H_o: There is a uniform distribution of potential source in the LWD.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

Origin
H_o: There is a uniform distribution of origin in the LWD.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

Bank Orientation
H_o: There is a uniform distribution of bank orientation in the LWD.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

Root Wad Presence
H_o: There is a uniform distribution of root wad presence in the LWD.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

Piece Position
H_o: There is a uniform distribution of piece position in the LWD.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

Stage Contact
H_o: There is a uniform distribution of stage contact in the LWD.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

Debris Jam Classification
H_o: There is a uniform distribution of debris jam classes in the LWD jams.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

Debris Jam Integrity
H_o: There is a uniform distribution of debris jam integrity in the LWD jams.
H_A: Not H_o
Decision Rule: reject H_o if x^2 is ≥ to the critical value; otherwise do not reject.

An ANOVA test was used to compare in channel LWD volumes, riparian forest bankside volume, and riparian forest down LWD volumes of each site to see if significant differences exist. The following hypotheses were used:

Channel LWD Volume
H_o: $\mu_{Calaveras} = \mu_{Floresville} = \mu_{Falls\ City} = \mu_{Charco} = \mu_{Goliad} = \mu_{McFaddin}$
H_A: not H_o
Decision Rule: reject H_o if F is ≥ critical value; otherwise, do not reject.

Riparian Forest Bankside Volume
H_o: $\mu_{Calaveras} = \mu_{Floresville} = \mu_{Falls\ City} = \mu_{Charco} = \mu_{Goliad} = \mu_{McFaddin}$
H_A: not H_o
Decision Rule: reject H_o if F is ≥ critical value; otherwise, do not reject.

Flow Rates and River Stage

Flow rates and river stage were obtained during the sampling times (Table 5). The values were averaged across multiple days. The Calaveras site (USGS 08181800) was sampled on June 28-29, 2011; July 6-7, 2011; and July 11, 2011. The Floresville site (USGS 08183200) was sampled on August 23-26, 2011. The Falls City site (USGS 08183500) was sampled on June 22-23, 2011 and June 27, 2011. The Charco site, closest to the gauge at Goliad (USGS 08188500), was sampled on July 12-13, 2011 and July 18-20, 2011. The Goliad site (USGS 08188500) was sampled on June 8-9, 2011 and June 15-16, 2011. The McFaddin site (USGS 08188570) was sampled from July 26-28, 2011.

Table 5. Averages of river discharge and river stage at the six sampling sites along the Lower San Antonio River.

Site	Discharge (m^3 s^{-1})	River Stage (m)
Calaveras	3.16	3.01
Floresville	1.73	1.44
Falls City	6.86	0.32
Charco	2.39	0.77
Goliad	3.77	0.87
McFaddin	4.12	4.34

LWD Volume and Mass

The total number of pieces inventoried across all six sites was 1,524 over a total river sampling length, across all six study sites, of 3.69 km. The most upstream site at Calaveras had 180 pieces of LWD measured, Floresville had 187 pieces, Falls City had 59 pieces, Charco had 238, Goliad had 150, and McFaddin had 710 pieces (Table 6). The total volume of LWD measured at each site was: 72.84 m^3 at Calaveras, 50.50 m^3 at Floresville, 36.81 m^3 at Falls City, 86.08 m^3 at Charco, 92.73 m^3 at Goliad, and 96.50 m^3 at McFaddin.

The site with the highest loading of debris was the McFaddin site with a calculated volume of 964.96 m^3 km^{-1} and a mass of 387,720.4 kg km^{-1} (Table 7). The site with the lowest loading of LWD was the Falls City site with a calculated volume of 57.18 m^3 km^{-1} and a mass of 23,525.1 kg km^{-1}. The volume of LWD at each of the six study sites was significantly different (p-value=<.0001, α=0.05).

LWD loading did not appear to follow an obvious pattern of increasing further downstream, with the exception of the McFaddin site, so downstream movement of LWD is an important function in this river system.

Table 6. Count of total instream LWD inventoried, the volume of the inventoried LWD, the mass of the inventoried LWD, and the reach length at the six sampling locations along the Lower San Antonio River.

Site	Measured Instream LWD Count	Measured Instream LWD Volume (m^3)	Mass of Measured Instream LWD (kg)	Reach Length (km)
Calaveras	180	72.84	28,742.9	0.56
Floresville	187	50.50	21,489.2	0.58
Falls City	59	36.81	15,144.0	0.64
Charco	238	86.08	41,627.2	0.79
Goliad	150	92.73	43,182.8	1.02
McFaddin	710	96.50	38,772.0	0.10

Table 7. Volume per km of instream LWD, mass per km of instream LWD, volume of bankside standing trees, with Tukey's Honest Significant Difference test results for each of the six sampling locations along the Lower San Antonio River.

Site	Instream LWD Volume per Length ($m^3\,km^{-1}$)	Instream LWD Mass per Length ($m^3\,km^{-1}$)	Bankside Standing Volume ($m^3\,ha^{-1}$)	*Tukey Grouping for Bankside Volume
Calaveras	129.32	51,028.7	77.48	A B
Floresville	87.17	37,091.0	**118.26**	**A**
Falls City	57.18	23,525.1	43.15	A B
Charco	109.16	52,787.6	60.26	A B
Goliad	90.91	42,336.0	64.38	A B
McFaddin	**964.96**	387,720.4	**0.00**	**B**

*Values with the same letter are not significantly different at an α=0.05

LWD Sub-Sample Analysis Results

The McFaddin site had the lowest number of sub-samples collected from the LWD inventoried with only 71 samples from the total of 710 pieces (Table 8). The low sampling percentage at the McFaddin site was primarily due to access and safety. The entire river was covered by a debris field that was unstable at many locations. Also, due to the extremely high number of pieces only a 10% sampling rate was selected. The Floresville site had the next lowest sampling rate at 68.4% due to safety issues with debris jams and steep banks that did not allow for safe sample collection. The other four sites had a very high sampling rate.

Table 8. Total number of LWD pieces inventoried, total number of LWD sub-samples collected and analyzed, and percentage of LWD pieces actually sampled.

Site	Total Number of LWD Pieces Inventoried	Number of Sub-Samples Collected	Sampled Percentage
Calaveras	180	166	92.2
Floresville	187	128	68.4
Falls City	59	58	98.3
Charco	238	228	95.8
Goliad	150	146	97.3
McFaddin	710	71	10.0

Using the sub-samples density was calculated and used to estimate the mass of LWD within the sampling sites. The sub-samples also were used to identify the species of tree. Field identification of the LWD was extremely difficult due to a lack of physical indicators, such as bark, twigs, and leaves. Wood structure was used to identify each species and even in extreme decay could be used to narrow the species to a general genus. The number of sub-samples collected does not match the total number of LWD pieces inventoried due to the inability to retrieve a suitable sample of a submerged log. In the event a piece of submerged LWD was at a depth greater than 0.3 m a sub-sample was not collected due to lack of visibility to safely perform the cutting operation. Diameters and lengths were measured by manually feeling along the log until the top and butt were located. The total number of LWD pieces at each site is different from the total number of LWD entries in the appendix tables due to the large limb sampling technique discussed on page 27.

A combination of the wood sub-sample identification, pictures, and notes were used to identify the species at each site. Some pieces of LWD were simply too decayed to get a positive identification. The most frequent species were: blackwillow (*Salix nigra*), eastern cottonwood (*Populus deltoids*), American elm (*Ulmus Americana*), cedar elm (*Ulmus crassifolia*), sugarberry (*Celtis laevigata*), pecan (*Carya illinoinensis*), sycamore (*Platanus occidentalis*), boxelder (*Acer negundo*), and mesquite (*Prosopis glandulosa*) (Table 9).

Table 9. Species identification of LWD sampled from six sites along the lower San Antonio River, identification based on a combination of in the field notes, photographs, and wood structure under a microscope.

Species	Calaveras	Floresville	Falls City	Charco	Goliad	McFaddin
Salix nigra	41	15	12	30	5	16
Populus deltoides	36	18	6	28	8	9
*Salix nigra / Populus deltoids**	15	22	5	25	17	19
Ulmus americana	2	1	2	16	16	4
*Ulmus crassifolia / Ulmus alata**	5	9	5	15	9	2
Ulmus rubra	1	-	-	1	-	1
Ulmus spp.	-	-	-	-	-	10
Celtis laevigata	21	14	10	41	15	9
Carya illinoinensis	19	11	6	22	16	16
Prosopis glandulosa	6	8	1	11	-	2
Platanus occidentalis	-	-	2	1	36	5
Acer negundo	16	24	7	13	4	10
Fraxinus spp.	4	-	1	6	12	-
Taxodium distichum	-	-	2	3	-	-
Quercus virginiana	-	1	-	-	2	-
Betula nigra	-	-	-	-	1	-
Maclura pomifera	-	-	-	1	1	-
Ilex opaca	-	-	-	-	1	-
Carya spp.	-	-	-	-	1	1
Melia azedarach	-	-	-	3	-	-
Robinia pseudoacacia	-	-	-	1	-	-
Bumelia lanuginosa	-	-	-	1	-	-
Morus rubra	-	-	-	1	-	-
Juglans nigra	-	-	-	-	-	3
Juniperus virginiana	-	-	-	-	-	2
unknown	14	64	-	19	6	601

*Pairs of species that are difficult to distinguish from each other using only wood samples.

Observed Counts

Potential source of LWD was difficult to determine for a majority of the LWD sampled because of a lack of clear evidence. Approximately only 7%, 113 pieces out of 1524, of LWD had a discernible source of entry into the river (Table 10). The most common way for LWD to enter the river was via bankside erosion.

Unless there was clear evidence that LWD had entered the river because of a particular event, the potential source was marked as unknown. There were some instances where a clean flat surface on a piece of LWD was obviously cut by some mechanical means or roots were still attached to the bank, however, the high level of uncertainty made this qualitative observation limited in the analysis. Based on the Chi-Square test there was not a uniform distribution ($p < 0.0001$) of potential sources between the six sites (Table 18). Analysis of individual sites was not effective due to the large number of zeros and unknowns.

Table 10. Potential source of how LWD entered into the lower San Antonio River at six sampling locations.

Site	Potential Source				
	Unknown	Erosion	Windthrow	Wind Snap	Cut
Calaveras	146	16	0	5	13
Floresville	171	12	2	1	1
Falls City	43	11	2	3	0
Charco	224	12	2	0	0
Goliad	117	8	12	9	4
McFaddin	710	0	0	0	0

The origin of a piece of LWD was another qualitative observation that had a high degree of uncertainty. The origin of a piece of LWD was difficult to determine because of a lack of obvious evidence indicating where the piece fell into the river. The most common origin of LWD was from upstream import, 74% of LWD measured was determined to have come from an upstream source (Table 11). The McFaddin site had all LWD imported from upstream due to a lack of bankside vegetation in the area adjacent to the river. The Floresville site had the highest level of unknown origin due to uncertainty of where the LWD entered into the river. Based on the Chi-Square test there was not a uniform distribution ($p < 0.0001$) of origin between the six sites (Table 18). Analyzing each site individually there was not a uniform distribution at any of the sites (Table 19) and across all sites there was a wide range of variability.

Table 11. Origin location of LWD that entered into the lower San Antonio River at six sampling locations.

Site	Origin		
	Unknown	Local	Upstream
Calaveras	34	40	106
Floresville	141	15	31
Falls City	6	18	35
Charco	10	15	213
Goliad	67	50	33
McFaddin	0	0	710

LWD was predominantly found in direct contact with low baseflow or within the bankfull channel but not touching baseflow contact (Table 12). Charco was the only site to have more LWD along the banks than within direct contact with the water in the river. The Charco site had several sections of low banks that under higher flow conditions would be submerged. These exposed low areas were often covered with a LWD field resulting in the higher number of pieces out of direct river contact. Calaveras, Floresville, Charco, and Goliad had steep banks with the river deeply incised allowing a greater surface area along the banks than within the river channel. The steep banks lead to LWD falling and sliding toward the river during low flow conditions.

Very few pieces were observed either extending over the bankfull channel or beyond the bankfull channel. Due to the width of the bankfull channel and steep banks at most of the sites, few pieces were extending over the water above the bankfull channel. The beyond bankfull channel was only recorded a small number of times because any LWD beyond the top banks of the river would be sampled during the bankside vegetation inventory. Based on the Chi-Square test there was not a uniform distribution ($p < 0.0001$) of stage contact between the six sites (Table 18).

Table 12. Stage contact classification of LWD inventoried along the lower San Antonio River at six sampling locations.

Site	Stage Contact Zone			
	1: Low Base Flow Contact	2: Within Bankfull Channel No Base Flow Contact	3: Extending Over Bankfull Channel	4: Beyond Bankfull Channel
Calaveras	112	68	0	0
Floresville	122	65	0	0
Falls City	35	22	0	2
Charco	76	162	0	0
Goliad	115	31	3	1
McFaddin	470	240	0	0

Degree of decay was significantly different ($p < 0.0001$) between the six sites (Table 18). The most common decay classifications were class 3, 4, and 5 across all six sites (Table 13). Decay classes 1 and 2 were consistently lower at all six sites with the greatest number at the Floresville site. Floresville had the highest number of LWD that was classified as 1 or 2 suggesting that local riparian trees may be entering the river in this section more than other sites. Floresville also had the highest volume of standing riparian trees so there are more potential trees to enter the river. The data that was collected suggest that moving downstream there is a greater proportion of LWD that is in the high decay classes. The higher decay classes downstream show that LWD movement downstream might be a larger part of the dynamics of this river. The majority of LWD sampled was decay class 4 with the greatest number at the McFaddin site. At each of the six sites there was not a uniform distribution of decay classes, indicating that some areas might be more important as sources of LWD from the banks, while other areas are sites where LWD is imported from upstream (Table 19).

The McFaddin site had 542 pieces in decay class 4 and only 135 pieces in the decay class 5 which might suggest that debris may be washed downstream rapidly during high flow events. This site had been cleared of woody debris in 2008 and by 2010 a large volume of woody debris was back on the site. Debris with a decay class of 5 may have been more prevalent on the site prior to debris removal. The debris removal set back the natural succession of debris movement in the river which may explain the higher levels in decay class 4 versus class 5. The geomorphology of the river at this location would suggest that debris can become lodged in the river and remain until either high flows move the debris downstream or decay break the LWD into smaller floatable pieces.

Table 13. LWD decay classification of LWD inventoried along the lower San Antonio River at six sampling locations.

Site	Decay Class				
	1	2	3	4	5
Calaveras	4	17	39	79	41
Floresville	8	29	58	70	22
Falls City	0	2	23	28	6
Charco	0	13	33	138	54
Goliad	1	12	56	58	23
McFaddin	0	0	33	542	135

Branch presence was significantly different ($p < 0.0001$) between the six sites (Table 18). Across all six sampling sites only 2.5% had intact branches with the overwhelming majority without branches. Goliad had the highest number of LWD with branches at 11 pieces (Table 14). There was not a uniform distribution of branch presence at each of the six sites (Table 19). If a piece of LWD had branches intact, it was considered to be a new piece of LWD that was introduced recently. As a piece of

LWD remains in the channel the branches can become broken off from the force of the water, debris breaking off the branches, or because of decay weakening the branches. The lack of branches indicates that the LWD present at the site may have either been at the site for a period of time or it washed in from upstream.

Table 14. Counts of LWD with and without branches along the lower San Antonio River at six sampling locations.

Site	Branch Presence	
	Yes	No
Calaveras	10	170
Floresville	7	180
Falls City	6	53
Charco	4	234
Goliad	11	139
McFaddin	0	710

Over 96% of LWD sampled in this study did not have an attached root wad (Table 15). Floresville had the highest number with 18; however, this is small compared to the 169 pieces that did not have a root wad at that site. Based on the Chi-Square test there was not a uniform distribution ($p < 0.0001$) of the presence of root wads between the six sites (Table 18). None of the sites had a uniform distribution (Table 19) of root wad presence when looking at them individually and ever site had the majority of pieces without a root wad.

Table 15. Counts of LWD with and without the presence of a root wad along the lower San Antonio River at six sampling locations.

Site	Root Wad Presence	
	Yes	No
Calaveras	8	172
Floresville	18	169
Falls City	4	55
Charco	7	231
Goliad	13	137
McFaddin	4	706

The 0° bank orientation, the butt of the log facing upstream while generally parallel with the river bank, was most common at all the sites except for McFaddin (Table 16). The tendency of LWD to orient parallel to the flow may be in part due to the power of the water flowing downstream. The Falls City site had the majoritiy of LWD in either the 0° or 90° orientation because of bedrock geology at the site that created deep pools within the river channel that slow water movement compared to Calaveras,

Floresvillie, Charco, and Goliad. The decreased flow during low flow conditions within deep pools may explain the result of debris at either 0° or 90° but not at 180°. Individually each site did not have a uniform distribution of LWD bank orientation (Table 19) with Falls City and McFaddin having small differences compared to the other sites.

The McFaddin site had the most LWD oriented at 90°, however, the other two categories were similar which would be expected considering all the LWD would have been imported from upstream and the collection of LWD would be random. Based on the Chi-Square test there was not a uniform distribution ($p < 0.0001$) of bank orientation between the six sites (Table 18).

Table 16. Bank orientation of LWD in the lower San Antonio River at six sampling locations.

Site	Bank Orientation		
	0	90	180
Calaveras	92	46	42
Floresville	105	44	38
Falls City	27	27	5
Charco	103	92	43
Goliad	86	39	25
McFaddin	217	288	205

LWD position was significantly different ($p < 0.0001$) between the six sites (Table 18). At the Calaveras and Charco sites LWD was more likely to be debris jam associated than an individual piece (Table 17). The McFaddin site was different because all the pieces of LWD were considered to be jam associated; the river was congested with LWD and all the pieces were interconnected. Falls City was almost evenly divided between individual pieces and jam associated pieces. Floresville and Goliad had the majority of pieces of LWD considered individual with no debris jam association. At each of the six sites there was not a uniform distribution of LWD position (Table 19). There is not a clear pattern of sites that were more likely to have debris jam associated pieces versus individual pieces with the exception of the most downstream site at McFaddin. The lack of obvious pattern may be evidence of the high mobility and movement of LWD in this river.

Table 17. LWD position within the lower San Antonio River at six sampling locations.

Site	LWD Position		
	Individual Piece	Fallen Tree	Debris Jam Associated
Calaveras	79	11	90
Floresville	118	0	69
Falls City	28	8	23
Charco	67	5	166
Goliad	83	19	48
McFaddin	0	0	710

Table 18. Chi-Square tests for a uniform distribution across the six sampling sites.

Tests	P value
Potential Source	<.0001
LWD Position	<.0001
Degree of Decay	<.0001
Bank Orientation	<.0001
Root Wad	<.0001
Branch Presence	<.0001
Stage Contact	<.0001
Origin	<.0001

Table 19. Chi-Square tests for the six sampling locations compared within sites, not across sites.

Tests	Sites					
	Calaveras	Floresville	Falls City	Charco	Goliad	McFaddin
Potential Source	n/a	<.0001	n/a	n/a	<.0001	n/a
LWD Position	<.0001	n/a	0.0041	<.0001	<.0001	n/a
Degree of Decay	<.0001	<.0001	n/a	n/a	<.0001	n/a
Bank Orientation	<.0001	<.0001	0.0003	<.0001	<.0001	0.0002
Root Wad	<.0001	<.0001	<.0001	<.0001	<.0001	<.0001
Branch Presence	<.0001	<.0001	<.0001	<.0001	<.0001	n/a
Stage Contact	n/a	n/a	n/a	n/a	<.0001	n/a
Origin	<.0001	<.0001	<.0001	<.0001	0.0031	n/a

Bankside Vegetation Results

The Calaveras site had the least number of total standing trees with a total of 29.2 trees ha^{-1} and a total volume of 77.48 m^3ha^{-1} (Table 20). The 70 cm diameter class had the greatest number of stems, with 6.3 trees ha^{-1}. The basal area was low, at 9.03 m^2ha^{-1} and was a result of wide spacing between larger mature trees. The quadratic mean diameter (QMD) was 62.8 indicating the site was dominated by larger diameter trees.

The Floresville site had the greatest number of total standing trees with 297.9 trees ha^{-1} and a total volume of 118.26 m^3ha^{-1} (Table 21). The 20 cm diameter class had the greatest number of stems, with 68.8 trees ha^{-1}. The basal area was 17.02 m^2ha^{-1} with a QMD of 27.0 and the majority of the trees ranged from 10 cm to 30 cm.

The Falls City site had 175.0 trees ha^{-1} with a total volume of 43.15 m^3ha^{-1} (Table 22). The 15 cm diameter class had the greatest number of stems, with 39.6 trees ha^{-1}. The basal area of the site was 10.02 m^2ha^{-1} with a QMD of 27.0 and the majority of the trees ranged from 10 cm to 30 cm.

The Charco site had 160.4 trees ha^{-1} with a total volume of 60.26 m^3ha^{-1} (Table 23). The 15 cm diameter class had the greatest number of stems, with 41.7 trees ha^{-1}. The basal area of the site was 8.92 m^2ha^{-1} with a QMD of 26.6 and the majority of the trees ranged from 10 cm to 25 cm.

The Goliad site had the second highest number of standing trees with 233.3 trees ha^{-1} for a total volume of 64.38 m^3ha^{-1} (Table 24). The 15 cm diameter class had the greatest number of stems, with 54.2 trees ha^{-1}. The basal area of the site was 12.85 m^2ha^{-1} with a QMD of 26.5 and the majority of the trees ranged from 10 cm to 30 cm.

The McFaddin site had no standing vegetation 15.2 meters away from the banks and no bankside inventory could be performed.

Based on an ANOVA there was a significant difference between bankside standing vegetation at the six sites (p-value=0.0053). A Tukey test was used to determine the different groupings (Table 6). Floresville was significantly different from the other 5 sites due in part to the abundance of very large diameter mature pecan trees. One of the banks at the Calaveras site was a former pecan orchard and has very large, widely spaced trees. McFaddin was also significantly different from all of the sites because there were no trees within the sampling plots.

Table 20. Volume and density of the bankside vegetation for the Calaveras site, collected on June 20, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots, set 15.2 meters in from the edge of the bank.

	Diameter Class (cm)	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)	Dominant Species
	25	2.1	0.10	0.33	pecan
	30	2.1	0.15	0.80	pecan
	35	2.1	0.20	1.09	pecan
	40	2.1	0.26	1.03	pecan
	45	2.1	0.33	2.39	pecan
	50	2.1	0.41	2.76	pecan
	55	2.1	0.49	3.96	pecan
	65	2.1	0.69	4.76	pecan
	70	6.3	2.41	22.57	pecan
	85	2.1	1.18	9.52	pecan
	90	2.1	1.33	12.71	pecan
	95	2.1	1.48	15.57	pecan
Total		29.2	9.03	77.48	
QMD* = 62.8					

*Quadratic mean diameter

Table 21. Volume and density of the bankside vegetation for the Floresville site, collected from August 23-25, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots, set 15.2 meters in from the edge of the bank.

	Diameter Class (cm)	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)	Dominant Species
	10	47.9	0.38	1.68	boxelder / sugarberry
	15	66.7	1.18	4.18	sugarberry
	20	68.8	2.16	10.59	sugarberry / cottonwood
	25	39.6	1.94	12.89	sugarberry / cottonwood
	30	33.3	2.36	14.81	sugarberry
	35	10.4	1.00	5.58	sugarberry
	40	14.6	1.83	11.05	sugarberry
	45	4.2	0.66	4.52	cedar elm
	50	2.1	0.41	3.15	ash
	55	2.1	0.49	3.16	sugarberry
	65	2.1	0.69	7.46	pecan
	70	2.1	0.80	8.14	American elm
	95	2.1	1.48	11.69	bur oak
	100	2.1	1.64	19.34	cottonwood
Total		297.9	17.02	118.26	
QMD* = 27.0					

*Quadratic mean diameter

Table 22. Volume and density of the bankside vegetation for the Falls City site, collected on June 23, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots, set 15.2 meters in from the edge of the bank.

	Diameter Class (cm)	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)	Dominant Species
	10	22.9	0.18	0.53	mesquite
	15	39.6	0.70	1.23	mesquite
	20	29.2	0.92	2.77	sugarberry / mesquite
	25	31.3	1.53	4.60	mesquite
	30	22.9	1.62	5.68	black willow / sugarberry
	35	6.3	0.60	2.24	mesquite
	40	2.1	0.26	1.63	mesquite
	45	6.3	0.99	5.05	sugarberry
	50	8.3	1.64	8.52	mesquite
	55	4.2	0.99	6.43	pecan
	60	2.1	0.59	4.48	sugarberry
Total		175.0	10.02	43.15	
QMD* = 27.0					

*Quadratic mean diameter

Table 23. Volume and density of the bankside vegetation for the Charco site, collected from July 12-13, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots, set 15.2 meters in from the edge of the bank.

	Diameter Class (cm)	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)	Dominant Species
	10	29.2	0.23	0.83	boxelder
	15	41.7	0.74	2.52	boxelder
	20	35.4	1.11	3.15	boxelder / sugarberry
	25	29.2	1.43	4.96	sugarberry
	30	8.3	0.59	1.91	sugarberry
	40	8.3	1.05	5.66	American elm / sugarberry
	45	2.1	0.33	1.98	sugarberry
	60	2.1	0.59	3.40	pecan
	65	2.1	0.69	6.75	pecan
	115	2.1	2.16	29.10	pecan
Total		160.4	8.92	60.26	
QMD* = 26.6					

*Quadratic mean diameter

Table 24. Volume and density of the bankside vegetation for the Goliad site, collected on June 10, 2011 and June 16, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots, set 15.2 meters in from the edge of the bank.

	Diameter Class (cm)	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)	Dominant Species
	10	29.2	0.23	0.88	sugarberry
	15	54.2	0.96	2.89	American elm / sugarberry
	20	41.7	1.31	4.00	sugarberry
	25	37.5	1.84	7.33	sugarberry
	30	29.2	2.06	9.77	sugarberry
	35	14.6	1.40	5.86	cedar elm
	40	12.5	1.57	7.82	cedar elm / sugarberry
	45	4.2	0.66	2.71	cedar elm / boxelder
	50	2.1	0.41	3.47	pecan
	55	6.3	1.48	9.33	pecan
	75	2.1	0.92	10.33	pecan
Total		233.3	12.85	64.38	
QMD* = 26.5					

*Quadratic mean diameter

Conceptual Models of LWD Dynamics

Based on the conceptual model created by Benda and Sias (2003) the data collected from this study was used to estimate the LWD dynamics of the Lower San Antonio River. Applying this model requires several assumptions are made in order to generalize the complex inputs and outputs. Mortality for the riparian vegetation was assumed to be 2% based on the fast growing shorter lived species that dominated many of the study sites. The number of banks contributing forest mortality was assumed to be 2 and the input from bankside erosion was also assumed at 2 banks. Trees falling from forest mortality were assumed to fall non-preferentially in any direction, and a value of 0.13 was chosen to represent the amount of a stem becoming biomass within the river based on work by Van Sickly and Gregory (1990). However, for bank erosion, the value selected to represent the amount of stem becoming biomass was 0.75 based on values from Benda and Sias (2003). Trees undercut by bank erosion are assumed to fall toward the river that is undercutting the bank. The volume of standing trees was converted to m^3 m^2 for the budget calculations. The mean bank erosion rate for Calveras, Floresville, Falls City, and McFaddin were estimated at 0.1525 m^{-1} yr^{-1} from Curran (2009). The mean bank erosion rates for Charco and Goliad were estimated at 0.3051 m^{-1} yr^{-1} using some data from Cawthorn and Curran (2007). The results from equations 3, 4, and 5 are presented in Table 25.

Table 25. Lateral recruitment budget estimates (m^3 km^{-1} yr^{-1}) for the six study reaches on the lower San Antonio River, Texas based on a model from Benda and Sias (2003).

Site	Mortality Recruitment (I_m)	Bank Erosion Recruitment (I_{be})	Total Lateral Recruitment (I_l)
Calaveras	0.75	1.77	2.52
Floresville	0.77	2.71	3.48
Falls City	0.18	0.99	1.17
Charco	0.29	2.76	3.05
Goliad	0.33	2.95	3.28
McFaddin	n/a*	n/a*	n/a*

*No bankside vegetation was within 15.24m of the river resulting in zeros as values.

Lateral LWD recruitment was similar between Calaveras, Floresville, Charco, and Goliad largely due to the volume of standing trees on the banks of the river. These sites had a higher volume per hectare and thus can theoretically contribute more LWD to the river. Falls City had the second lowest volume of riparian trees and it is refleceted in the ability of the banks to contribute LWD to the river. The McFaddin site is completely different compared with all the other sites because no standing trees were within the sampling area for bankside vegetation. The result of no standing trees lead to a zero value for the total lateral recruitment. The zero lateral recruitment of LWD at McFaddin

indicates that at this section of the river, fluvial dynamics are the key driving source to LWD inputs.

In order to calculate the LWD budget estimate, from equation 2, an estimate of decay was required for the storage time. Few studies have looked at decay rates of wood within streams and along stream banks; little is known about decay rates under natural conditions (Hart, 2003). Benke and Wallace (1990) found that in swamps of the Ogeechee River, estimates of woody debris mass were lower than would be expected in this region due to wood washing into the river and because of rapid decomposition under warm, humid conditions. Spies *et al.* (1988) estimated terrestrial decay rate constants of LWD in Douglas-fir forests in the Pacific Northwest at 0.029 yr^{-1}. Bilby *et al.* (1999) estimated decay rate constants between 0.026 – 0.038 yr^{-1} for submerged LWD in western Washington. Based on the cooler climate in that region of the country decay rates would be expected to be lower than in the hotter and more humid southeastern portion of the United States. Harmon *et al.* (1986) found rates of decay ranging from 0.004-0.520 yr^{-1} depending upon the species in temperate ecosystems in the northwest United States. Due to climate differences of the Pacific Northwest and the southern United states a higher value of 7% mass loss per year was used in this study. The higher decay rate was also selected because of the species mix of the riparian forests along the Lower San Antonio River are predominately faster growing species that are not decay resistant. Using a 7% decay rate, approximately 70% of the mass of LWD would be gone after 18 years. Under the Benda and Sias (2003) model mass lost will serve as eventual volume loss due to LWD breaking into smaller pieces.

Using equation 9, the LWD budget was calculated using a 7% decay rate with an 18 year residence time (Table 26). Fluvial transport into a reach (Q_i), fluvial transport out of a reach (Q_o), and volume being deposited in the floodplain (L_o) were unknown variables.

Table 26. Estimated LWD recruitment, decay, and storage for the six study reaches on the lower San Antonio River, Texas based on the model from Benda and Sias (2003).

Variable	Calaveras	Floresville	Falls City
Total Recruitment (L_i, m^3 km^{-1} yr^{-1})	2.52	3.48	1.17
Volume Decayed (D, m^3 km^{-1} yr^{-1})	0.18	0.24	0.08
Net Recruitment (m^3 km^{-1} yr^{-1})	2.34	3.24	1.09
Recruitment in 18 Years (m^3 km^{-1})	42.12	58.32	19.62
Volume Measured (m^3 km^{-1})	129.32	87.17	57.18
(Q_i-Q_o-L_o)[a] Units (m^3 km^{-1} yr^{-1})	4.84	1.60	2.09

*No bankside vegetation was within 15.24 m of the river resulting in zeros as values
[a] Q_i = LWD from fluvial inflow, Q_o = LWD from fluvial outflow, L_o = floodplain deposition; no estimate is available for McFaddin because of no bankside vegetation recruitment.

Table 26. (Cont.)

Variable	Charco	Goliad	McFaddin
Total Recruitment (L_i, m^3 km^{-1} yr^{-1})	3.05	3.28	N/A*
Volume Decayed (D, m^3 km^{-1} yr^{-1})	0.21	0.23	N/A
Net Recruitment (m^3 km^{-1} yr^{-1})	2.84	3.05	N/A
Recruitment in 18 Yrs (m^3 km^{-1})	51.12	54.90	N/A
Volume Measured (m^3 km^{-1})	109.16	90.91	964.96
(Q_i-Q_o-L_o)[a] Units (m^3 km^{-1} yr^{-1})	3.22	2.00	N/A

*No bankside vegetation was within 15.24m of the river resulting in zeros as values
[a] Q_i = LWD from fluvial inflow, Q_o = LWD from fluvial outflow, L_o = floodplain deposition; no estimate is available for McFaddin because of no bankside vegetation recruitment.

For all six of the sites the LWD volume measured in the river was more than the 18 year estimated residence time of LWD within a river segment, indicating that fluvial transport into a reach (Q_i), fluvial transport out of a reach (Q_o), and volume being deposited in the floodplain (L_o) are very important in this low-gradient river. It seems that the import of upstream LWD is extremely important in the LWD dynamics. This is supported by the finding by Curran (2010) that all LWD jams in a 72 km stretch of the Lower San Antonio River had moved by the end of four years. LWD is highly mobile in this river even in moderate flow events.

There is a degree of uncertainty in these LWD budget estimates because of a lack of direct empirical data on mortality rates, bank erosion rates, and decay rates in the southeastern United States. However, these numbers represent a rational estimate of LWD dynamics in the Lower San Antonio River. Fluvial dynamics ranged between 33% and nearly 100% of the total annual recruitment of LWD in the sections of river sampled. Therefore, upstream forests and tributaries contribute large volumes of LWD down the Lower San Antonio River. Any impacts to uspstream riparian vegetation could have an impact on LWD dynamics downstream in the future.

The ability of sites to maintain LWD in the sections of the river appear to be dependent on the physical channel combined with discharge and the presence of any obstructions in the river. The Falls City site had the lowest measured instream LWD volume. This may have been in part to the exposed bedrock within that river section. The shallow section of the river may trap more LWD in the deep pools interspaced in that section of the river.

Comparison to other Texas River Systems and Management Recommendations:

LWD dynamics in the Lower San Antonio River are more dependent on large fluxes of LWD during periodic flood pulses. The volume measured at all six study sites was greater than bankside recruitment alone could account for. In addition, Curran (2010) found that all LWD debris jams measured in a reach of the Lower San Antonio River moved downstream within four years, indicating that LWD mobility is high. The San Antonio River is supply limited for sediment transport with the largest 10% of flows carrying more than 90% of sediment (Holley, 1992). The relatively flashy nature of the Lower San Antonio River the ability to transport sediment and LWD downstream during periodic pulsed events. The Lower San Antonio River appears to be supply limited for LWD with the capability to transport large quantities of LWD downstream.

The Lower San Antonio River has a much larger flux of LWD into and out of river reaches compared to the Sabine River. The Sabine River is a low-gradient river that is transport limited for sediment and LWD with a large portion of LWD coming directly from the river banks (McBroom, 2010). The Sabine River had higher volumes of standing bankside vegetation than the Lower San Antonio River but, the average loading of LWD per river mile within the Lower San Antonio River was higher. The Sabine River does not generally have the same bankside erosion rates that Lower San Antonio River exhibits. The Sabine River did not exhibit a pattern of LWD volume increasing downstream. In contrast, there were larger accumulations of LWD at the most downstream site on the San Antonio River which is evidence of the high LWD mobility.

These differences account for the variations observed in LWD budgets for these two rivers. The Lower San Antonio River is much more dependent on LWD coming from upstream sources. In particular, the high mobility of LWD during periodic high flow events allows for major tributaries to contribute LWD into the system. In addition to upstream forests, local riparian forests, along the banks, provide direct input of LWD into the river due to bank erosion and other processes.

The supply limited nature of LWD in the Lower San Antonio River means that riparian forest management can have greater potential influence on instream wood. Therefore, protection of riparian forest vegetation is necessary for managing LWD in the river. Protection of riparian forests should include maintaining a forested buffer of mature trees (preferably native to Texas) along the river and the major tributaries. This buffer should be consistent with existing Texas Forestry Best Management Practices, which calls for a minimum width of 15 m (50') on each side of the river channel and a forest density of at least 11.5 m^2 ha^{-1} (50 ft^2 ac^{-1}). These recommendations will minimize land use impacts on water resources, as has been extensively documented in the forestry literature. Maintaining this forest buffer is crucial for proper management of LWD in the Sabine River.

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Appendix A

Table A1. Instream large woody debris analysis, data collected from the Calaveras site on June 28-29, 2011; July 6-7, 2011; and July 11, 2011.

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
400	2.13	26.67	21.59	unknown	3	No	
401	4.27	25.91	22.86	cottonwood	3	No	
402	3.35	24.38	17.78	boxelder	4	No	
403	4.27	15.24	11.43	blackwillow	3	No	
404	1.83	24.64	19.05	mesquite	4	No	
405	4.88	121.92	101.60	cottonwood	4	No	
406	2.13	60.96	25.40	willow/cottonwood	3	No	
407	2.74	27.94	22.86	willow/cottonwood	3	No	
408	15.24	91.44	48.26	cottonwood	3	No	main stem, branch is 409
409	4.88	43.18	24.13				see 408
410	11.89	38.10	17.78	blackwillow	3	No	
411	9.14	22.86	15.24	blackwillow	3	No	
412	3.66	30.48	22.86	cottonwood	4	No	
413	8.53	33.27	22.86	blackwillow	2	Yes	
414	5.79	29.21	22.61	blackwillow	3	No	
415	1.83	13.21	10.16	blackwillow	1	Yes	
416	1.37	13.97	10.16	sugarberry	4	No	
417	2.13	19.05	16.51	willow/cottonwood	5	No	
418	7.01	21.08	18.03	blackwillow	2	No	
419	4.27	14.99	12.19	blackwillow	2	No	
420	8.84	29.21	17.78	blackwillow	2	No	
421	8.23	21.08	14.73	blackwillow	2	No	
422	2.29	15.24	11.43	blackwillow	3	No	
423	7.01	34.80	26.16	blackwillow	2	Yes	
424	4.57	22.86	15.24	blackwillow	4	No	
425	5.18	25.40	20.32	cottonwood	5	No	
426	4.27	38.61	33.02	sugarberry	5	No	
427	1.37	16.00	10.16	ash	3	No	
428	2.83	17.78	12.95	mesquite	3	No	
429	4.57	23.88	19.81	sugarberry	4	No	
430	3.96	27.94	13.97	mesquite	4	No	
431	2.44	25.40	17.02	willow/cottonwood	4	No	
432	5.49	15.75	11.43	blackwillow	1	Yes	

Table A1. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
400	unknown	Upstream	0	No	Individual Piece	1
401	unknown	Upstream	0	Yes	Individual Piece	1
402	unknown	Upstream	0	No	Individual Piece	1
403	unknown	Upstream	0	No	Individual Piece	1
404	unknown	Upstream	0	No	Individual Piece	1
405	Erosion	Local	90	No	Jam 400	2
406	unknown	Upstream	180	No	Jam 400	1
407	unknown	Upstream	0	No	Jam 400	1
408	Erosion	Local	0	Yes	Fallen Tree	1
409						
410	Erosion	Local	0	Yes	Fallen Tree	2
411	Erosion	Local	0	No	Fallen Tree	2
412	unknown	unknown	0	No	Individual Piece	2
413	unknown	unknown	90	No	Jam 401	1
414	unknown	Upstream	0	No	Jam 401	1
415	unknown	Upstream	90	No	Jam 401	1
416	unknown	Upstream	0	No	Jam 401	1
417	unknown	Upstream	0	No	Jam 401	1
418	unknown	Upstream	0	No	Jam 401	1
419	unknown	Upstream	0	No	Jam 401	1
420	unknown	Upstream	0	No	Jam 401	1
421	unknown	Upstream	0	No	Jam 401	1
422	unknown	Upstream	0	No	Jam 401	1
423	Wind Snap	Upstream	90	No	Jam 401	2
424	unknown	Upstream	90	No	Jam 401	1
425	unknown	Upstream	90	No	Jam 401	1
426	unknown	Upstream	180	No	Jam 402	1
427	unknown	Upstream	90	No	Jam 402	1
428	unknown	Upstream	180	No	Jam 402	1
429	unknown	Upstream	0	No	Jam 402	1
430	unknown	Upstream	180	No	Jam 402	1
431	unknown	Upstream	180	No	Jam 402	2
432	Erosion	Local	0	No	Jam 402	2

Table A1. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
433	3.35	24.38	13.97	blackwillow	1	Yes	main stem, branch is 434
434	2.74	24.38	15.24				see 433
435	2.13	26.67	24.13	sugarberry	5	No	
436	3.05	22.86	19.05	sugarberry	4	No	
437	3.66	28.45	21.59	slippery elm	4	No	
438	2.13	16.51	11.43	sugarberry	4	No	
439	2.59	20.32	17.78	sugarberry	4	No	
440	3.96	33.02	24.13	cottonwood	4	No	
441	4.27	38.10	25.91	unknown	4	No	
442	1.37	13.97	11.43	boxelder	4	No	
443	1.83	20.32	15.24	unknown	5	No	
444	22.56	91.44	47.24	cottonwood	4	No	
445	1.98	16.51	12.70	cottonwood	4	No	
446	5.49	36.07	18.29	cottonwood	3	No	main stem, branch is 447
447	3.96	18.29	12.45				see 446
448	1.37	40.64	36.83	cottonwood	5	No	
449	3.05	46.74	37.85	willow/cottonwood	4	No	main stem, branch is 450
450	6.71	19.56	11.68				see 449
451	1.98	21.84	11.43	blackwillow	3	No	
452	1.83	30.48	23.62	willow/cottonwood	4	No	
453	2.74	20.32	14.22	blackwillow	4	No	
454	3.35	26.67	23.37	pecan	3	No	
455	1.52	22.10	12.70	blackwillow	3	No	
456	4.27	39.12	33.02	pecan	3	No	
457	4.42	21.59	17.53	sugarberry	5	No	
458	1.52	26.67	25.40	pecan	3	No	
459	2.74	45.72	24.13	pecan	5	No	
460	2.74	27.94	17.78	ash	4	No	
461	3.96	17.78	12.70	boxelder	4	No	
462	3.35	38.10	27.94	boxelder	4	No	

Table A1. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
433	Erosion	Local	0	No	Jam 402	2
434						
435	unknown	Upstream	180	No	Jam 402	2
436	Erosion	Local	0	No	Jam 402	2
437	Erosion	Local	0	No	Jam 402	2
438	Erosion	Local	0	No	Jam 402	2
439	unknown	Upstream	0	No	Individual Piece	1
440	unknown	Upstream	0	No	Individual Piece	1
441	unknown	Upstream	0	No	Individual Piece	1
442	unknown	Upstream	0	No	Individual Piece	1
443	unknown	Upstream	90	No	Individual Piece	1
444	Erosion	Local	180	Yes	Fallen Tree	1
445	unknown	Upstream	0	No	Individual Piece	1
446	Erosion	Local	0	No	Fallen Tree	2
447						
448	unknown	Upstream	0	No	Individual Piece	2
449	unknown	unknown	0	No	Fallen Tree	1
450						
451	unknown	unknown	0	No	Individual Piece	1
452	unknown	unknown	0	No	Fallen Tree	1
453	unknown	unknown	0	No	Fallen Tree	1
454	unknown	Upstream	0	No	Individual Piece	1
455	unknown	Upstream	0	No	Individual Piece	1
456	unknown	Upstream	0	No	Individual Piece	1
457	unknown	unknown	0	No	Individual Piece	1
458	unknown	unknown	90	No	Individual Piece	1
459	unknown	Upstream	0	No	Individual Piece	1
460	unknown	unknown	180	No	Individual Piece	1
461	unknown	unknown	0	No	Individual Piece	1
462	Erosion	Local	0	Yes	Individual Piece	1

Table A1. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
463	2.59	43.18	40.64	pecan	3	No	main stem, branches are 464-466
464	2.29	23.88	19.30				see 463
465	4.88	38.86	33.02				see 463
466	1.68	18.80	15.24				see 463
467	4.57	15.24	12.70	hard elm	4	No	main stem, branch is 468
468	4.27	20.32	15.24				see 467
469	5.18	22.86	11.43	boxelder	4	No	
470	7.01	40.64	30.48	sugarberry	4	No	
471	1.83	17.78	10.16	ash	5	No	
472	1.52	25.40	20.32	sugarberry	4	No	
473	2.29	23.62	13.97	willow/cottonwood	4	No	
474	3.96	60.96	45.72	cottonwood	4	No	
475	13.72	40.64	19.05	blackwillow	3	No	
476	13.11	33.02	13.97	cottonwood	4	No	
477	2.90	29.21	21.59	willow/cottonwood	5	No	
478	2.44	17.78	12.70	cottonwood	4	No	
479	1.83	16.51	12.70	unknown	4	No	
480	5.18	30.48	27.94	ash	4	No	
481	2.13	17.78	15.24	sugarberry	3	No	
482	4.27	40.64	38.10	mesquite	5	No	
483	4.11	27.94	16.51	American elm	4	No	
484	3.35	40.89	38.10	pecan	5	No	
485	3.35	14.73	10.16	blackwillow	5	No	
486	4.11	21.34	20.83	pecan	3	No	
487	1.83	16.51	10.16	boxelder	5	No	
488	4.72	17.78	16.26	boxelder	4	No	
489	1.52	20.32	14.48	blackwillow	4	No	
490	3.66	53.34	40.64	cottonwood	4	No	main stem, branches are 491-493
491	5.49	32.77	15.75				see 490
492	5.79	26.92	20.57				see 490
493	5.79	17.27	15.24				see 490
494	4.27	25.91	24.38	boxelder	3	No	

Table A1. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
463	unknown	Upstream	0	No	Fallen Tree	1
464						
465						
466						
467	unknown	Upstream	180	No	Individual Piece	1
468						
469	unknown	Upstream	180	No	Individual Piece	1
470	unknown	Upstream	0	No	Individual Piece	2
471	unknown	Upstream	0	No	Individual Piece	1
472	unknown	Upstream	0	No	Individual Piece	1
473	unknown	Upstream	0	No	Individual Piece	1
474	Erosion	Local	90	Yes	Fallen Tree	2
475	unknown	Upstream	0	No	Jam 403	1
476	unknown	Upstream	90	No	Jam 403	1
477	unknown	Upstream	90	No	Jam 403	1
478	unknown	Upstream	0	No	Jam 403	1
479	unknown	Upstream	180	No	Jam 403	1
480	unknown	Upstream	0	No	Jam 403	1
481	unknown	unknown	180	No	Jam 403	1
482	unknown	unknown	0	No	Jam 403	1
483	unknown	Upstream	0	No	Jam 403	1
484	unknown	unknown	90	No	Jam 404	1
485	unknown	unknown	90	No	Jam 404	1
486	unknown	unknown	180	No	Jam 404	1
487	unknown	Upstream	180	No	Jam 404	1
488	unknown	Upstream	90	No	Jam 404	1
489	unknown	unknown	0	No	Jam 404	1
490	unknown	Upstream	0	Yes	Fallen Tree	2
491						
492						
493						
494	unknown	Upstream	180	No	Individual Piece	2

Table A1. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
495	4.27	23.37	12.95	boxelder	5	No	
496	3.20	16.76	12.95	willow/cottonwood	5	No	
497	4.51	32.51	28.19	pecan	5	No	
498	2.13	31.75	28.45	unknown	4	No	
499	4.42	15.24	10.67	boxelder	5	No	
500	4.57	13.21	11.68	unknown	5	No	
501	1.37	28.19	24.89	pecan	5	No	
502	3.66	18.54	13.97	hard elm	5	No	
503	3.66	27.43	20.07	cottonwood	5	No	
504	4.72	50.04	20.83	unknown	5	No	
505	3.66	32.51	24.38	cottonwood	5	No	
506	3.05	34.54	25.65	hard elm	5	No	
507	4.57	83.82	55.88	pecan	4	No	
508	3.05	43.94	33.27	cottonwood	4	No	main stem, branches are 509-511
509	1.98	31.24	24.13				see 508
510	1.37	35.56	28.96				see 508
511	2.59	12.70	10.16				see 508
512	1.68	22.10	18.29	American elm	4	No	
513	1.83	14.48	10.16	hard elm	4	No	
514	2.44	16.76	16.51	sugarberry	4	No	
515	1.98	33.78	30.48	blackwillow	4	No	
516	3.81	42.67	39.88	unknown	4	No	
517	3.35	24.89	21.84	cottonwood	4	No	
518	5.49	42.42	28.96	cottonwood	4	No	
519	7.80	28.45	17.27	cottonwood	4	No	
520	7.01	25.91	15.49	sugarberry	4	Yes	
521	4.88	50.80	40.13	cottonwood	4	No	
522	1.83	14.22	12.70	pecan	3	No	
523	4.27	19.30	10.16	cottonwood	4	No	
524	3.35	16.00	14.22	mesquite	4	No	
525	10.97	36.07	29.46	cottonwood	3	No	
526	7.01	36.07	25.91	blackwillow	3	No	
527	7.92	17.78	12.19	blackwillow	3	No	
528	3.05	43.43	37.34	sugarberry	5	No	

Table A1. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
495	unknown	unknown	0	No	Individual Piece	2
496	unknown	unknown	0	No	Individual Piece	2
497	unknown	unknown	180	No	Individual Piece	1
498	unknown	unknown	90	No	Individual Piece	1
499	unknown	unknown	90	No	Individual Piece	2
500	unknown	unknown	0	No	Individual Piece	2
501	unknown	Upstream	0	No	Individual Piece	2
502	unknown	Upstream	0	No	Individual Piece	2
503	unknown	Upstream	0	No	Individual Piece	2
504	unknown	Upstream	0	No	Individual Piece	2
505	unknown	Upstream	0	No	Individual Piece	1
506	unknown	Upstream	180	No	Individual Piece	1
507	unknown	Upstream	90	No	Individual Piece	2
508	unknown	Upstream	0	No	Jam 405	2
509						
510						
511						
512	unknown	Upstream	90	No	Jam 405	1
513	unknown	Upstream	90	No	Jam 405	1
514	unknown	Upstream	0	No	Jam 405	1
515	unknown	Upstream	0	No	Jam 405	1
516	unknown	Upstream	90	Yes	Individual Piece	1
517	unknown	unknown	0	No	Individual Piece	1
518	unknown	Upstream	0	No	Individual Piece	1
519	unknown	Upstream	0	No	Individual Piece	1
520	unknown	Upstream	0	No	Individual Piece	1
521	unknown	Upstream	0	No	Individual Piece	1
522	unknown	unknown	180	No	Individual Piece	1
523	unknown	Upstream	0	No	Individual Piece	1
524	Cut	Upstream	0	No	Individual Piece	2
525	Cut	Local	90	No	Jam 406	2
526	Cut	Local	90	No	Jam 406	2
527	unknown	Local	90	No	Jam 406	2
528	unknown	Upstream	90	No	Jam 407	2

Table A1. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
529	3.75	25.91	17.02	cottonwood	5	No	
530	1.58	11.18	10.16	cottonwood	5	No	
531	2.44	30.73	26.16	blackwillow	5	No	
532	4.42	40.89	36.58	boxelder	5	No	
533	1.52	15.24	11.68	mesquite	4	No	
534	2.59	28.45	26.92	cottonwood	4	No	
535	2.13	24.38	19.56	cottonwood	5	No	
536	1.37	17.78	11.68	sugarberry	3	No	
537	6.10	15.75	10.16	blackwillow	3	No	
538	1.83	13.72	10.41	blackwillow	4	No	
539	1.37	57.91	57.40				see 543
540	3.54	101.60	71.12				see 543
541	3.66	78.74	71.12				see 543
542	3.05	48.26	47.50				see 543
543	3.35	121.92	96.52	cottonwood	4	No	main stem, branches are 539-542
544	1.83	11.94	10.16	blackwillow	2	No	
545	3.05	26.42	23.11	blackwillow	3	No	
546	1.25	35.81	27.69	blackwillow	2	No	
547	1.37	13.72	12.95	sugarberry	4	No	
548	3.05	73.15	43.18	blackwillow	2	No	
549	1.68	28.45	22.86	pecan	4	No	
550	3.66	18.29	13.97	boxelder	4	No	
551	2.29	18.29	16.26	boxelder	4	No	
552	1.98	18.80	18.80	willow/cottonwood	4	No	
553	1.52	17.78	14.22	sugarberry	4	No	
554	1.37	42.16	38.61	blackwillow	2	No	
555	2.13	21.34	16.00	unknown	5	No	
556	1.37	24.13	20.32	sugarberry	2	No	
557	9.14	25.40	15.24	unknown	1	Yes	
558	4.27	27.94	21.08	boxelder	5	No	
559	5.49	30.48	23.62	unknown	3	No	
560	3.05	40.13	38.10	cottonwood	4	No	
561	3.96	20.32	12.45	sugarberry	4	No	
562	3.35	20.32	10.16	boxelder	4	No	

Table A1. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
529	unknown	Upstream	90	No	Jam 407	2
530	unknown	Upstream	180	No	Jam 407	2
531	Cut	Local	90	No	Jam 407	2
532	unknown	Local	90	No	Jam 407	2
533	unknown	Local	180	No	Jam 407	2
534	unknown	Local	180	No	Jam 407	2
535	unknown	unknown	0	No	Jam 407	2
536	unknown	Upstream	90	No	Jam 407	2
537	unknown	Upstream	90	No	Jam 407	2
538	unknown	Upstream	90	No	Jam 407	2
539						
540						
541						
542						
543	unknown	Local	180	No	Jam 407	2
544	Cut	Local	90	No	Jam 407	2
545	Cut	Local	0	No	Jam 407	2
546	Cut	Local	90	No	Jam 407	2
547	unknown	Upstream	0	No	Jam 407	2
548	Cut	Local	0	No	Jam 407	2
549	Cut	Local	180	No	Jam 407	2
550	unknown	Upstream	180	No	Jam 407	2
551	unknown	Upstream	0	No	Jam 407	2
552	unknown	Upstream	180	No	Jam 407	2
553	unknown	Upstream	180	No	Jam 407	2
554	unknown	unknown	0	No	Jam 407	2
555	unknown	Upstream	0	No	Jam 407	2
556	unknown	unknown	90	No	Jam 407	2
557	Erosion	Local	90	No	Jam 407	2
558	unknown	Upstream	180	No	Jam 407	2
559	Erosion	Local	90	No	Individual Piece	2
560	unknown	Upstream	90	No	Individual Piece	2
561	unknown	Upstream	90	No	Individual Piece	2
562	unknown	Upstream	0	No	Individual Piece	2

Table A1. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
563	6.10	19.81	12.70	boxelder	5	No	
564	7.62	20.32	13.97	blackwillow	3	No	
565	3.66	37.85	25.65	pecan	4	No	
566	4.27	54.10	22.10	sugarberry	5	No	
567	1.37	15.24	10.16	sugarberry	5	No	
568	2.44	18.29	13.72	blackwillow	5	No	
569	3.96	30.48	20.07	blackwillow	4	No	
570	4.27	22.86	10.16	blackwillow	3	No	
571	3.96	34.29	27.94	unknown	4	No	
572	7.62	13.72	10.16	willow/cottonwood	4	No	
573	1.68	21.08	17.27	willow/cottonwood	4	No	
574	2.13	24.13	21.84	willow/cottonwood	4	No	
575	1.83	13.72	10.16	blackwillow	4	No	
576	1.83	13.21	12.19	blackwillow	4	No	
577	9.75	58.42	30.48	unknown	3	No	
578	7.01	20.32	11.94	cottonwood	2	Yes	
579	11.28	52.32	26.92	cottonwood	2	No	
580	3.05	19.05	16.51	cottonwood	3	No	
581	10.67	28.19	17.27	cottonwood	2	Yes	
582	11.58	35.56	21.59	cottonwood	2	Yes	
583	3.66	36.58	26.42	hard elm	4	No	
584	4.57	33.53	21.34	blackwillow	3	No	main stem, branch is 585
585	3.66	16.26	13.46				see 584
586	3.51	43.69	25.91	cottonwood	3	No	
587	2.44	12.95	10.16	willow/cottonwood	4	No	
588	2.13	18.03	14.99	unknown	4	No	
589	2.44	18.03	14.22	blackwillow	2	No	
590	1.83	22.86	20.32	blackwillow	2	No	
591	1.52	15.24	13.97	pecan	5	No	
592	3.35	22.86	15.24	pecan	3	No	
593	3.35	50.04	32.26	pecan	5	No	
594	4.27	35.56	17.78	pecan	3	No	

Table A1. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
563	unknown	Upstream	180	No	Individual Piece	2
564	Wind Snap	Local	0	No	Individual Piece	2
565	unknown	Upstream	180	No	Individual Piece	1
566	unknown	Upstream	90	No	Individual Piece	1
567	Cut	Upstream	180	No	Individual Piece	1
568	unknown	Upstream	0	No	Individual Piece	1
569	unknown	Upstream	90	No	Individual Piece	1
570	Wind Snap	Local	0	No	Individual Piece	1
571	unknown	Upstream	180	No	Individual Piece	1
572	unknown	Upstream	0	No	Individual Piece	1
573	Erosion	Local	180	No	Individual Piece	1
574	Erosion	Local	180	No	Individual Piece	1
575	Erosion	Local	180	No	Individual Piece	1
576	Erosion	Local	180	No	Individual Piece	1
577	unknown	Upstream	180	No	Individual Piece	1
578	unknown	Local	90	No	Jam 407	1
579	Wind Snap	Local	180	No	Jam 407	1
580	Wind Snap	Local	180	No	Jam 407	2
581	unknown	Local	90	No	Jam 407	1
582	unknown	Local	90	No	Jam 407	1
583	unknown	unknown	0	No	Jam 407	1
584	unknown	Local	0	No	Jam 407	1
585						
586	Cut	Local	180	No	Jam 407	1
587	unknown	Upstream	180	No	Jam 407	1
588	unknown	Local	0	No	Jam 407	1
589	Cut	Upstream	180	No	Jam 407	2
590	Cut	Local	0	No	Jam 407	2
591	unknown	Upstream	180	No	Jam 407	1
592	unknown	Upstream	0	No	Jam 407	1
593	unknown	unknown	0	No	Individual Piece	1
594	unknown	unknown	90	No	Individual Piece	1

Table A1. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
595	6.10	41.91	39.62	cottonwood	5	No	
596	3.66	71.12	60.96	pecan	5	No	
597	2.44	19.56	16.51	pecan	4	No	
598	3.05	17.27	10.16	willow/cottonwood	4	No	

Table A1. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
595	unknown	unknown	0	No	Individual Piece	2
596	unknown	unknown	90	No	Individual Piece	2
597	unknown	unknown	180	No	Individual Piece	2
598	unknown	unknown	0	No	Individual Piece	1

Table A2. Instream large woody debris analysis, data collected from the Floresville site on August 23-26, 2011.

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
2000	5.03	34.04	30.48	sugarberry	3	No	
2001	2.13	12.70	10.16	sugarberry	3	No	
2002	4.57	25.91	10.16	blackwillow	3	No	
2003	2.44	45.72	36.83	boxelder	1	Yes	main stem, branches are 2004-2006
2004	2.74	21.08	15.75				see 2003
2005	3.05	25.65	22.86				see 2003
2006	3.35	16.51	12.70				see 2003
2007	4.88	18.03	12.70	blackwillow	4	No	
2008	2.44	64.77	60.96	cottonwood	5	No	
2009	3.05	48.26	40.64	boxelder	5	No	
2010	4.27	27.94	16.51	mesquite	5	No	
2011	1.83	19.05	16.51	sugarberry	4	No	
2012	5.18	45.72	38.10	cottonwood	4	No	
2013	1.52	21.59	17.27	boxelder	4	No	
2014	6.71	46.99	30.48	cottonwood	3	No	
2015	3.66	55.88	45.72	pecan	4	No	main stem, branch is 2018
2016	1.68	21.59	12.70	willow/cottonwood	4	No	
2017	1.52	25.40	18.03	willow/cottonwood	4	No	
2018	3.66	27.18	22.86				see 2015
2019	1.98	23.62	22.10	boxelder	3	No	
2020	3.05	15.24	14.73	cottonwood	2	No	
2021	4.27	30.48	26.16	cottonwood	5	No	main stem, branches are 2022-2023
2022	3.05	25.40	15.24				see 2021
2023	1.52	27.94	25.40				see 2021
2024	1.37	12.19	10.41	hard elm	4	No	
2025	1.37	12.70	10.16	unknown	3	No	
2026	3.35	19.56	15.24	blackwillow	3	No	
2027	1.37	20.32	10.16	American elm	5	No	

Table A2. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
2000	unknown	unknown	0	No	Individual Piece	1
2001	unknown	unknown	0	No	Individual Piece	1
2002	unknown	unknown	0	No	Individual Piece	2
2003	Wind Snap	Local	90	No	Individual Piece	2
2004						
2005						
2006						
2007	unknown	unknown	0	No	Individual Piece	1
2008	unknown	unknown	0	No	Individual Piece	1
2009	unknown	unknown	0	No	Individual Piece	1
2010	unknown	unknown	0	No	Individual Piece	1
2011	unknown	unknown	0	No	Individual Piece	1
2012	unknown	unknown	0	No	Individual Piece	1
2013	unknown	unknown	0	No	Individual Piece	1
2014	unknown	unknown	0	No	Individual Piece	1
2015	unknown	unknown	0	No	Individual Piece	1
2016	unknown	unknown	0	No	Individual Piece	1
2017	unknown	unknown	0	No	Individual Piece	1
2018						
2019	unknown	unknown	180	No	Individual Piece	1
2020	unknown	unknown	90	No	Individual Piece	1
2021	unknown	Upstream	0	No	Individual Piece	1
2022						
2023						
2024	unknown	unknown	90	No	Individual Piece	1
2025	unknown	unknown	90	No	Individual Piece	1
2026	unknown	unknown	90	No	Individual Piece	1
2027	unknown	unknown	0	No	Individual Piece	1

Table A2. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
2028	2.74	30.48	21.59	willow/cottonwood	5	No	
2029	1.52	11.94	10.16	unknown	3	No	
2030	2.13	23.11	17.02	unknown	4	No	
2031	2.13	31.75	25.40	boxelder	5	No	
2032	6.71	38.10	33.02	blackwillow	2	No	
2033	4.57	91.44	88.90	cottonwood	2	Yes	main stem, branches are 2034-2039
2034	10.67	48.26	20.32				see 2033
2035	4.57	68.58	66.04				see 2033
2036	3.35	46.99	38.10				see 2033
2037	1.52	60.20	59.69				see 2033
2038	2.44	44.20	40.64				see 2033
2039	8.84	46.74	30.48				see 2033
2040	1.83	18.29	10.67	hard elm	5	No	
2041	7.62	35.56	15.24	blackwillow	3	No	
2042	2.13	20.57	15.24	cottonwood	2	No	
2043	2.74	17.78	15.49	pecan	2	No	
2044	1.83	15.24	10.16	pecan	4	No	
2045	3.35	11.94	26.92	cottonwood	2	No	
2046	2.13	16.00	13.46	unknown	3	No	
2047	3.66	19.05	12.70	blackwillow	2	No	
2048	1.83	11.43	10.16	boxelder	5	No	
2049	3.05	16.76	12.45	sugarberry	3	No	
2050	1.83	25.40	21.59	boxelder	3	Yes	
2051	1.52	11.43	10.16	unknown	3	No	
2052	2.13	15.24	12.70	cottonwood	2	No	
2053	3.66	33.02	27.94	live oak	3	No	
2054	2.74	39.37	32.00	cottonwood	5	No	
2055	1.83	20.32	18.03	hard elm	3	No	
2056	3.05	38.10	37.59	unknown	4	No	
2057	1.83	43.18	38.10	unknown	4	No	
2058	2.74	18.29	15.24	unknown	2	No	
2059	3.05	20.32	17.78	sugarberry	3	No	
2060	4.27	24.13	11.94	boxelder	3	No	

Table A2. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
2028	unknown	unknown	0	No	Individual Piece	2
2029	unknown	unknown	0	No	Individual Piece	2
2030	unknown	unknown	180	No	Individual Piece	1
2031	unknown	unknown	180	No	Individual Piece	1
2032	unknown	unknown	0	No	Individual Piece	1
2033	Windthrow	Local	90	Yes	Jam 2000	1
2034						
2035						
2036						
2037						
2038						
2039						
2040	unknown	unknown	0	No	Jam 2000	1
2041	unknown	unknown	0	No	Jam 2000	1
2042	unknown	unknown	0	No	Jam 2000	1
2043	unknown	unknown	0	No	Jam 2000	1
2044	unknown	unknown	180	No	Jam 2000	1
2045	unknown	unknown	90	No	Individual Piece	1
2046	unknown	Upstream	90	No	Individual Piece	1
2047	unknown	Upstream	90	No	Individual Piece	1
2048	unknown	unknown	90	No	Individual Piece	1
2049	unknown	Upstream	180	No	Individual Piece	1
2050	Windthrow	Local	0	Yes	Individual Piece	1
2051	unknown	Upstream	90	No	Individual Piece	1
2052	unknown	unknown	90	No	Individual Piece	1
2053	unknown	Upstream	0	Yes	Individual Piece	2
2054	unknown	unknown	0	No	Individual Piece	1
2055	Erosion	Local	0	Yes	Individual Piece	2
2056	unknown	unknown	90	No	Individual Piece	2
2057	unknown	unknown	0	No	Individual Piece	2
2058	unknown	unknown	90	No	Individual Piece	1
2059	unknown	unknown	0	No	Individual Piece	2
2060	unknown	unknown	0	No	Individual Piece	1

Table A2. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
2061	4.88	22.86	12.70				see 2062
2062	4.27	34.80	24.38	boxelder	3	No	main stem, branch is 2061
2063	2.74	17.78	15.24	hard elm	3	No	
2064	4.57	21.59	19.05	boxelder	4	No	
2065	2.44	16.51	15.24	hard elm	5	No	
2066	3.05	19.05	10.16	willow/cottonwood	4	No	
2067	3.05	20.32	12.70	unknown	4	No	
2068	5.79	22.35	12.95	willow/cottonwood	3	No	
2069	1.37	27.94	22.86	boxelder	4	No	
2070	1.52	22.86	17.78	boxelder	4	No	
2071	4.57	25.40	10.16	cottonwood	4	No	
2072	3.05	20.32	16.76	pecan	3	No	
2073	7.32	60.96	58.42	pecan	4	No	
2074	5.49	24.13	21.59	willow/cottonwood	4	No	
2075	1.98	53.34	43.18	cottonwood	4	No	main stem, branches are 2076-2077
2076	5.49	25.40	12.70				see 2075
2077	1.98	25.40	15.24				see 2075
2078	1.83	17.78	16.51	willow/cottonwood	4	No	
2079	5.49	20.32	12.70	boxelder	3	No	
2080	3.66	17.78	16.51	willow/cottonwood	4	No	
2081	3.35	17.78	10.16	sugarberry	4	No	
2082	1.68	17.78	10.92	pecan	3	No	
2083	2.13	13.97	10.16	boxelder	4	No	
2084	1.83	17.78	10.16	boxelder	4	No	
2085	2.13	12.70	10.16	boxelder	4	No	
2086	3.05	26.92	25.40	willow/cottonwood	4	No	
2087	6.10	16.51	12.70	cottonwood	4	No	
2088	2.59	16.51	10.16	sugarberry	4	No	
2089	3.05	12.70	10.16	unknown	4	No	
2090	2.90	13.97	12.70	sugarberry	4	No	
2091	1.68	16.51	12.70	mesquite	3	No	
2092	4.27	20.32	19.81	blackwillow	2	No	

Table A2. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
2061						
2062	Erosion	Local	0	Yes	Individual Piece	1
2063	unknown	unknown	90	No	Individual Piece	1
2064	unknown	unknown	0	No	Individual Piece	1
2065	unknown	unknown	0	No	Individual Piece	1
2066	unknown	unknown	0	No	Individual Piece	1
2067	unknown	unknown	0	No	Individual Piece	1
2068	unknown	unknown	0	No	Individual Piece	1
2069	unknown	unknown	0	No	Individual Piece	1
2070	unknown	unknown	180	No	Individual Piece	1
2071	unknown	unknown	180	No	Individual Piece	1
2072	unknown	unknown	0	No	Individual Piece	2
2073	unknown	unknown	0	No	Individual Piece	1
2074	unknown	unknown	0	No	Individual Piece	2
2075	unknown	Upstream	0	No	Jam 2001	2
2076						
2077						
2078	unknown	Upstream	180	No	Jam 2001	2
2079	unknown	Upstream	0	No	Jam 2001	2
2080	unknown	Upstream	180	No	Jam 2001	2
2081	unknown	Upstream	0	Yes	Jam 2001	2
2082	unknown	Upstream	0	No	Jam 2001	2
2083	unknown	Upstream	180	No	Jam 2001	2
2084	unknown	Upstream	180	No	Jam 2001	2
2085	unknown	Upstream	0	No	Individual Piece	2
2086	unknown	Upstream	180	No	Individual Piece	2
2087	unknown	Upstream	0	No	Individual Piece	2
2088	unknown	Upstream	0	No	Individual Piece	2
2089	unknown	Upstream	0	No	Individual Piece	2
2090	unknown	unknown	180	No	Individual Piece	1
2091	unknown	unknown	0	No	Individual Piece	2
2092	unknown	unknown	0	No	Individual Piece	1

Table A2. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
2093	5.49	22.35	15.49	willow/cottonwood	4	No	main stem, branch is 2094
2094	6.71	29.21	19.30				see 2093
2095	5.49	11.94	10.16	blackwillow	4	No	
2096	4.57	12.70	12.19	blackwillow	4	No	
2097	3.66	16.26	16.00	mesquite	4	No	
2098	3.35	17.78	17.27	unknown	4	No	
2099	3.35	33.02	22.86	willow/cottonwood	4	No	
2100	5.49	54.61	43.69	hard elm	2	No	main stem, branches are 2101-2105
2101	1.83	30.73	28.96				see 2100
2102	2.74	23.62	18.03				see 2100
2103	4.88	16.51	16.51				see 2100
2104	1.37	26.42	16.00				see 2100
2105	5.18	22.86	11.43				see 2100
2106	3.05	18.29	15.75	sugarberry	3	No	
2107	7.62	27.94	10.16	willow/cottonwood	1	Yes	
2108	2.44	31.50	30.48	hard elm	4	No	
2109	3.96	24.13	19.05	willow/cottonwood	4	No	
2110	2.13	22.86	16.51	willow/cottonwood	3	No	
2111	4.42	30.48	29.21	willow/cottonwood	4	No	
2112	3.66	21.84	18.80	mesquite	4	No	
2113	4.27	40.64	33.02	pecan	2	No	main stem, branch is 2114
2114	1.52	32.51	30.73				see 2113
2115	1.37	15.24	10.16	unknown	2	No	
2116	2.29	21.59	15.75	unknown	2	No	
2117	1.68	20.32	10.16	mesquite	4	No	
2118	1.52	25.40	10.16	unknown	4	No	
2119	2.44	16.51	12.70	mesquite	3	No	
2120	7.92	58.67	16.51	sugarberry	3	No	main stem, branches are 2121-2122
2121	5.49	18.80	15.24				see 2120
2122	8.53	22.10	10.16				see 2120

Table A2. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
2093	unknown	unknown	90	Yes	Jam 2002	1
2094						
2095	unknown	unknown	90	No	Jam 2002	1
2096	unknown	unknown	90	No	Jam 2002	1
2097	unknown	unknown	180	No	Jam 2002	1
2098	unknown	unknown	0	No	Individual Piece	1
2099	unknown	unknown	0	No	Individual Piece	1
2100	unknown	unknown	0	No	Individual Piece	1
2101						
2102						
2103						
2104						
2105						
2106	unknown	unknown	180	No	Individual Piece	1
2107	Erosion	Local	180	No	Individual Piece	1
2108	unknown	unknown	180	No	Individual Piece	1
2109	unknown	unknown	0	No	Individual Piece	1
2110	unknown	unknown	180	No	Individual Piece	1
2111	unknown	unknown	0	No	Individual Piece	1
2112	unknown	unknown	0	No	Individual Piece	1
2113	unknown	unknown	0	No	Individual Piece	1
2114						
2115	unknown	unknown	0	No	Individual Piece	1
2116	unknown	unknown	0	No	Individual Piece	1
2117	unknown	unknown	0	No	Individual Piece	1
2118	unknown	unknown	0	No	Individual Piece	1
2119	unknown	unknown	0	No	Individual Piece	1
2120	unknown	unknown	0	No	Individual Piece	1
2121						
2122						

Table A2. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
2123	2.90	14.22	11.18	mesquite	3	No	
2124	3.66	16.51	13.46	unknown	3	No	
2125	4.57	92.71	76.20	cottonwood	4	No	
2126	3.35	11.94	10.16	cottonwood	2	No	
2127	7.32	38.10	15.75	willow/cottonwood	2	No	
2128	3.05	35.56	22.86	sugarberry	3	No	
2129	6.10	25.40	22.86	unknown	3	No	
2130	7.62	25.40	23.62	unknown	3	No	
2131	1.83	21.08	15.24	unknown	2	No	
2132	2.44	27.94	22.86	unknown	3	No	
2133	1.52	20.32	17.78	unknown	3	No	
2134	1.37	15.24	13.21	unknown	3	No	
2135	1.68	13.46	10.16	unknown	4	No	
2136	6.71	17.78	17.27	unknown	3	No	
2137	6.71	16.51	10.16	unknown	4	No	
2138	5.49	35.56	22.86	unknown	4	No	
2139	3.96	31.75	19.05	unknown	4	No	
2140	2.44	25.40	20.32	unknown	3	No	
2141	6.10	22.86	17.78	cottonwood	4	No	
2142	3.66	20.32	16.51	unknown	3	No	
2143	4.27	15.24	11.43	blackwillow	1	Yes	
2144	1.83	17.78	12.70	unknown	5	No	
2145	3.35	15.24	11.43	unknown	3	No	
2146	1.83	12.70	10.16	unknown	4	No	
2147	6.10	27.94	10.16	unknown	2	No	
2148	4.57	45.72	39.37	sugarberry	2	Yes	main stem, branches are 2149-2156
2149	1.83	26.42	25.40				see 2148
2150	1.52	17.02	12.70				see 2148
2151	2.29	22.86	22.10				see 2148
2152	2.74	22.10	16.51				see 2148
2153	1.37	12.70	10.16				see 2148
2154	4.57	35.56	27.94				see 2148
2155	3.96	20.32	15.24				see 2148
2156	1.37	21.08	20.32				see 2148

Table A2. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
2123	unknown	unknown	0	No	Individual Piece	1
2124	unknown	unknown	0	No	Individual Piece	1
2125	Cut	unknown	90	No	Jam 2003	2
2126	unknown	unknown	0	No	Jam 2003	2
2127	unknown	unknown	0	Yes	Jam 2003	2
2128	unknown	unknown	0	No	Jam 2003	2
2129	unknown	unknown	90	No	Jam 2004	2
2130	unknown	unknown	180	No	Jam 2004	2
2131	unknown	unknown	90	No	Jam 2004	2
2132	Erosion	Local	90	Yes	Jam 2004	2
2133	Erosion	Local	90	Yes	Jam 2004	2
2134	Erosion	Local	90	Yes	Jam 2004	2
2135	unknown	Upstream	90	No	Jam 2004	2
2136	unknown	Upstream	90	No	Jam 2004	2
2137	unknown	Upstream	90	No	Jam 2004	1
2138	unknown	Upstream	90	No	Jam 2004	2
2139	unknown	Upstream	90	No	Jam 2004	2
2140	unknown	Upstream	180	No	Jam 2004	1
2141	unknown	Upstream	90	No	Jam 2004	2
2142	unknown	Upstream	0	No	Jam 2004	2
2143	Erosion	Local	0	Yes	Jam 2004	2
2144	unknown	unknown	90	No	Jam 2004	2
2145	unknown	unknown	90	No	Jam 2004	2
2146	unknown	unknown	0	No	Jam 2004	2
2147	unknown	unknown	0	No	Jam 2004	1
2148	Erosion	Local	90	Yes	Jam 2004	1
2149						
2150						
2151						
2152						
2153						
2154						
2155						
2156						

Table A2. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
2157	5.18	19.30	10.16	boxelder	4	No	
2158	2.13	20.57	16.76	blackwillow	4	No	
2159	5.64	55.88	33.27	pecan	3	No	
2160	3.05	23.11	17.78	unknown	5	No	
2161	1.83	12.70	10.67	boxelder	5	No	
2162	3.96	28.45	25.65	pecan	3	No	main stem, branch is 2163
2163	4.57	23.88	15.24				see 2162
2164	5.18	27.18	16.76	blackwillow	3	No	
2165	2.44	17.27	16.51	boxelder	4	No	
2166	3.66	15.24	10.16	unknown	1	No	
2167	3.96	20.32	12.70	unknown	1	No	
2168	1.52	12.70	11.43	unknown	1	Yes	
2169	2.74	30.48	25.40	willow/cottonwood	3	No	
2170	4.88	53.34	48.26	pecan	2	No	main stem, branches are 2171-2174
2171	3.05	35.56	25.40				see 2170
2172	3.66	33.02	25.40				see 2170
2173	2.74	21.08	19.81				see 2170
2174	1.52	20.57	19.81				see 2170
2175	2.44	16.51	12.70	unknown	3	No	
2176	4.27	40.64	25.40	unknown	2	No	
2177	4.57	30.48	15.24	unknown	2	No	
2178	1.37	48.26	32.77	hard elm	5	No	
2179	3.05	12.70	10.16	unknown	2	No	
2180	2.44	40.64	33.02	unknown	2	No	
2181	3.96	30.48	12.70	unknown	3	No	
2182	2.74	15.24	10.16	unknown	3	No	
2183	1.37	15.24	12.70	unknown	3	No	
2184	3.96	25.40	15.24	unknown	3	No	
2185	3.05	25.40	15.24	unknown	4	No	
2186	3.96	30.48	15.49	pecan	4	No	main stem, branch is 2187
2187	3.05	27.94	10.16				see 2186

Table A2. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
2157	unknown	unknown	0	No	Individual Piece	1
2158	unknown	unknown	180	No	Individual Piece	1
2159	unknown	unknown	180	No	Individual Piece	1
2160	unknown	unknown	180	No	Individual Piece	1
2161	unknown	unknown	0	No	Individual Piece	1
2162	unknown	unknown	0	No	Individual Piece	1
2163						
2164	unknown	unknown	0	No	Individual Piece	1
2165	unknown	unknown	0	No	Individual Piece	1
2166	unknown	unknown	90	No	Individual Piece	2
2167	Erosion	Local	0	Yes	Individual Piece	2
2168	Erosion	Local	90	Yes	Individual Piece	2
2169	Erosion	Local	180	Yes	Jam 2005	2
2170	Erosion	Local	180	Yes	Jam 2005	1
2171						
2172						
2173						
2174						
2175	unknown	unknown	90	No	Jam 2005	1
2176	unknown	unknown	90	No	Jam 2005	1
2177	unknown	unknown	180	No	Jam 2005	1
2178	unknown	Upstream	180	No	Jam 2005	1
2179	unknown	Upstream	0	No	Jam 2005	1
2180	unknown	unknown	180	No	Jam 2005	1
2181	unknown	unknown	180	No	Jam 2005	2
2182	unknown	unknown	180	No	Jam 2005	2
2183	unknown	unknown	180	No	Jam 2005	2
2184	unknown	unknown	0	No	Individual Piece	1
2185	unknown	unknown	0	No	Individual Piece	1
2186	unknown	unknown	90	No	Individual Piece	1
2187						

Table A2. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
2188	2.90	39.62	26.16	cottonwood	4	No	
2189	2.90	46.74	30.73	willow/cottonwood	4	No	
2190	2.59	46.74	30.99	cottonwood	4	No	
2191	3.05	54.10	44.20	willow/cottonwood	4	No	main stem, branches are 2192-2193
2192	2.44	28.96	26.16				see 2191
2193	2.13	27.94	20.57				see 2191
2194	6.71	20.32	15.24	sugarberry	2	No	main stem, branch is 2195
2195	2.74	12.70	10.16				see 2194
2196	4.88	12.70	10.16	unknown	2	No	
2197	2.44	12.70	11.43	unknown	2	No	
2198	6.10	30.48	17.78	unknown	1	No	
2199	3.35	45.72	40.64	unknown	4	No	
2200	4.27	25.91	21.84	blackwillow	2	No	main stem, branches are 2201-2202
2201	3.66	20.83	12.95				see 2200
2202	4.88	19.30	10.16				see 2200
2203	1.37	18.80	16.00	willow/cottonwood	1	No	
2204	3.05	20.32	19.05	unknown	4	No	
2205	2.44	38.10	33.02	blackwillow	5	No	
2206	4.27	32.00	28.70	unknown	4	No	
2207	5.18	24.13	20.32	boxelder	4	No	
2208	3.05	12.95	11.43	boxelder	4	No	
2209	2.90	15.24	10.16	mesquite	3	No	
2210	2.74	20.32	10.41	boxelder	4	No	
2211	2.74	21.84	10.92	boxelder	5	No	
2212	2.13	15.24	10.16	sugarberry	5	No	
2213	6.10	26.67	21.59	willow/cottonwood	5	No	
2214	3.96	15.24	10.41	unknown	2	No	
2215	1.83	25.40	20.32	unknown	4	No	
2216	1.98	17.78	16.76	boxelder	5	No	

Table A2. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
2188	unknown	unknown	180	No	Individual Piece	1
2189	unknown	unknown	180	No	Individual Piece	1
2190	unknown	unknown	180	No	Individual Piece	1
2191	unknown	unknown	0	No	Individual Piece	1
2192						
2193						
2194	unknown	unknown	0	No	Individual Piece	2
2195						
2196	unknown	Upstream	0	No	Individual Piece	2
2197	unknown	Upstream	0	No	Individual Piece	2
2198	unknown	unknown	0	No	Individual Piece	2
2199	unknown	unknown	90	No	Individual Piece	2
2200	unknown	unknown	180	No	Individual Piece	1
2201						
2202						
2203	unknown	unknown	0	No	Individual Piece	1
2204	unknown	unknown	0	No	Individual Piece	1
2205	unknown	unknown	180	Yes	Jam 2006	1
2206	unknown	unknown	180	No	Jam 2006	1
2207	unknown	unknown	90	No	Jam 2006	1
2208	unknown	unknown	0	No	Jam 2006	1
2209	unknown	unknown	0	No	Individual Piece	2
2210	unknown	unknown	0	No	Individual Piece	1
2211	unknown	unknown	0	No	Individual Piece	2
2212	unknown	unknown	90	No	Individual Piece	2
2213	unknown	unknown	0	No	Individual Piece	2
2214	unknown	unknown	90	No	Individual Piece	2
2215	unknown	unknown	90	No	Jam 2007	1
2216	unknown	unknown	0	No	Jam 2007	1

Table A2. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
2217	3.66	36.07	27.18	hard elm	4	No	main stem, branches are 2218-2221
2218	2.56	24.64	18.29				see 2217
2219	3.20	18.29	10.16				see 2217
2220	3.05	21.59	10.16				see 2217
2221	3.35	21.59	10.16				see 2217
2222	3.05	14.48	13.46	unknown	5	No	
2223	3.96	15.24	10.16	blackwillow	4	No	main stem, branchs are 2224-2225
2224	4.57	64.77	41.15				see 2223
2225	3.35	28.19	17.78				see 2223
2226	3.96	33.53	30.48	unknown	3	No	
2227	3.35	16.76	12.70	unknown	3	No	
2228	1.52	16.26	12.70	unknown	3	No	
2229	2.74	27.94	16.51	unknown	3	No	
2230	4.27	18.03	15.24	unknown	3	No	
2231	3.81	18.03	15.24	unknown	4	No	
2232	3.05	15.24	20.32	willow/cottonwood	5	No	
2233	5.49	55.88	45.72	unknown	3	No	
2234	3.66	22.86	17.78	unknown	3	No	
2235	2.13	12.70	10.16	unknown	3	No	

Table A2. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
2217	unknown	unknown	0	No	Jam 2007	1
2218						
2219						
2220						
2221						
2222	unknown	unknown	180	No	Jam 2007	1
2223	unknown	unknown	90	No	Jam 2007	1
2224						
2225						
2226	unknown	unknown	0	No	Jam 2007	1
2227	unknown	unknown	0	No	Jam 2007	1
2228	unknown	unknown	0	No	Jam 2007	1
2229	unknown	unknown	0	No	Jam 2007	1
2230	unknown	unknown	0	No	Jam 2007	1
2231	unknown	unknown	0	No	Jam 2007	1
2232	unknown	unknown	0	No	Jam 2007	1
2233	unknown	unknown	0	No	Individual Piece	2
2234	unknown	unknown	0	No	Individual Piece	2
2235	unknown	unknown	0	No	Individual Piece	2

Table A3. Instream large woody debris analysis, data collected from the Falls City site on June 22-23, 2011 and June 27, 2011.

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
300	2.44	15.24	10.16	blackwillow	4	No	
301	3.35	27.94	24.13	blackwillow	3	No	
302	2.62	22.86	21.84	hard elm	5	No	
303	2.44	20.83	16.26	sugarberry	5	No	
304	1.83	24.13	14.22	mesquite	4	No	
305	3.35	12.70	10.16	willow/cottonwood	3	No	
306	7.47	15.24	10.16	blackwillow	3	Yes	
307	4.27	17.78	20.32	blackwillow	4	No	
308	3.66	22.86	10.16	blackwillow	2	Yes	
309	2.13	16.51	12.70	sugarberry	5	No	
310	3.35	20.32	16.51	pecan	4	No	
311	3.05	20.32	15.24	sycamore	3	No	
312	5.49	27.94	11.68	pecan	3	No	
313	4.27	30.48	11.43	boxelder	4	No	
314	9.45	45.72	15.24	pecan	5	No	
315	3.96	20.32	11.43	blackwillow	3	Yes	
316	3.96	20.32	10.16	blackwillow	3	No	
317	1.52	15.24	10.16	blackwillow	4	Yes	
318	1.37	11.68	10.16	blackwillow	3	No	
319	1.37	13.97	10.92	blackwillow	3	No	
320	1.68	25.40	22.86	boxelder	5	No	
321	2.74	17.78	12.70	blackwillow	3	No	
322	4.33	40.64	40.64	cottonwood	4	No	main stem, branch is 324
323	9.75	31.75	27.94	cottonwood	3	No	
324	6.71	24.13	17.78				see 322
325	3.66	16.26	10.92	willow/cottonwood	4	No	
326	15.24	78.74	45.72	cottonwood	3	No	
327	2.99	20.32	15.24	pecan	4	No	
328	5.49	38.10	20.32	sugarberry	3	No	
329	3.66	35.56	22.86	hard elm	4	No	
330	2.93	43.69	42.16	willow/cottonwood	4	No	
331	15.15	73.91	50.80	cottonwood	4	No	
332	5.06	16.76	10.16	ash	3	No	
333	2.59	16.76	13.97	sugarberry	3	No	

Table A3. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
300	unknown	Upstream	0	No	Individual Piece	1
301	Erosion	Local	0	No	Jam 300	1
302	unknown	Upstream	90	No	Jam 300	1
303	unknown	Upstream	90	No	Jam 300	1
304	unknown	Upstream	90	No	Jam 300	1
305	unknown	Upstream	90	No	Jam 300	1
306	Erosion	Local	0	Yes	Fallen Tree	2
307	Erosion	Local	0	No	Individual Piece	1
308	Windthrow	Local	90	No	Individual Piece	1
309	unknown	Upstream	0	No	Individual Piece	1
310	unknown	Upstream	180	No	Individual Piece	1
311	unknown	Upstream	0	No	Individual Piece	1
312	unknown	Upstream	0	No	Individual Piece	1
313	unknown	Upstream	0	No	Individual Piece	1
314	unknown	Upstream	0	No	Fallen Tree	1
315	Erosion	Local	0	No	Individual Piece	1
316	Erosion	Local	0	No	Individual Piece	1
317	Erosion	Local	0	No	Individual Piece	1
318	unknown	Local	90	No	Individual Piece	1
319	unknown	Local	90	No	Individual Piece	2
320	unknown	unknown	0	No	Individual Piece	1
321	Erosion	Local	0	No	Individual Piece	1
322	unknown	unknown	0	No	Individual Piece	1
323	Wind Snap	Local	90	No	Individual Piece	2
324						
325	unknown	Upstream	180	No	Individual Piece	2
326	Windthrow	Local	90	No	Fallen Tree	2
327	unknown	Upstream	0	No	Individual Piece	1
328	Erosion	Local	90	No	Individual Piece	1
329	unknown	unknown	180	No	Individual Piece	1
330	unknown	Upstream	0	No	Individual Piece	1
331	unknown	Upstream	90	No	Jam 301	2
332	unknown	unknown	180	No	Jam 301	2
333	unknown	Upstream	90	No	Jam 301	2
334	unknown	Upstream	0	No	Jam 301	2

Table A3. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
334	8.35	38.10	28.70	sugarberry	3	No	main stem, branch is 336
335	5.58	30.73	16.76	boxelder	3	No	
336	4.27	30.23	21.84				see 334
337	2.74	13.97	12.45	sugarberry	4	No	
338	6.68	16.76	10.16	hard elm	3	No	
339	2.13	14.22	10.41	sugarberry	3	No	
340	1.52	15.49	12.70	sugarberry	4	No	
341	1.83	11.43	10.16	boxelder	4	No	
342	1.37	14.99	10.16	boxelder	4	No	
343	7.62	58.42	45.72	American elm	4	No	
344	3.66	40.64	30.48	hard elm	4	No	
345	3.05	40.64	38.10	pecan	3	No	
346	6.10	33.02	20.32	American elm	4	No	
347	10.36	102.62	87.63	baldcypress	3	No	
348	9.02	46.48	35.56	sugarberry	4	N	
349	1.83	35.05	23.62	hard elm	2	Y	main stem, branch is 350
350	1.52	35.05	26.42				see 349
351	7.32	48.26	40.64	willow/cottonwood	4	N	
352	2.13	50.80	48.26	baldcypress	3	N	
353	1.52	12.70	11.43	blackwillow	3	Y	
354	12.19	53.34	40.64	cottonwood	4	N	
355	3.35	56.13	50.80				see 356
356	6.71	63.50	53.34	cottonwood	4	N	main stem, branch is 355
357	6.10	50.80	40.64	pecan	4	N	
358	10.67	27.94	23.37	willow/cottonwood	4	N	
359	3.05	13.72	11.18	sycamore	4	N	
360	3.35	50.80	40.64	boxelder	5	N	
361	1.83	25.40	17.78	sugarberry	4	N	
362	2.13	20.32	17.78	boxelder	4	N	

Table A3. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
334	unknown	Upstream	0	No	Jam 301	2
335	unknown	Upstream	0	No	Jam 301	2
336						
337	unknown	Upstream	90	No	Jam 301	2
338	unknown	Upstream	90	No	Jam 301	2
339	unknown	Upstream	90	No	Jam 301	2
340	unknown	Upstream	90	No	Jam 301	2
341	unknown	Upstream	90	No	Jam 301	2
342	unknown	Upstream	90	No	Jam 301	2
343	unknown	unknown	180	No	Individual Piece	2
344	unknown	Upstream	0	No	Individual Piece	1
345	unknown	unknown	0	No	Individual Piece	1
346	Erosion	Local	0	No	Fallen Tree	2
347	Erosion	Local	90	Yes	Fallen Tree	2
348	Wind Snap	Local	90	No	Fallen Tree	4
349	Wind Snap	Local	90	No	Fallen Tree	4
350						
351	unknown	Upstream	90	No	Individual Piece	2
352	unknown	Upstream	90	No	Individual Piece	2
353	Erosion	Local	0	Yes	Fallen Tree	2
354	unknown	Upstream	0	Yes	Jam 302	1
355						
356	unknown	Upstream	90	No	Jam 302	1
357	unknown	Upstream	0	No	Jam 302	1
358	unknown	Upstream	0	No	Jam 302	1
359	unknown	Upstream	0	No	Jam 302	1
360	unknown	Upstream	90	No	Jam 302	1
361	unknown	Upstream	90	No	Jam 302	1
362	unknown	Upstream	90	No	Individual Piece	1

Table A4. Instream large woody debris analysis, data collected from the Charco site on July 12-13, 2011 and July 18-20, 2011.

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
600	4.88	42.42	34.29	sugarberry	5	No	
601	3.96	26.92	22.35	cottonwood	5	No	
602	1.52	15.24	12.95	mesquite	4	No	
603	6.40	27.94	22.86	ash	4	No	
604	9.14	45.72	29.21	pecan	3	Yes	main stem, branches are 605-606
605	4.27	13.97	12.70				see 604
606	1.83	19.05	12.70				see 604
607	6.40	25.40	15.24	boxelder	4	No	
608	7.01	35.56	33.02	unknown	4	No	
609	5.18	35.31	25.40	unknown	4	No	
610	1.37	13.97	10.16	pecan	4	No	
611	3.96	28.96	17.78	pecan	4	No	
612	3.05	17.78	14.48	unknown	4	No	
613	4.88	48.26	40.64	American elm	5	No	main stem, branch is 614
614	5.79	27.94	22.86				see 613
615	1.52	35.56	33.27	baldcypress	5	No	
616	3.05	17.53	12.95	baldcypress	5	No	
617	1.37	25.15	22.86	American elm	5	No	
618	4.88	31.75	13.46	sugarberry	5	No	
619	4.27	47.24	29.21	blacklocust	5	No	
620	8.53	55.12	45.47	pecan	5	No	
621	1.37	35.31	34.04	unknown	3	No	
622	3.66	33.78	25.40	pecan	5	No	
623	6.40	36.83	15.49	sugarberry	5	No	
624	5.18	56.90	44.96	sugarberry	4	No	main stem, branches are 624-626
625	3.66	33.78	27.94				see 624
626	5.18	28.96	23.37				see 624
627	4.27	15.49	14.22	American elm	4	No	
628	4.88	30.48	24.13	mesquite	4	No	
629	3.66	35.56	24.64	mesquite	5	No	
630	3.35	27.43	23.88	hard elm	4	No	

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
600	unknown	Upstream	0	No	Individual Piece	1
601	unknown	Upstream	180	No	Individual Piece	2
602	unknown	Upstream	0	No	Individual Piece	1
603	unknown	Local	180	No	Individual Piece	1
604	Erosion	Local	0	Yes	Fallen Tree	1
605						
606						
607	unknown	Upstream	0	No	Individual Piece	1
608	unknown	Upstream	0	No	Individual Piece	1
609	unknown	Upstream	180	No	Individual Piece	1
610	unknown	Upstream	0	No	Individual Piece	1
611	unknown	Upstream	0	No	Individual Piece	1
612	unknown	Upstream	180	No	Individual Piece	1
613	unknown	Upstream	0	No	Individual Piece	1
614						
615	unknown	Upstream	0	No	Individual Piece	2
616	unknown	Upstream	0	No	Individual Piece	2
617	unknown	Upstream	180	No	Individual Piece	1
618	unknown	Upstream	0	No	Individual Piece	1
619	unknown	Upstream	0	No	Individual Piece	1
620	unknown	Upstream	0	No	Individual Piece	1
621	unknown	Upstream	0	No	Individual Piece	2
622	unknown	Upstream	180	No	Individual Piece	2
623	unknown	Upstream	180	No	Individual Piece	2
624	unknown	Upstream	0	No	Individual Piece	1
625						
626						
627	unknown	Upstream	180	No	Individual Piece	1
628	unknown	Upstream	180	No	Individual Piece	2
629	unknown	Upstream	0	No	Individual Piece	2
630	unknown	Upstream	0	No	Individual Piece	1

Table A4. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
631	4.88	33.02	16.51	pecan	5	No	
632	3.05	32.00	21.34	unknown	5	No	
633	3.66	52.32	39.88	cottonwood	4	No	
634	1.37	17.78	10.16	blackwillow	4	No	
635	2.13	13.72	10.67	willow/cottonwood	4	No	
636	4.88	27.94	22.86	American elm	4	No	
637	1.83	21.84	15.49	unknown	4	No	
638	1.83	16.76	10.16	mesquite	4	No	
639	1.37	22.86	18.03	unknown	4	No	
640	1.83	17.78	12.70	sugarberry	5	No	
641	2.13	36.32	15.24	blackwillow	5	No	
642	1.98	17.02	15.24	sugarberry	5	No	
643	1.37	33.53	20.57	willow/cottonwood	5	No	
644	2.44	17.78	10.16	boxelder	5	No	
645	1.37	18.29	17.53	cottonwood	3	No	
646	3.66	20.83	12.70	American elm	4	No	
647	1.37	25.91	22.86				see 648
648	2.74	34.29	24.38	pecan	5	No	main stem, branch is 647
649	3.05	24.13	16.76	sugarberry	4	No	
650	11.28	31.24	11.94	boxelder	3	Yes	
651	6.71	25.65	17.27	hard elm	2	Yes	
652	2.59	48.26	44.96	blackwillow	4	No	main stem, branches are 653-654
653	4.57	43.69	16.00				see 652
654	4.57	21.34	19.30				see 652
655	1.52	13.97	10.92	mesquite	4	No	
656	6.71	40.64	27.94	ash	4	No	main stem, branch is 657
657	4.27	25.40	17.78				see 656
658	1.83	18.29	15.24	hard elm	4	No	
659	2.13	18.80	18.29	pecan	5	No	
660	3.66	31.24	23.88	sugarberry	5	No	
661	1.52	18.80	13.21	sugarberry	4	No	
662	3.66	32.26	23.88	blackwillow	4	No	
663	6.10	15.49	10.16	blackwillow	4	No	

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
631	unknown	Upstream	0	No	Jam 600	1
632	unknown	Upstream	90	No	Jam 600	1
633	unknown	Upstream	0	No	Jam 600	1
634	unknown	Upstream	0	No	Individual Piece	1
635	unknown	Upstream	0	No	Individual Piece	1
636	unknown	Upstream	0	No	Individual Piece	1
637	unknown	Upstream	180	No	Individual Piece	1
638	unknown	Upstream	0	No	Individual Piece	1
639	unknown	Upstream	90	No	Individual Piece	1
640	unknown	unknown	180	No	Individual Piece	1
641	Erosion	Local	90	No	Individual Piece	1
642	unknown	Upstream	90	No	Individual Piece	1
643	unknown	Upstream	0	No	Individual Piece	1
644	unknown	Upstream	90	No	Individual Piece	2
645	unknown	Upstream	90	No	Individual Piece	2
646	Erosion	Local	0	No	Individual Piece	2
647						
648	unknown	Upstream	90	No	Individual Piece	1
649	unknown	Upstream	180	No	Fallen Tree	2
650	Erosion	Local	90	No	Fallen Tree	1
651	unknown	Upstream	90	No	Individual Piece	1
652	unknown	Upstream	0	No	Individual Piece	1
653						
654						
655	unknown	unknown	0	No	Individual Piece	1
656	unknown	Upstream	0	No	Fallen Tree	1
657						
658	unknown	Upstream	0	No	Fallen Tree	1
659	unknown	Upstream	0	No	Individual Piece	2
660	unknown	Upstream	0	No	Individual Piece	1
661	unknown	Upstream	0	No	Individual Piece	1
662	unknown	Upstream	180	No	Jam 601	2
663	unknown	Local	180	No	Jam 601	2

Table A4. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
664	1.83	20.57	18.54	hard elm	4	No	
665	1.37	13.21	10.16	mesquite	5	No	
666	3.35	53.34	42.16	sugarberry	5	No	main stem, branch is 667
667	1.68	14.73	11.94				see 666
668	7.32	34.04	21.08	sugarberry	5	No	
669	1.83	31.50	24.89	willow/cottonwood	5	No	
670	4.27	17.02	13.72	willow/cottonwood	5	No	
671	2.13	14.73	12.70	mesquite	4	No	
672	7.16	30.48	19.81	unknown	4	No	
673	1.68	41.66	26.92	cottonwood	4	No	
674	8.53	38.61	24.38	blackwillow	3	No	
675	1.83	14.73	11.68	blackwillow	5	No	
676	5.49	29.21	23.88	hard elm	5	No	main stem, branch is 677
677	3.05	14.22	14.22				see 676
678	2.13	20.83	14.22	hard elm	5	No	
679	4.27	15.75	12.70	blackwillow	4	No	
680	4.27	28.19	16.26	hard elm	4	No	
681	1.52	38.10	33.78	sugarberry	4	No	main stem, branches are 682-683
682	3.05	23.62	15.24				see 681
683	3.66	21.84	19.56				see 681
684	2.13	11.68	10.16	boxelder	4	No	
685	2.44	16.76	10.16	hard elm	4	No	
686	4.57	22.35	15.75	unknown	4	No	
687	2.44	28.45	22.86	hard elm	4	No	
688	2.13	27.18	22.35	mesquite	4	No	
689	1.37	11.68	10.16	pecan	4	No	
690	4.42	19.05	11.94	sugarberry	4	No	
691	2.44	20.32	19.05	willow/cottonwood	5	No	
692	3.05	40.13	33.53	mesquite	3	No	
693	3.35	13.72	11.18	pecan	4	No	
694	2.13	19.30	11.94	unknown	4	No	
695	3.66	24.13	16.51	sugarberry	4	No	
696	1.37	25.65	25.40	hard elm	5	No	

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
664	unknown	Upstream	0	No	Jam 601	2
665	unknown	Upstream	0	No	Individual Piece	1
666	unknown	Upstream	0	No	Individual Piece	2
667						
668	unknown	Upstream	0	No	Individual Piece	2
669	unknown	unknown	0	No	Individual Piece	2
670	unknown	unknown	0	No	Individual Piece	2
671	unknown	unknown	90	No	Individual Piece	2
672	unknown	Upstream	0	No	Individual Piece	2
673	unknown	Upstream	180	No	Individual Piece	1
674	unknown	Upstream	90	No	Individual Piece	2
675	unknown	Upstream	90	No	Individual Piece	1
676	unknown	Upstream	0	No	Jam 602	1
677						
678	unknown	Upstream	180	No	Jam 602	1
679	Erosion	Local	0	No	Jam 602	1
680	unknown	Upstream	90	No	Individual Piece	1
681	unknown	Upstream	180	No	Individual Piece	1
682						
683						
684	unknown	Upstream	180	No	Individual Piece	1
685	unknown	unknown	0	No	Individual Piece	1
686	unknown	unknown	0	No	Individual Piece	1
687	unknown	Upstream	0	No	Individual Piece	1
688	unknown	Upstream	90	No	Individual Piece	1
689	unknown	Upstream	0	No	Individual Piece	1
690	unknown	unknown	0	No	Individual Piece	1
691	unknown	Upstream	0	No	Individual Piece	1
692	unknown	Upstream	0	No	Jam 603	1
693	unknown	Upstream	90	No	Jam 603	1
694	unknown	Upstream	90	No	Jam 603	1
695	unknown	Upstream	0	No	Jam 603	1
696	unknown	Upstream	90	No	Jam 603	1

Table A4. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
697	4.88	76.20	61.47	cottonwood	4	No	
698	1.52	24.13	21.84	boxelder	5	No	
699	2.13	14.73	14.22	blackwillow	3	No	
700	1.52	39.12	36.32	sugarberry	4	No	
701	6.40	54.86	41.66	cottonwood	4	No	
702	4.27	71.12	60.96	pecan	3	No	main stem, branches are 703-707
703	5.18	45.47	24.89				see 702
704	1.37	32.00	25.40				see 702
705	1.37	54.86	38.86				see 702
706	6.71	60.20	31.75				see 702
707	1.52	33.02	27.94				see 702
708	8.23	30.48	10.16	American elm	5	No	
709	3.66	19.05	12.70	cottonwood	3	No	
710	2.44	18.29	12.70	American elm	4	No	
711	1.52	20.57	19.30	sugarberry	5	No	
712	7.32	50.29	45.72	pecan	3	No	main stem, branches are 713-717
713	3.66	26.42	25.91				see 712
714	3.05	21.34	20.32				see 712
715	2.44	16.51	10.16				see 712
716	2.74	17.78	12.70				see 712
717	6.10	39.37	20.32				see 712
718	6.10	23.88	10.16	ash	3	No	
719	3.05	20.83	15.75	blackwillow	3	No	
720	3.66	66.04	60.96	pecan	2	No	main stem, branches are 721-727
721	4.57	53.85	46.74				see 720
722	6.40	38.35	27.94				see 720
723	1.83	17.02	16.51				see 720
724	3.35	23.37	19.81				see 720
725	6.10	41.40	31.50				see 720
726	1.37	12.70	10.16				see 720
727	2.44	35.56	23.37				see 720

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
697	unknown	Upstream	90	No	Individual Piece	2
698	unknown	Upstream	180	No	Jam 604	1
699	unknown	Upstream	0	No	Jam 604	2
700	unknown	Upstream	180	No	Jam 604	1
701	Erosion	Local	0	No	Jam 604	1
702	Erosion	Local	0	Yes	Jam 604	1
703						
704						
705						
706						
707						
708	unknown	Upstream	0	No	Jam 604	1
709	unknown	Upstream	180	No	Jam 604	1
710	unknown	Upstream	180	No	Jam 604	1
711	unknown	Upstream	90	No	Jam 604	1
712	Erosion	Local	0	No	Jam 604	2
713						
714						
715						
716						
717						
718	unknown	Upstream	180	No	Jam 604	1
719	unknown	Upstream	90	No	Jam 604	2
720	Erosion	Local	0	Yes	Jam 605	1
721						
722						
723						
724						
725						
726						
727						

Table A4. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
728	8.53	30.48	18.80	pecan	2	No	
729	2.44	48.26	39.37		4	No	
730	4.88	71.12	53.34	American elm	4	No	main stem, branches are 731-734
731	6.40	35.56	10.16				see 730
732	1.37	16.26	12.95				see 730
733	2.74	41.91	38.10				see 730
734	3.05	23.11	13.97				see 730
735	1.83	44.20	43.69	American elm	4	No	main stem, branches are 736-741
736	5.18	21.84	15.24				see 735
737	1.52	33.78	33.53				see 735
738	3.66	26.16	22.10				see 735
739	1.83	22.86	22.35				see 735
740	1.52	13.72	12.95				see 735
741	3.05	16.51	12.70				see 735
742	1.52	28.70	22.61	pecan	2	No	
743	10.67	45.72	13.21	cottonwood	2	No	
744	3.05	121.92	109.22	cottonwood	2	No	main stem, branches are 745-752
745	9.14	86.36	60.96				see 744
746	9.14	50.80	10.16				see 744
747	7.32	40.64	10.16				see 744
748	6.40	52.07	41.15				see 744
749	3.35	85.34	71.12				see 744
750	4.27	46.23	44.20				see 744
751	3.05	44.70	41.15				see 744
752	2.74	41.66	38.86				see 744
753	9.14	55.63	41.66	sugarberry	3	No	main stem, branches are 754-756
754	3.35	14.99	11.18				see 753
755	7.32	27.43	13.46				see 753
756	7.32	32.26	14.73				see 753
757	4.57	17.78	16.51	blackwillow	2	No	

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
728	unknown	Upstream	0	No	Jam 605	1
729	unknown	unknown	0	No	Individual Piece	1
730	unknown	unknown	0	No	Jam 605	1
731						
732						
733						
734						
735	unknown	Upstream	0	No	Jam 605	1
736						
737						
738						
739						
740						
741						
742	unknown	Upstream	0	No	Jam 605	1
743	Erosion	Local	0	Yes	Jam 605	2
744	Erosion	Local	0	No	Jam 606	2
745						
746						
747						
748						
749						
750						
751						
752						
753	unknown	Upstream	0	No	Jam 606	2
754						
755						
756						
757	unknown	Upstream	180	No	Jam 606	2

Table A4. (Continued).

Log ID	Length (m)	Diameter		Species	Degree of Decay	Branch Presence	Notes
		Butt (cm)	Top (cm)				
758	1.37	11.43	10.16	blackwillow	4	No	
759	1.37	19.05	13.97	cottonwood	4	No	
760	1.83	15.24	10.16	blackwillow	4	No	
761	1.83	18.54	17.78	sugarberry	5	No	
762	3.66	17.78	10.16	cottonwood	3	No	
763	2.74	19.05	15.75	cottonwood	4	No	
764	2.13	12.95	12.70	cottonwood	4	No	
765	5.49	30.48	21.08	cottonwood	4	No	
766	1.37	13.72	12.95	pecan	4	No	
767	2.74	13.21	11.18	blackwillow	4	No	
768	2.13	23.11	19.05	sugarberry	3	No	
769	1.83	16.26	12.70	cottonwood	4	No	
770	1.37	12.70	10.16	boxelder	4	No	
771	2.13	35.56	27.94	sugarberry	4	No	
772	1.37	19.30	15.24	blackwillow	4	No	
773	3.05	25.40	13.46	willow/cottonwood	4	No	
774	1.37	12.70	11.43	willow/cottonwood	4	No	
775	1.83	18.54	17.78	sugarberry	4	No	
776	2.13	16.26	10.16	sugarberry	4	No	
777	1.83	16.76	15.24	blackwillow	3	No	
778	2.44	12.70	10.16	willow/cottonwood	4	No	
779	1.83	21.08	19.05	sugarberry	4	No	
780	2.44	13.21	10.16	ash	4	No	
781	1.83	13.46	12.70	blackwillow	4	No	
782	2.74	18.80	14.22	American elm	4	No	
783	5.18	30.48	24.38	sugarberry	4	No	
784	4.57	40.64	34.29	cottonwood	2	No	
785	1.37	10.41	10.16	blackwillow	3	No	
786	7.92	40.64	27.94	blackwillow	4	No	
787	1.83	12.70	10.16	willow/cottonwood	4	No	
788	2.74	24.64	15.24	blackwillow	5	No	
789	1.52	22.86	21.59	willow/cottonwood	5	No	
790	4.57	21.34	15.75	sugarberry	5	No	
791	1.83	12.70	10.16	sugarberry	4	No	
792	4.27	16.51	15.24	pecan	4	No	

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
758	unknown	Upstream	180	No	Jam 606	2
759	unknown	Upstream	90	No	Jam 606	2
760	unknown	Upstream	180	No	Jam 606	2
761	unknown	Upstream	0	No	Jam 606	2
762	unknown	Upstream	0	No	Jam 606	2
763	unknown	Upstream	90	No	Jam 606	2
764	unknown	Upstream	90	No	Jam 606	2
765	unknown	Upstream	90	No	Jam 606	2
766	unknown	Upstream	90	No	Jam 606	2
767	unknown	Upstream	90	No	Jam 606	2
768	unknown	Upstream	180	No	Jam 606	2
769	unknown	Upstream	0	No	Jam 606	2
770	unknown	Upstream	180	No	Jam 606	2
771	unknown	Upstream	0	No	Jam 606	2
772	unknown	Upstream	0	No	Jam 606	2
773	unknown	Upstream	90	No	Jam 606	2
774	unknown	Upstream	90	No	Jam 606	2
775	unknown	Upstream	90	No	Jam 606	2
776	unknown	Upstream	180	No	Jam 606	2
777	unknown	Upstream	90	No	Jam 606	2
778	unknown	Upstream	90	No	Jam 606	2
779	unknown	Upstream	180	No	Jam 607	2
780	unknown	Upstream	90	No	Jam 607	2
781	unknown	Upstream	0	No	Jam 607	2
782	unknown	Upstream	180	No	Jam 607	2
783	Windthrow	Upstream	180	No	Jam 607	2
784	unknown	Upstream	0	No	Jam 607	2
785	unknown	Upstream	180	No	Jam 607	2
786	unknown	Upstream	90	No	Jam 607	2
787	unknown	Upstream	0	No	Jam 607	2
788	unknown	Upstream	90	No	Jam 607	2
789	unknown	Upstream	90	No	Jam 607	2
790	unknown	Upstream	90	No	Jam 607	2
791	unknown	Upstream	0	No	Jam 607	2
792	unknown	Upstream	0	No	Jam 607	2

Table A4. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
793	3.66	18.29	10.16	hard elm	5	No	
794	3.66	13.97	10.16	blackwillow	2	Yes	
795	2.44	22.86	17.78	willow/cottonwood	5	No	
796	4.57	40.64	29.21	boxelder	4	No	
797	3.05	20.32	13.21	willow/cottonwood	4	No	
798	1.83	45.72	41.91	willow/cottonwood	4	No	
799	2.44	15.24	10.16	boxelder	4	No	
800	2.44	15.75	13.97	hard elm	4	No	
801	1.52	17.78	15.24	willow/cottonwood	4	No	
802	2.13	15.75	12.70	ash	4	No	
803	1.37	12.19	11.68	pecan	3	No	
804	4.27	26.42	20.07	cottonwood	4	No	
805	4.27	24.38	17.78	willow/cottonwood	4	No	
806	1.37	11.68	10.16	willow/cottonwood	4	No	
807	1.37	22.86	11.43	mesquite	4	No	
808	1.83	20.83	11.94	cottonwood	4	No	
809	1.52	17.78	16.51	hard elm	4	No	
810	6.71	39.37	21.59	willow/cottonwood	4	No	
811	4.27	14.73	10.16	unknown	4	No	
812	1.83	15.24	11.43	chinaberry tree	4	No	
813	4.57	33.02	16.76	chinaberry tree	4	No	
814	2.74	24.89	23.88	American elm	4	No	main stem, branch is 815
815	2.74	24.38	21.59				see 814
816	3.96	25.40	17.78	boxelder	4	No	
817	6.71	48.26	25.40	cottonwood	3	No	
818	3.66	20.83	19.05	baldcypress	5	No	
819	2.44	24.13	23.37	American elm	4	No	
820	1.83	20.32	19.81	pecan	3	No	
821	4.88	12.70	10.16	American elm	4	No	
822	1.37	15.75	12.70	ash	2	No	
823	1.37	17.78	16.51	unknown	2	No	
824	3.05	18.80	16.76	American elm	2	No	
825	1.52	19.30	16.00	unknown	3	No	
826	4.27	29.21	26.42	hard elm	4	No	
827	1.83	15.24	14.22	sugarberry	4	No	

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
793	unknown	Upstream	0	No	Jam 607	2
794	Windthrow	Local	90	No	Jam 607	2
795	unknown	Upstream	0	No	Jam 607	2
796	unknown	Upstream	0	No	Jam 607	2
797	unknown	Upstream	0	No	Jam 607	2
798	unknown	Upstream	0	No	Jam 607	2
799	unknown	Upstream	0	No	Jam 607	2
800	unknown	Upstream	0	No	Jam 607	2
801	unknown	Upstream	90	No	Jam 607	2
802	unknown	Upstream	0	No	Jam 607	2
803	unknown	Upstream	180	No	Jam 607	2
804	unknown	Upstream	0	No	Jam 607	2
805	unknown	Upstream	0	No	Jam 607	2
806	unknown	Upstream	0	No	Jam 607	2
807	unknown	Upstream	0	No	Jam 607	2
808	unknown	Upstream	0	No	Jam 607	2
809	unknown	Upstream	90	No	Jam 608	2
810	unknown	Upstream	90	No	Jam 608	2
811	unknown	Upstream	90	No	Jam 608	2
812	unknown	Upstream	90	No	Jam 608	2
813	unknown	Upstream	90	No	Jam 608	2
814	unknown	Upstream	90	No	Jam 608	2
815						
816	unknown	Upstream	90	No	Jam 608	2
817	unknown	Upstream	90	No	Jam 608	2
818	unknown	Upstream	90	No	Jam 608	2
819	unknown	Upstream	0	No	Jam 608	2
820	unknown	Upstream	180	No	Jam 608	2
821	unknown	Upstream	90	No	Jam 608	2
822	unknown	Upstream	90	No	Jam 608	2
823	unknown	Upstream	90	No	Jam 608	2
824	unknown	Upstream	90	No	Jam 608	2
825	unknown	Upstream	90	No	Jam 608	2
826	unknown	Upstream	90	No	Jam 608	2
827	unknown	Upstream	90	No	Jam 608	2

Table A4. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
828	5.64	21.08	11.18	blackwillow	3	No	
829	2.74	24.89	22.86	cottonwood	3	No	
830	1.52	17.78	14.48	sugarberry	4	No	
831	5.49	63.50	49.53	American elm	2	No	main stem, branches are 832-835
832	4.57	31.50	21.84				see 831
833	2.13	40.64	38.10				see 831
834	3.66	24.64	21.59				see 831
835	3.96	26.42	22.86				see 831
836	3.05	17.78	15.24	chinaberry tree	5	No	
837	4.57	21.84	11.43	boxelder	4	No	
838	5.18	38.86	20.83	cottonwood	4	No	
839	2.13	16.26	13.72	sugarberry	3	No	
840	1.83	26.42	25.40	willow/cottonwood	4	No	
841	2.74	19.30	15.24	blackwillow	3	No	
842	1.52	17.27	16.51	cottonwood	4	No	
843	1.52	15.75	12.70	sugarberry	4	No	
844	6.40	58.67	51.82	unknown	4	No	main stem, branches are 845-847
845	7.62	25.40	18.80				see 844
846	4.27	37.34	34.80				see 844
847	3.35	30.48	22.86				see 844
848	4.57	64.77	58.42	sugarberry	5	No	
849	2.74	51.56	47.75	willow/cottonwood	4	No	main stem, branches are 850-851
850	2.13	34.29	32.00				see 849
851	4.57	29.21	23.88				see 849
852	2.74	19.05	16.51	willow/cottonwood	4	No	
853	2.13	23.11	20.32	unknown	5	No	
854	1.52	20.32	17.02	sugarberry	4	No	
855	3.05	16.00	13.97	sugarberry	4	No	
856	1.37	30.48	27.94	mesquite	4	No	
857	3.66	24.38	12.70	willow/cottonwood	5	No	
858	2.44	20.07	18.80	willow/cottonwood	4	No	

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
828	unknown	Upstream	90	No	Jam 608	2
829	unknown	Upstream	90	No	Jam 608	2
830	unknown	Upstream	90	No	Jam 608	2
831	Erosion	Local	90	No	Jam 608	2
832						
833						
834						
835						
836	unknown	Upstream	90	No	Jam 608	2
837	unknown	Upstream	0	No	Jam 608	2
838	unknown	Upstream	90	No	Jam 608	2
839	unknown	Upstream	90	No	Jam 608	2
840	unknown	Upstream	90	No	Jam 608	2
841	unknown	Upstream	90	No	Jam 608	2
842	unknown	Upstream	90	No	Jam 608	2
843	unknown	Upstream	180	No	Jam 608	2
844	unknown	Upstream	90	No	Jam 608	2
845						
846						
847						
848	unknown	Upstream	90	No	Jam 608	2
849	unknown	Upstream	180	No	Jam 608	2
850						
851						
852	unknown	Upstream	0	No	Jam 608	2
853	unknown	Upstream	90	No	Jam 608	2
854	unknown	Upstream	90	No	Jam 608	2
855	unknown	Upstream	90	No	Jam 608	2
856	unknown	Upstream	90	No	Jam 608	2
857	unknown	Upstream	0	No	Jam 608	2
858	unknown	Upstream	0	No	Jam 608	2

Table A4. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
859	6.71	54.86	38.61	sugarberry	4	No	
860	4.57	18.54	12.70	blackwillow	4	No	
861	9.14	64.77	45.72	cottonwood	5	No	
862	3.35	29.21	27.94	sugarberry	5	No	
863	2.74	16.26	15.24	blackwillow	5	No	
864	9.14	31.75	10.16	willow/cottonwood	4	No	
865	1.37	10.67	10.16	boxelder	4	No	
866	1.83	16.00	10.41	chittamwood	4	No	
867	1.83	19.05	15.24	red mulberry	4	No	
868	2.13	20.32	19.05	sugarberry	4	No	
869	7.32	35.56	31.24	sugarberry	4	No	main stem, branch is 870
870	2.13	24.38	21.59				see 869
871	4.57	23.37	16.76	sycamore	4	No	
872	3.05	31.24	21.59	sugarberry	4	No	
873	3.96	20.32	19.05	unknown	4	No	
874	1.83	30.73	22.86	unknown	5	No	
875	2.74	38.10	27.94	pecan	3	No	
876	4.57	21.34	12.70	unknown	3	No	
877	1.83	12.70	12.70	blackwillow	3	No	
878	2.13	16.51	12.45	blackwillow	4	No	
879	3.66	15.24	11.94	blackwillow	5	No	
880	2.44	13.97	12.70	osage-orange	4	No	
881	2.13	35.56	34.29	cottonwood	4	No	
882	1.52	12.95	11.43	slippery elm	5	No	
883	9.14	91.44	66.04	cottonwood	5	No	
884	4.27	46.99	30.48	cottonwood	4	No	
885	2.74	15.24	12.70	sugarberry	4	No	
886	3.66	20.57	12.95	sugarberry	4	No	
887	3.05	20.32	11.43	pecan	4	No	
888	4.57	21.59	15.75	boxelder	4	No	
889	3.96	13.97	10.16	willow/cottonwood	4	No	
890	6.71	16.26	10.16	willow/cottonwood	4	No	
891	3.05	35.56	34.29	sugarberry	5	No	

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
859	unknown	Upstream	90	No	Jam 608	2
860	unknown	Upstream	90	No	Jam 608	2
861	unknown	Upstream	90	No	Jam 608	2
862	unknown	Upstream	90	No	Jam 608	2
863	unknown	Upstream	90	No	Jam 608	2
864	unknown	Upstream	90	No	Jam 608	2
865	unknown	Upstream	90	No	Jam 608	2
866	unknown	Upstream	90	No	Jam 608	2
867	unknown	Upstream	90	No	Jam 608	2
868	unknown	Upstream	90	No	Jam 608	2
869	unknown	Upstream	90	No	Jam 608	2
870						
871	unknown	Upstream	180	No	Jam 608	2
872	unknown	Upstream	0	No	Jam 608	2
873	unknown	Upstream	0	No	Jam 608	2
874	unknown	Upstream	0	No	Jam 608	2
875	unknown	Upstream	0	No	Jam 608	2
876	unknown	Upstream	0	No	Jam 608	2
877	unknown	Upstream	90	No	Jam 608	2
878	unknown	Upstream	90	No	Jam 608	2
879	unknown	Upstream	90	No	Jam 608	2
880	unknown	Upstream	90	No	Jam 608	2
881	unknown	Upstream	90	No	Jam 608	2
882	unknown	Upstream	90	No	Jam 608	2
883	unknown	Upstream	90	No	Jam 608	2
884	unknown	Upstream	180	No	Jam 608	2
885	unknown	Upstream	0	No	Jam 608	2
886	unknown	Upstream	0	No	Jam 608	2
887	unknown	Upstream	180	No	Jam 608	2
888	unknown	Upstream	0	No	Jam 608	2
889	unknown	Upstream	0	No	Jam 608	2
890	unknown	Upstream	180	No	Jam 608	2
891	unknown	Upstream	0	No	Jam 608	2

Table A4. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
892	1.52	26.92	25.40	American elm	4	No	
893	6.10	30.48	26.67	hard elm	4	No	main stem, branches are 894-895
894	3.66	17.02	10.16				see 893
895	3.05	17.78	12.70				see 893
896	3.66	31.75	20.83	cottonwood	3	No	
897	9.14	36.83	26.67	cottonwood	3	No	
898	3.96	24.13	12.70	blackwillow	3	No	
899	2.74	20.32	17.78	pecan	3	No	
900	2.74	45.72	43.18	boxelder	4	No	
901	2.74	25.40	22.86	blackwillow	3	No	

Table A4. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
892	unknown	Upstream	90	No	Jam 608	2
893	unknown	Upstream	180	No	Jam 608	2
894						
895						
896	unknown	Upstream	180	No	Jam 608	2
897	unknown	Upstream	90	Yes	Jam 608	2
898	unknown	Upstream	90	Yes	Jam 608	2
899	unknown	Upstream	0	Yes	Jam 608	2
900	unknown	Upstream	90	No	Jam 608	2
901	unknown	Upstream	0	No	Jam 608	2

Table A5. Instream large woody debris analysis, data collected from the Goliad site on June 8-9, 2011 and June 15-16, 2011.

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
100	9.60	56.64	44.45	American elm	3	No	
101	2.96	45.72	26.67	pecan	3	No	
102	5.70	48.26	38.10	sycamore	4	No	
103	5.49	33.02	23.37	ash	1	Yes	
104	3.66	12.70	10.16	willow/cottonwood	5	No	
105	2.13	12.70	10.16	sugarberry	3	No	
106	4.57	13.97	10.16	sycamore	3	No	
107	9.42	30.48	10.16	river birch	3	No	
108	8.99	25.40	10.16	willow/cottonwood	3	No	
109	4.21	25.40	12.70	willow/cottonwood	3	Yes	
110	4.08	16.51	10.16	willow/cottonwood	4	No	
111	3.99	33.02	17.78	sugarberry	4	No	
112	2.23	18.54	10.16	hard elm	4	No	
113	3.78	19.05	19.05	American elm	3	Yes	
114	6.07	45.72	14.73	pecan	3	Yes	
115	2.44	27.94	22.86	American elm	3	No	
116	3.93	11.43	10.16	ash	3	No	
117	3.54	21.59	15.75	sycamore	3	No	
118	1.74	13.97	10.67	osage-orange	3	No	
119	4.11	42.67	30.48	sycamore	4	No	
120	4.72	33.53	20.32	pecan	4	No	
121	4.21	36.58	15.24	sycamore	3	No	
122	2.59	39.62	36.58	unknown	3	No	
123	1.62	24.38	18.29	American elm	3	No	
124	2.90	21.34	13.46	ash	3	No	
125	2.77	57.91	30.48	ash	4	No	
126	3.35	27.43	15.24	hard elm	4	No	
127	4.27	17.78	12.70	sycamore	4	No	
128	19.20	100.58	36.58	cottonwood	4	No	
129	5.79	60.96	18.54	pecan	3	No	
130	4.27	15.24	7.62	American elm	4	No	
131	5.18	79.25	49.28	sycamore	3	No	
132	7.32	45.72	35.56	sycamore	3	No	
133	2.80	12.70	10.16	American elm	3	No	

Table A5. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
100	unknown	unknown	0	No	Fallen Tree	1
101	unknown	unknown	0	No	Individual Piece	1
102	Erosion	Local	0	Yes	Fallen Tree	1
103	Wind Snap	Local	90	No	Fallen Tree	3
104	unknown	Upstream	90	No	Individual Piece	2
105	unknown	Upstream	90	No	Individual Piece	2
106	unknown	Upstream	0	No	Jam 100	1
107	unknown	Upstream	0	No	Jam 100	1
108	unknown	Upstream	0	No	Jam 100	1
109	unknown	unknown	0	Yes	Jam 100	1
110	unknown	Local	180	Yes	Jam 101	1
111	unknown	Local	0	No	Jam 101	1
112	unknown	Local	90	No	Jam 101	1
113	Erosion	Local	0	No	Fallen Tree	1
114	unknown	unknown	0	No	Individual Piece	1
115	Cut	unknown	90	No	Individual Piece	1
116	unknown	Upstream	180	No	Individual Piece	2
117	unknown	unknown	90	No	Fallen Tree	1
118	unknown	Local	0	No	Individual Piece	1
119	Erosion	Local	180	Yes	Jam 102	1
120	Erosion	Local	180	Yes	Jam 102	2
121	unknown	unknown	180	No	Jam 102	1
122	unknown	unknown	0	No	Jam 102	2
123	unknown	unknown	0	No	Individual Piece	2
124	unknown	unknown	90	No	Individual Piece	1
125	unknown	unknown	0	No	Individual Piece	2
126	Windthrow	Local	90	No	Individual Piece	2
127	unknown	unknown	90	No	Individual Piece	1
128	Erosion	Local	0	Yes	Jam 103	2
129	unknown	unknown	0	No	Individual Piece	1
130	unknown	unknown	90	No	Individual Piece	1
131	Wind Snap	Local	180	No	Fallen Tree	2
132	Wind Snap	Local	180	No	Fallen Tree	2
133	unknown	unknown	90	No	Fallen Tree	2

Table A5. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
134	2.90	12.19	10.16	boxelder	3	No	
135	13.23	54.86	24.38	sycamore	3	No	
136	7.62	30.48	20.32	willow/cottonwood	4	No	
137	4.88	17.78	10.16	ash	3	No	
138	3.05	14.73	11.43	ash	3	No	
139	4.88	22.86	17.78	hard elm	2	No	
140	4.57	25.40	15.24	blackwillow	2	No	
141	6.71	40.39	33.02	sugarberry	3	No	
142	4.57	79.25	60.96	pecan	4	No	
143	2.13	20.32	15.24	live oak	3	No	
144	2.74	60.96	55.88	hard elm	2	No	
145	2.13	22.86	17.78	unknown	2	No	
146	2.59	55.88	40.64	pecan	2	No	
147	2.44	18.29	18.29	hard elm	3	No	
148	3.35	27.43	24.38	pecan	2	Yes	
149	2.13	27.43	18.29	blackwillow	3	No	
150	2.44	19.05	12.70	live oak	2	No	
151	3.66	24.38	18.29	willow/cottonwood	3	No	
152	17.68	85.34	36.58	sycamore	3	No	main stem, branch is 153
153	14.02	64.01	27.43				see 152
154	3.96	39.62	30.48	sycamore	3	No	
155	5.49	33.53	24.38	unknown	3	No	
156	3.63	19.05	15.24	sugarberry	5	No	
157	2.47	15.75	15.49	American elm	2	No	
158	3.32	18.29	12.19	American elm	4	No	
159	2.44	54.86	30.48	boxelder	5	No	
160	5.24	36.58	15.49	American holly	4	No	
161	3.05	24.38	15.75	sycamore	4	No	
162	4.51	27.94	24.38	unknown	3	No	
163	3.11	33.53	15.24	pecan	2	No	
164	3.54	73.15	48.77	unknown	4	No	
165	4.27	12.70	10.16	sycamore	3	Yes	
166	1.89	19.56	18.29	ash	2	No	
167	2.83	27.43	24.38	sugarberry	5	No	
168	1.83	12.19	10.16	hard elm	4	No	

Table A5. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
134	unknown	Local	0	No	Individual Piece	1
135	unknown	Local	0	No	Fallen Tree	1
136	unknown	unknown	0	No	Individual Piece	1
137	unknown	unknown	90	No	Individual Piece	1
138	unknown	unknown	180	No	Individual Piece	2
139	Wind Snap	Local	180	No	Fallen Tree	2
140	unknown	unknown	0	No	Individual Piece	2
141	unknown	unknown	0	No	Individual Piece	1
142	unknown	Local	0	No	Fallen Tree	1
143	unknown	unknown	0	No	Individual Piece	1
144	unknown	Local	0	No	Fallen Tree	2
145	unknown	unknown	0	No	Individual Piece	1
146	unknown	Local	0	No	Fallen Tree	1
147	unknown	unknown	0	Yes	Jam 104	1
148	unknown	Local	0	No	Jam 104	1
149	unknown	Local	90	No	Jam 104	1
150	unknown	Local	0	No	Jam 104	1
151	unknown	Local	0	No	Jam 104	1
152	Windthrow	Local	0	Yes	Jam 105	1
153						
154	Windthrow	Local	0	No	Jam 105	1
155	Windthrow	Local	0	No	Jam 105	1
156	unknown	Upstream	0	No	Jam 105	1
157	unknown	unknown	0	No	Jam 105	1
158	unknown	unknown	0	No	Jam 105	1
159	unknown	Upstream	90	No	Jam 105	1
160	unknown	Upstream	90	No	Individual Piece	1
161	unknown	unknown	90	No	Individual Piece	1
162	unknown	unknown	90	No	Individual Piece	1
163	unknown	Upstream	0	No	Jam 106	1
164	unknown	unknown	0	No	Individual Piece	1
165	Erosion	Local	90	No	Fallen Tree	1
166	unknown	unknown	0	No	Individual Piece	1
167	unknown	unknown	0	No	Individual Piece	1
168	unknown	unknown	0	No	Individual Piece	1

Table A5. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
169	4.88	30.48	21.34	pecan	3	No	
170	3.96	15.24	12.70	willow/cottonwood	4	No	
171	5.03	25.40	15.24	pecan	5	No	
172	3.08	42.67	27.43	American elm	4	No	
173	5.58	30.48	24.38	American elm	4	No	
174	8.63	38.10	34.54	sugarberry	3	Yes	
175	2.74	24.38	19.56	pecan	3	No	
176	10.67	42.67	33.53	sycamore	4	No	
177	2.56	27.43	15.24	sycamore	4	No	
178	1.77	33.53	27.43	sugarberry	5	No	
179	2.74	30.48	24.38	sugarberry	3	No	
180	6.10	33.53	18.29	sugarberry	3	No	
181	2.44	20.57	18.29	sycamore	4	No	
182	5.94	24.89	19.05	willow/cottonwood	4	No	
183	1.89	15.49	14.73	sycamore	4	No	
184	4.66	22.86	10.16	sycamore	4	No	
185	2.74	22.86	12.19	sycamore	4	No	
186	7.92	91.44	45.72	cottonwood	4	No	
187	4.27	17.78	10.16	pecan	3	Yes	
188	3.35	17.78	12.70	unknown	4	No	
189	8.32	27.43	21.84	sugarberry	4	No	
190	6.58	45.72	10.16	willow/cottonwood	5	No	
191	3.66	50.80	35.56	willow/cottonwood	5	No	
192	5.76	67.06	64.01	sycamore	4	No	
193	7.32	60.96	35.31	American elm	3	No	
194	13.11	82.30	18.29	sycamore	5	No	
195	2.74	20.32	11.43	boxelder	4	No	
196	1.52	15.24	12.70	sugarberry	4	No	
197	3.81	23.37	10.16	willow/cottonwood	4	No	
198	1.68	20.32	15.24	boxelder	4	No	
199	10.67	82.30	22.86	pecan	3	No	
200	4.11	20.32	11.43	blackwillow	5	No	
201	5.94	57.91	39.62	sycamore	5	No	
202	2.65	55.88	50.80	sycamore	5	No	
203	2.59	33.02	22.86	cottonwood	4	No	

Table A5. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
169	unknown	unknown	180	No	Individual Piece	1
170	unknown	unknown	180	No	Individual Piece	1
171	unknown	unknown	180	No	Individual Piece	1
172	unknown	unknown	0	No	Individual Piece	1
173	unknown	unknown	0	No	Individual Piece	1
174	Windthrow	unknown	0	Yes	Individual Piece	2
175	unknown	unknown	0	No	Individual Piece	1
176	unknown	unknown	0	No	Jam 107	1
177	unknown	unknown	90	No	Jam 107	2
178	unknown	unknown	90	No	Jam 107	2
179	Cut	Upstream	0	No	Individual Piece	1
180	Cut	Upstream	0	No	Individual Piece	1
181	unknown	unknown	0	No	Individual Piece	1
182	unknown	unknown	180	No	Jam 108	1
183	unknown	unknown	0	No	Jam 108	1
184	unknown	unknown	0	No	Jam 108	1
185	unknown	unknown	0	No	Jam 108	1
186	Windthrow	Local	0	Yes	Individual Piece	4
187	Wind Snap	Local	90	No	Individual Piece	3
188	unknown	unknown	0	No	Individual Piece	1
189	unknown	unknown	0	No	Individual Piece	1
190	unknown	unknown	0	No	Individual Piece	1
191	unknown	unknown	0	No	Individual Piece	1
192	unknown	Upstream	0	No	Jam 109	1
193	Windthrow	Local	90	No	Jam 109	2
194	unknown	unknown	180	No	Jam 109	1
195	unknown	Upstream	90	No	Jam 109	1
196	unknown	Upstream	180	No	Jam 109	1
197	Windthrow	Local	180	No	Jam 109	2
198	unknown	unknown	90	No	Jam 109	1
199	Windthrow	Local	180	No	Fallen Tree	2
200	unknown	Upstream	180	No	Jam 109	2
201	unknown	unknown	0	No	Individual Piece	1
202	unknown	unknown	0	No	Individual Piece	1
203	unknown	Upstream	180	No	Individual Piece	1

Table A5. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
204	3.05	20.32	10.16	sycamore	4	No	
205	2.29	30.48	25.40	sycamore	5	No	
206	2.07	18.29	10.16	willow/cottonwood	4	No	
207	2.99	27.43	11.94	sugarberry	4	No	
208	3.35	35.56	31.50	American elm	3	No	
209	1.37	15.24	10.16	American elm	3	No	
210	2.04	20.32	10.16	American elm	4	No	
211	4.27	25.40	15.24	hard elm	3	No	
212	1.83	15.24	10.16	ash	4	No	
213	3.66	20.32	15.24	ash	3	No	
214	6.10	25.40	20.32	ash	3	No	
215	6.10	30.48	15.24	true hickory	5	No	
216	3.05	24.38	21.34	pecan	5	No	
217	2.13	27.43	24.38	ash	5	No	
218	5.33	76.20	55.88	American elm	4	No	
219	11.83	60.96	18.03	cottonwood	5	No	
220	15.36	50.80	40.64	sycamore	3	Yes	
221	5.46	45.72	35.56	sycamore	3	No	
222	5.79	20.32	11.43	sycamore	4	No	
223	4.02	33.02	25.40	sycamore	5	No	
224	3.26	25.40	16.51	sycamore	4	No	
225	2.23	29.21	12.70	hard elm	4	No	
226	5.49	30.48	17.78	hard elm	4	No	
227	3.51	41.91	34.29	pecan	4	No	
228	2.44	38.10	38.10	sycamore	5	No	
229	4.27	21.34	10.16	sugarberry	3	No	
230	6.40	38.10	25.65	ash	3	No	
231	4.27	34.80	29.21	cottonwood	3	Yes	
232	4.33	17.78	15.24	willow/cottonwood	4	No	
233	9.14	45.72	40.64				see 235
234	7.92	29.72	16.00				see 235
235	15.85	91.44	71.12	cottonwood	3	Yes	main stem, branches are 233-234
236	8.23	81.28	66.04	cottonwood	2	No	

Table A5. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
204	unknown	unknown	0	No	Individual Piece	1
205	Wind Snap	Local	0	No	Individual Piece	2
206	unknown	Local	90	No	Individual Piece	1
207	Wind Snap	Local	0	No	Individual Piece	1
208	unknown	Local	90	No	Individual Piece	1
209	unknown	unknown	90	No	Individual Piece	1
210	unknown	unknown	0	No	Individual Piece	1
211	unknown	unknown	0	No	Individual Piece	1
212	unknown	unknown	180	No	Individual Piece	1
213	unknown	unknown	0	No	Individual Piece	1
214	unknown	unknown	0	No	Individual Piece	1
215	unknown	Upstream	0	No	Individual Piece	1
216	unknown	Upstream	0	No	Individual Piece	1
217	unknown	Upstream	0	No	Individual Piece	1
218	Erosion	Local	0	Yes	Fallen Tree	2
219	unknown	Upstream	90	No	Jam 110	1
220	Erosion	Local	0	Yes	Jam 110	2
221	unknown	Upstream	0	No	Jam 110	1
222	unknown	Upstream	90	No	Individual Piece	1
223	unknown	Upstream	0	No	Individual Piece	1
224	unknown	Upstream	0	No	Individual Piece	1
225	unknown	Upstream	90	No	Individual Piece	1
226	unknown	Upstream	0	No	Individual Piece	1
227	unknown	Upstream	180	No	Individual Piece	1
228	unknown	Upstream	90	No	Individual Piece	1
229	unknown	Upstream	0	No	Individual Piece	1
230	Cut	Local	90	No	Individual Piece	1
231	Windthrow	Local	180	No	Jam 111	2
232	unknown	unknown	90	No	Individual Piece	1
233						
234						
235	Windthrow	Local	180	No	Jam 111	2
236	Windthrow	Local	0	Yes	Fallen Tree	3

Table A5. (Continued).

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
237	5.49	45.72	30.48	American elm	3	No	main stem, branch is 238
238	3.05	40.64	27.94				see 237
239	3.96	32.51	10.92	sugarberry	3	No	
240	7.92	20.32	11.94	sugarberry	2	No	
241	6.40	38.86	12.19	sycamore	4	No	
242	12.80	76.20	31.24	sycamore	4	No	
243	1.37	20.32	16.51	blackwillow	4	No	
244	1.43	11.18	10.41	blackwillow	4	No	
245	2.93	14.48	13.21	sycamore	5	No	
246	5.18	38.10	28.70	sycamore	4	No	
247	2.80	26.16	12.70	willow/cottonwood	4	No	
248	1.71	48.26	43.18	sycamore	4	No	
249	1.68	18.54	12.70	willow/cottonwood	4	No	
250	5.03	31.75	21.59	cottonwood	4	No	
251	2.74	26.67	17.78	willow/cottonwood	5	No	
252	1.37	17.78	15.24	willow/cottonwood	5	No	
253	1.37	15.24	12.70	pecan	5	No	

Table A5. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
237	Wind Snap	Local	90	No	Jam 111	2
238						
239	unknown	unknown	180	No	Jam 111	2
240	unknown	Upstream	90	No	Jam 111	2
241	unknown	Local	0	No	Fallen Tree	1
242	unknown	Local	0	No	Fallen Tree	1
243	unknown	Upstream	0	No	Individual Piece	1
244	unknown	unknown	0	No	Individual Piece	1
245	unknown	Upstream	90	No	Individual Piece	1
246	Wind Snap	Local	0	No	Individual Piece	1
247	unknown	Local	0	No	Individual Piece	1
248	unknown	Local	90	No	Individual Piece	1
249	unknown	unknown	180	No	Individual Piece	1
250	unknown	unknown	90	No	Individual Piece	1
251	unknown	Local	90	No	Individual Piece	1
252	unknown	unknown	0	No	Individual Piece	1
253	unknown	Local	0	No	Individual Piece	1

Table A6. Instream large woody debris analysis, data collected from the McFaddin site from July 26-28, 2011.

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1000	4.88	32.26	21.59		5	No	
1001	3.66	20.57	15.75		5	No	
1002	4.27	32.00	27.94		4	No	
1003	7.62	31.50	25.40		4	No	
1004	2.74	21.84	17.78		4	No	
1005	4.27	45.97	39.62		5	No	
1006	1.37	19.05	17.78		4	No	
1007	1.83	17.78	15.24		4	No	
1008	1.52	22.86	21.59		4	No	
1009	1.37	24.13	22.86		4	No	
1010	2.44	17.78	15.24		4	No	
1011	1.52	15.24	12.70		4	No	
1012	2.13	30.48	27.94		4	No	
1013	1.83	34.29	30.48	blackwillow	4	No	
1014	4.88	50.80	35.56		4	No	
1015	5.18	52.07	33.02		4	No	
1016	1.83	16.76	13.97		5	No	
1017	1.83	12.70	11.43		4	No	
1018	3.96	20.32	13.97		4	No	
1019	1.37	31.75	30.48		5	No	
1020	4.27	33.53	21.84	pecan	4	No	
1021	3.05	25.40	20.32		5	No	
1022	3.05	27.94	25.40		4	No	
1023	4.57	22.86	17.78		4	No	
1024	3.66	35.56	30.48		3	No	
1025	2.74	27.94	22.86		3	No	
1026	1.83	35.56	33.02	pecan	3	No	
1027	2.44	16.26	10.16		4	No	
1028	2.44	20.32	13.97		4	No	
1029	4.27	17.78	13.46		4	No	
1030	3.05	27.18	26.67		4	No	
1031	1.83	11.43	10.16		4	No	
1032	1.52	13.97	11.94		4	No	
1033	1.52	25.40	22.86		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1000	unknown	Upstream	0	No	Jam Associated	1
1001	unknown	Upstream	0	No	Jam Associated	1
1002	unknown	Upstream	0	No	Jam Associated	1
1003	unknown	Upstream	180	No	Jam Associated	1
1004	unknown	Upstream	180	No	Jam Associated	1
1005	unknown	Upstream	180	No	Jam Associated	1
1006	unknown	Upstream	0	No	Jam Associated	1
1007	unknown	Upstream	0	No	Jam Associated	1
1008	unknown	Upstream	180	No	Jam Associated	1
1009	unknown	Upstream	180	No	Jam Associated	1
1010	unknown	Upstream	90	No	Jam Associated	1
1011	unknown	Upstream	0	No	Jam Associated	1
1012	unknown	Upstream	0	No	Jam Associated	1
1013	unknown	Upstream	180	No	Jam Associated	2
1014	unknown	Upstream	0	Yes	Jam Associated	2
1015	unknown	Upstream	0	Yes	Jam Associated	2
1016	unknown	Upstream	180	No	Jam Associated	2
1017	unknown	Upstream	90	No	Jam Associated	2
1018	unknown	Upstream	90	No	Jam Associated	2
1019	unknown	Upstream	90	No	Jam Associated	2
1020	unknown	Upstream	180	No	Jam Associated	2
1021	unknown	Upstream	180	No	Jam Associated	1
1022	unknown	Upstream	180	No	Jam Associated	1
1023	unknown	Upstream	180	No	Jam Associated	1
1024	unknown	Upstream	180	No	Jam Associated	1
1025	unknown	Upstream	180	No	Jam Associated	1
1026	unknown	Upstream	180	No	Jam Associated	1
1027	unknown	Upstream	180	No	Jam Associated	2
1028	unknown	Upstream	0	No	Jam Associated	2
1029	unknown	Upstream	180	No	Jam Associated	2
1030	unknown	Upstream	180	No	Jam Associated	1
1031	unknown	Upstream	90	No	Jam Associated	1
1032	unknown	Upstream	180	No	Jam Associated	1
1033	unknown	Upstream	180	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1034	1.83	32.26	30.48		4	No	
1035	3.66	68.58	63.50	pecan	4	No	
1036	3.35	20.32	15.49	pecan	4	No	
1037	6.71	50.80	40.64	cottonwood	3	No	
1038	4.27	21.34	15.24		4	No	
1039	4.57	35.56	27.94		4	No	
1040	6.71	31.24	26.92		4	No	
1041	1.37	12.70	11.43		4	No	
1042	1.37	20.57	17.78		4	No	
1043	2.44	25.40	13.97		4	No	
1044	1.37	20.32	15.24		4	No	
1045	1.83	22.86	17.78	elm	4	No	
1046	3.66	35.56	30.48		4	No	
1047	1.68	12.70	10.16		4	No	
1048	3.05	11.43	10.16		4	No	
1049	4.57	12.70	10.16		4	No	
1050	1.37	17.02	17.02		4	No	
1051	4.88	59.44	38.10		5	No	
1052	2.13	16.76	13.46		4	No	
1053	1.52	11.94	11.18		4	No	
1054	4.27	21.08	16.26		4	No	
1055	1.52	16.51	15.75		5	No	
1056	2.13	15.49	13.46		4	No	
1057	3.66	46.99	41.66		5	No	
1058	2.74	18.03	12.70		4	No	
1059	1.52	18.54	16.76		4	No	
1060	2.74	11.43	10.16		4	No	
1061	1.37	20.32	17.78		5	No	
1062	3.35	56.64	50.80	pecan	4	No	
1063	4.88	30.73	19.56		4	No	
1064	3.96	35.56	22.86		4	No	
1065	2.44	33.02	31.24		5	No	
1066	4.88	43.18	25.40		4	No	
1067	2.13	16.51	12.70		4	No	
1068	1.52	11.43	10.16		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1034	unknown	Upstream	0	No	Jam Associated	1
1035	unknown	Upstream	90	No	Jam Associated	1
1036	unknown	Upstream	90	No	Jam Associated	1
1037	unknown	Upstream	180	No	Jam Associated	1
1038	unknown	Upstream	90	No	Jam Associated	1
1039	unknown	Upstream	90	No	Jam Associated	1
1040	unknown	Upstream	90	No	Jam Associated	1
1041	unknown	Upstream	90	No	Jam Associated	1
1042	unknown	Upstream	90	No	Jam Associated	1
1043	unknown	Upstream	90	No	Jam Associated	1
1044	unknown	Upstream	0	No	Jam Associated	1
1045	unknown	Upstream	90	No	Jam Associated	1
1046	unknown	Upstream	180	No	Jam Associated	1
1047	unknown	Upstream	90	No	Jam Associated	1
1048	unknown	Upstream	90	No	Jam Associated	1
1049	unknown	Upstream	0	No	Jam Associated	1
1050	unknown	Upstream	90	No	Jam Associated	1
1051	unknown	Upstream	180	No	Jam Associated	2
1052	unknown	Upstream	180	No	Jam Associated	2
1053	unknown	Upstream	180	No	Jam Associated	2
1054	unknown	Upstream	180	No	Jam Associated	2
1055	unknown	Upstream	180	No	Jam Associated	2
1056	unknown	Upstream	180	No	Jam Associated	2
1057	unknown	Upstream	90	No	Jam Associated	2
1058	unknown	Upstream	90	No	Jam Associated	2
1059	unknown	Upstream	0	No	Jam Associated	2
1060	unknown	Upstream	0	No	Jam Associated	2
1061	unknown	Upstream	90	No	Jam Associated	2
1062	unknown	Upstream	0	No	Jam Associated	2
1063	unknown	Upstream	0	No	Jam Associated	2
1064	unknown	Upstream	0	No	Jam Associated	2
1065	unknown	Upstream	180	No	Jam Associated	2
1066	unknown	Upstream	180	No	Jam Associated	2
1067	unknown	Upstream	90	No	Jam Associated	2
1068	unknown	Upstream	0	No	Jam Associated	2

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1069	2.74	11.94	10.16	pecan	4	No	
1070	1.37	11.68	10.67		4	No	
1071	3.96	14.99	12.70		4	No	
1072	3.66	33.02	27.94		4	No	
1073	6.10	48.26	28.96		4	No	
1074	1.83	13.46	10.67		5	No	
1075	2.44	38.10	29.46		5	No	
1076	9.14	41.15	27.94		4	No	
1077	4.27	11.43	10.16		4	No	
1078	1.83	14.48	10.16		4	No	
1079	1.37	12.70	10.16		4	No	
1080	1.37	10.16	10.16		4	No	
1081	2.13	17.53	12.19		5	No	
1082	1.37	14.22	10.16		4	No	
1083	1.83	17.78	11.43		4	No	
1084	1.52	12.70	11.43		4	No	
1085	2.44	20.32	15.24		5	No	
1086	3.35	16.51	12.70		4	No	
1087	2.74	16.00	13.21		4	No	
1088	1.83	19.56	10.92		4	No	
1089	2.44	25.15	22.35		4	No	
1090	1.37	17.02	12.70		4	No	
1091	1.37	11.43	10.16		4	No	
1092	2.44	25.40	20.32		5	No	
1093	4.88	36.07	31.24		4	No	
1094	2.13	22.10	20.32		4	No	
1095	1.37	27.94	25.40		4	No	
1096	1.37	15.24	12.70		4	No	
1097	1.83	17.78	10.16		4	No	
1098	1.37	15.24	11.18		4	No	
1099	1.83	20.83	15.24		4	No	
1100	2.13	23.88	19.05		4	No	
1101	1.37	17.78	17.27		5	No	
1102	6.10	11.43	10.16		4	No	
1103	5.49	11.43	10.16		4	No	
1104	5.18	11.43	10.16		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1069	unknown	Upstream	0	No	Jam Associated	2
1070	unknown	Upstream	0	No	Jam Associated	2
1071	unknown	Upstream	180	No	Jam Associated	2
1072	unknown	Upstream	90	No	Jam Associated	2
1073	unknown	Upstream	90	No	Jam Associated	2
1074	unknown	Upstream	90	No	Jam Associated	2
1075	unknown	Upstream	90	No	Jam Associated	1
1076	unknown	Upstream	90	No	Jam Associated	1
1077	unknown	Upstream	90	No	Jam Associated	1
1078	unknown	Upstream	90	No	Jam Associated	1
1079	unknown	Upstream	90	No	Jam Associated	1
1080	unknown	Upstream	90	No	Jam Associated	1
1081	unknown	Upstream	90	No	Jam Associated	1
1082	unknown	Upstream	90	No	Jam Associated	1
1083	unknown	Upstream	90	No	Jam Associated	1
1084	unknown	Upstream	90	No	Jam Associated	1
1085	unknown	Upstream	90	No	Jam Associated	1
1086	unknown	Upstream	90	No	Jam Associated	1
1087	unknown	Upstream	0	No	Jam Associated	1
1088	unknown	Upstream	0	No	Jam Associated	1
1089	unknown	Upstream	180	No	Jam Associated	1
1090	unknown	Upstream	90	No	Jam Associated	1
1091	unknown	Upstream	0	No	Jam Associated	1
1092	unknown	Upstream	90	No	Jam Associated	1
1093	unknown	Upstream	90	No	Jam Associated	1
1094	unknown	Upstream	90	No	Jam Associated	1
1095	unknown	Upstream	180	No	Jam Associated	1
1096	unknown	Upstream	90	No	Jam Associated	1
1097	unknown	Upstream	90	No	Jam Associated	1
1098	unknown	Upstream	90	No	Jam Associated	1
1099	unknown	Upstream	90	No	Jam Associated	1
1100	unknown	Upstream	90	No	Jam Associated	1
1101	unknown	Upstream	90	No	Jam Associated	1
1102	unknown	Upstream	90	No	Jam Associated	1
1103	unknown	Upstream	90	No	Jam Associated	1
1104	unknown	Upstream	90	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1105	4.27	11.43	10.16		4	No	
1106	2.74	43.18	38.10		4	No	
1107	1.52	17.78	15.24		4	No	
1108	3.05	33.02	27.94		4	No	
1109	2.74	22.86	19.05		4	No	
1110	1.83	19.05	17.78		4	No	
1111	3.66	17.78	15.24		4	No	
1112	1.37	30.99	29.21		4	No	
1113	3.35	22.86	20.32		4	No	
1114	3.05	55.88	53.34	elm	4	No	
1115	2.74	25.40	17.78		4	No	
1116	3.05	46.99	40.64		4	No	
1117	1.83	11.43	10.16		4	No	
1118	2.13	11.43	10.16		4	No	
1119	1.37	11.43	10.16		4	No	
1120	1.83	11.43	10.16		4	No	
1121	1.52	11.43	10.16		4	No	
1122	2.74	11.43	10.16		4	No	
1123	1.37	11.43	10.16		4	No	
1124	1.52	11.43	10.16		4	No	
1125	2.44	11.43	10.16		4	No	
1126	1.37	11.43	10.16		4	No	
1127	1.37	22.86	20.32		4	No	
1128	1.52	17.78	15.24		4	No	
1129	3.66	16.51	10.16		4	No	
1130	1.52	15.24	12.70		4	No	
1131	6.40	22.86	10.16		4	No	
1132	1.37	27.94	26.67		4	No	
1133	2.13	15.24	13.72		4	No	
1134	4.27	44.45	25.91		4	No	
1135	5.49	31.50	27.94		5	No	
1136	1.83	16.51	10.16		4	No	
1137	1.37	22.86	17.78		5	No	
1138	4.27	17.78	10.16		4	No	
1139	3.05	23.37	18.80		4	No	
1140	1.37	10.16	15.24		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1105	unknown	Upstream	90	No	Jam Associated	1
1106	unknown	Upstream	90	No	Jam Associated	1
1107	unknown	Upstream	90	No	Jam Associated	1
1108	unknown	Upstream	90	No	Jam Associated	1
1109	unknown	Upstream	90	No	Jam Associated	1
1110	unknown	Upstream	90	No	Jam Associated	1
1111	unknown	Upstream	90	No	Jam Associated	1
1112	unknown	Upstream	90	No	Jam Associated	1
1113	unknown	Upstream	90	No	Jam Associated	1
1114	unknown	Upstream	90	No	Jam Associated	1
1115	unknown	Upstream	90	No	Jam Associated	1
1116	unknown	Upstream	90	No	Jam Associated	1
1117	unknown	Upstream	180	No	Jam Associated	1
1118	unknown	Upstream	180	No	Jam Associated	1
1119	unknown	Upstream	180	No	Jam Associated	1
1120	unknown	Upstream	90	No	Jam Associated	2
1121	unknown	Upstream	90	No	Jam Associated	2
1122	unknown	Upstream	90	No	Jam Associated	2
1123	unknown	Upstream	90	No	Jam Associated	2
1124	unknown	Upstream	0	No	Jam Associated	2
1125	unknown	Upstream	0	No	Jam Associated	2
1126	unknown	Upstream	0	No	Jam Associated	2
1127	unknown	Upstream	90	No	Jam Associated	2
1128	unknown	Upstream	180	No	Jam Associated	2
1129	unknown	Upstream	90	No	Jam Associated	2
1130	unknown	Upstream	180	No	Jam Associated	2
1131	unknown	Upstream	90	No	Jam Associated	2
1132	unknown	Upstream	0	No	Jam Associated	2
1133	unknown	Upstream	180	No	Jam Associated	2
1134	unknown	Upstream	180	No	Jam Associated	2
1135	unknown	Upstream	0	No	Jam Associated	2
1136	unknown	Upstream	180	No	Jam Associated	2
1137	unknown	Upstream	0	No	Jam Associated	2
1138	unknown	Upstream	90	No	Jam Associated	2
1139	unknown	Upstream	0	No	Jam Associated	2
1140	unknown	Upstream	0	No	Jam Associated	2

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1141	1.37	21.34	20.32	blackwillow	4	No	
1142	2.74	17.78	12.70		4	No	
1143	3.05	25.40	20.32		4	No	
1144	3.05	21.59	12.70		4	No	
1145	3.81	57.15	53.34		4	No	
1146	1.83	19.05	16.51		4	No	
1147	2.13	24.38	20.83		4	No	
1148	2.44	37.59	30.48		5	No	
1149	3.05	33.78	23.62		4	No	
1150	2.44	25.40	20.32		4	No	
1151	2.13	19.05	15.24		4	No	
1152	9.75	30.99	17.02		4	No	
1153	2.13	21.59	15.24		4	No	
1154	2.44	20.83	10.16		4	No	
1155	3.05	22.61	18.29	pecan	4	No	
1156	2.13	16.51	12.70		5	No	
1157	1.37	11.43	10.16		5	No	
1158	1.83	25.40	27.94		5	No	
1159	1.37	13.72	12.70	elm	5	No	
1160	1.83	35.56	24.13		4	No	
1161	3.05	11.43	10.16		4	No	
1162	3.05	68.58	50.80		4	No	
1163	7.92	32.51	15.24		4	No	
1164	1.83	31.75	22.86		4	No	
1165	4.27	25.91	20.32		5	No	
1166	1.83	16.51	12.70		4	No	
1167	2.44	19.05	15.24		4	No	
1168	2.44	23.62	17.78		4	No	
1169	4.88	50.80	40.64		4	No	
1170	6.10	20.32	16.51		4	No	
1171	1.83	15.24	12.70		4	No	
1172	7.32	48.26	26.67		4	No	
1173	1.83	31.50	27.94		4	No	
1174	6.10	19.56	11.43		4	No	
1175	2.13	12.70	11.18	pecan	4	No	
1176	2.44	12.95	10.16		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1141	unknown	Upstream	0	No	Jam Associated	2
1142	unknown	Upstream	180	No	Jam Associated	2
1143	unknown	Upstream	180	No	Jam Associated	2
1144	unknown	Upstream	180	No	Jam Associated	2
1145	unknown	Upstream	0	No	Jam Associated	2
1146	unknown	Upstream	0	No	Jam Associated	2
1147	unknown	Upstream	0	No	Jam Associated	2
1148	unknown	Upstream	0	No	Jam Associated	2
1149	unknown	Upstream	0	No	Jam Associated	2
1150	unknown	Upstream	90	No	Jam Associated	2
1151	unknown	Upstream	90	No	Jam Associated	2
1152	unknown	Upstream	90	No	Jam Associated	2
1153	unknown	Upstream	90	No	Jam Associated	2
1154	unknown	Upstream	90	No	Jam Associated	2
1155	unknown	Upstream	90	No	Jam Associated	2
1156	unknown	Upstream	90	No	Jam Associated	2
1157	unknown	Upstream	90	No	Jam Associated	2
1158	unknown	Upstream	90	No	Jam Associated	2
1159	unknown	Upstream	90	No	Jam Associated	2
1160	unknown	Upstream	0	No	Jam Associated	2
1161	unknown	Upstream	90	No	Jam Associated	2
1162	unknown	Upstream	0	No	Jam Associated	2
1163	unknown	Upstream	90	No	Jam Associated	2
1164	unknown	Upstream	90	No	Jam Associated	2
1165	unknown	Upstream	90	No	Jam Associated	2
1166	unknown	Upstream	0	No	Jam Associated	2
1167	unknown	Upstream	0	No	Jam Associated	2
1168	unknown	Upstream	90	No	Jam Associated	2
1169	unknown	Upstream	90	No	Jam Associated	2
1170	unknown	Upstream	0	No	Jam Associated	1
1171	unknown	Upstream	0	No	Jam Associated	2
1172	unknown	Upstream	180	No	Jam Associated	1
1173	unknown	Upstream	90	No	Jam Associated	2
1174	unknown	Upstream	90	No	Jam Associated	2
1175	unknown	Upstream	90	No	Jam Associated	2
1176	unknown	Upstream	90	No	Jam Associated	2

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1177	1.83	21.59	17.78		5	No	
1178	1.37	35.56	33.02		5	No	
1179	3.05	20.32	18.29		4	No	
1180	1.83	15.24	11.43		4	No	
1181	3.96	19.05	13.97	pecan	4	No	
1182	3.66	25.40	20.32		4	No	
1183	1.83	26.92	18.29		4	No	
1184	1.83	32.51	18.80		4	No	
1185	1.52	17.78	15.24		4	No	
1186	3.05	11.68	10.16		4	No	
1187	1.37	20.83	20.32		4	No	
1188	1.83	54.86	50.80		4	No	
1189	6.10	34.54	29.97		5	No	
1190	2.44	30.99	25.91		4	No	
1191	1.37	21.34	20.32		4	No	
1192	2.44	22.86	20.32		4	No	
1193	3.96	26.16	20.32		4	No	
1194	2.13	24.89	20.32		4	No	
1195	2.44	12.70	10.16		4	No	
1196	2.74	20.32	15.24		5	No	
1197	2.13	26.67	25.40		5	No	
1198	3.35	22.86	17.78		4	No	
1199	2.13	15.24	12.70		4	No	
1200	1.52	25.40	22.86		4	No	
1201	4.27	30.48	25.40		4	No	
1202	5.49	48.26	41.91		4	No	
1203	1.37	16.26	14.48		5	No	
1204	5.18	14.99	10.16		4	No	
1205	4.27	30.48	22.86		4	No	
1206	1.52	12.70	11.43		4	No	
1207	1.83	30.48	27.94		5	No	
1208	3.96	45.72	40.64		4	No	
1209	1.83	11.43	10.16		4	No	
1210	1.52	11.43	10.16		4	No	
1211	1.83	11.43	10.16		4	No	
1212	1.52	45.72	43.18		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1177	unknown	Upstream	90	No	Jam Associated	2
1178	unknown	Upstream	90	No	Jam Associated	2
1179	unknown	Upstream	90	No	Jam Associated	2
1180	unknown	Upstream	90	No	Jam Associated	1
1181	unknown	Upstream	90	No	Jam Associated	1
1182	unknown	Upstream	180	No	Jam Associated	1
1183	unknown	Upstream	180	No	Jam Associated	1
1184	unknown	Upstream	180	No	Jam Associated	1
1185	unknown	Upstream	0	No	Jam Associated	2
1186	unknown	Upstream	0	No	Jam Associated	2
1187	unknown	Upstream	90	No	Jam Associated	2
1188	unknown	Upstream	0	No	Jam Associated	2
1189	unknown	Upstream	0	No	Jam Associated	2
1190	unknown	Upstream	0	No	Jam Associated	2
1191	unknown	Upstream	0	No	Jam Associated	2
1192	unknown	Upstream	0	No	Jam Associated	2
1193	unknown	Upstream	90	No	Jam Associated	2
1194	unknown	Upstream	0	No	Jam Associated	2
1195	unknown	Upstream	90	No	Jam Associated	2
1196	unknown	Upstream	0	No	Jam Associated	2
1197	unknown	Upstream	90	No	Jam Associated	2
1198	unknown	Upstream	90	No	Jam Associated	2
1199	unknown	Upstream	0	No	Jam Associated	2
1200	unknown	Upstream	0	No	Jam Associated	2
1201	unknown	Upstream	0	No	Jam Associated	2
1202	unknown	Upstream	180	No	Jam Associated	2
1203	unknown	Upstream	180	No	Jam Associated	2
1204	unknown	Upstream	180	No	Jam Associated	2
1205	unknown	Upstream	180	No	Jam Associated	2
1206	unknown	Upstream	0	No	Jam Associated	2
1207	unknown	Upstream	90	No	Jam Associated	2
1208	unknown	Upstream	180	No	Jam Associated	2
1209	unknown	Upstream	180	No	Jam Associated	2
1210	unknown	Upstream	180	No	Jam Associated	1
1211	unknown	Upstream	180	No	Jam Associated	1
1212	unknown	Upstream	180	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1213	4.57	25.40	17.53		4	No	
1214	1.52	12.70	10.16		4	No	
1215	2.13	15.24	12.70		4	No	
1216	1.37	22.86	21.59		4	No	
1217	2.74	17.78	12.70		4	No	
1218	3.05	30.48	17.78		4	No	
1219	3.05	27.94	20.32		4	No	
1220	2.74	26.67	22.86		4	No	
1221	2.44	15.75	11.43		4	No	
1222	1.52	11.43	10.16		4	No	
1223	1.37	31.50	30.48		4	No	
1224	5.79	23.37	30.48		4	No	
1225	6.71	35.56	27.94		4	No	
1226	1.37	11.43	10.16		4	No	
1227	1.52	13.72	10.16		4	No	
1228	1.52	20.83	17.78		5	No	
1229	2.74	20.32	18.03		4	No	
1230	1.37	17.02	15.24		4	No	
1231	2.74	12.70	10.16		4	No	
1232	5.18	21.08	15.24	pecan	4	No	
1233	3.66	23.37	16.51		4	No	
1234	1.83	14.48	13.97		4	No	
1235	3.35	25.40	20.32		4	No	
1236	2.13	12.70	11.43		4	No	
1237	1.83	11.43	10.16		4	No	
1238	2.74	13.97	11.43		4	No	
1239	1.83	38.10	35.56		4	No	
1240	1.83	23.37	17.78		4	No	
1241	2.13	12.70	11.43		4	No	
1242	5.79	20.32	12.70		4	No	
1243	3.35	12.45	10.67		4	No	
1244	2.74	48.26	38.10		4	No	
1245	2.44	27.94	20.83		4	No	
1246	1.37	15.24	12.70		4	No	
1247	2.13	30.48	25.40		4	No	
1248	6.10	31.50	24.89		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1213	unknown	Upstream	0	No	Jam Associated	1
1214	unknown	Upstream	0	No	Jam Associated	1
1215	unknown	Upstream	0	No	Jam Associated	1
1216	unknown	Upstream	0	No	Jam Associated	1
1217	unknown	Upstream	0	No	Jam Associated	1
1218	unknown	Upstream	90	No	Jam Associated	1
1219	unknown	Upstream	180	No	Jam Associated	1
1220	unknown	Upstream	90	No	Jam Associated	1
1221	unknown	Upstream	180	No	Jam Associated	1
1222	unknown	Upstream	180	No	Jam Associated	1
1223	unknown	Upstream	0	No	Jam Associated	1
1224	unknown	Upstream	180	No	Jam Associated	1
1225	unknown	Upstream	180	No	Jam Associated	2
1226	unknown	Upstream	90	No	Jam Associated	2
1227	unknown	Upstream	90	No	Jam Associated	2
1228	unknown	Upstream	90	No	Jam Associated	2
1229	unknown	Upstream	180	No	Jam Associated	2
1230	unknown	Upstream	0	No	Jam Associated	2
1231	unknown	Upstream	90	No	Jam Associated	2
1232	unknown	Upstream	0	No	Jam Associated	2
1233	unknown	Upstream	0	No	Jam Associated	2
1234	unknown	Upstream	180	No	Jam Associated	2
1235	unknown	Upstream	0	No	Jam Associated	2
1236	unknown	Upstream	180	No	Jam Associated	2
1237	unknown	Upstream	180	No	Jam Associated	2
1238	unknown	Upstream	180	No	Jam Associated	2
1239	unknown	Upstream	180	No	Jam Associated	2
1240	unknown	Upstream	180	No	Jam Associated	1
1241	unknown	Upstream	180	No	Jam Associated	1
1242	unknown	Upstream	90	No	Jam Associated	1
1243	unknown	Upstream	90	No	Jam Associated	1
1244	unknown	Upstream	0	No	Jam Associated	2
1245	unknown	Upstream	0	No	Jam Associated	1
1246	unknown	Upstream	90	No	Jam Associated	2
1247	unknown	Upstream	0	No	Jam Associated	2
1248	unknown	Upstream	90	No	Jam Associated	2

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1249	6.40	35.56	20.32		4	No	
1250	1.83	17.27	15.75		4	No	
1251	3.35	27.69	23.11		4	No	
1252	2.74	15.49	10.41		4	No	
1253	2.44	16.76	12.70		4	No	
1254	1.83	20.32	18.29		4	No	
1255	2.13	13.21	10.16		4	No	
1256	2.74	15.75	12.70		4	No	
1257	4.88	26.92	22.86		4	No	
1258	6.71	35.05	14.99		4	No	
1259	4.27	22.86	15.75		4	No	
1260	3.05	33.02	23.88		4	No	
1261	2.74	68.58	60.96		4	No	
1262	2.44	50.80	30.99		4	No	
1263	6.40	24.38	20.32		5	No	
1264	3.96	23.37	19.81	pecan	4	No	
1265	5.18	27.69	19.81		4	No	
1266	2.13	17.78	15.24		4	No	
1267	1.37	25.40	17.78		4	No	
1268	1.83	66.04	60.96		5	No	
1269	5.79	27.94	15.24		4	No	
1270	1.37	11.43	10.16		4	No	
1271	1.37	11.43	10.16		4	No	
1272	1.37	11.43	10.16		4	No	
1273	1.37	11.43	10.16		4	No	
1274	1.37	18.29	12.70		4	No	
1275	1.83	14.48	10.16		4	No	
1276	2.13	21.59	18.54		4	No	
1277	1.37	11.43	10.16		4	No	
1278	1.37	11.43	10.16		4	No	
1279	1.37	11.43	10.16		4	No	
1280	2.13	31.75	25.65		4	No	
1281	2.74	19.05	12.70		4	No	
1282	4.27	38.10	20.32		4	No	
1283	3.66	38.10	25.40		5	No	
1284	1.37	30.48	25.40		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1249	unknown	Upstream	180	No	Jam Associated	2
1250	unknown	Upstream	180	No	Jam Associated	2
1251	unknown	Upstream	180	No	Jam Associated	2
1252	unknown	Upstream	0	No	Jam Associated	2
1253	unknown	Upstream	180	No	Jam Associated	2
1254	unknown	Upstream	180	No	Jam Associated	2
1255	unknown	Upstream	90	No	Jam Associated	2
1256	unknown	Upstream	180	No	Jam Associated	2
1257	unknown	Upstream	0	No	Jam Associated	2
1258	unknown	Upstream	0	No	Jam Associated	2
1259	unknown	Upstream	0	No	Jam Associated	2
1260	unknown	Upstream	0	No	Jam Associated	2
1261	unknown	Upstream	90	No	Jam Associated	2
1262	unknown	Upstream	90	No	Jam Associated	2
1263	unknown	Upstream	90	No	Jam Associated	2
1264	unknown	Upstream	90	No	Jam Associated	2
1265	unknown	Upstream	90	No	Jam Associated	2
1266	unknown	Upstream	0	No	Jam Associated	2
1267	unknown	Upstream	0	No	Jam Associated	2
1268	unknown	Upstream	90	No	Jam Associated	2
1269	unknown	Upstream	90	No	Jam Associated	2
1270	unknown	Upstream	90	No	Jam Associated	2
1271	unknown	Upstream	90	No	Jam Associated	2
1272	unknown	Upstream	90	No	Jam Associated	2
1273	unknown	Upstream	90	No	Jam Associated	2
1274	unknown	Upstream	0	No	Jam Associated	2
1275	unknown	Upstream	0	No	Jam Associated	2
1276	unknown	Upstream	0	No	Jam Associated	2
1277	unknown	Upstream	90	No	Jam Associated	2
1278	unknown	Upstream	90	No	Jam Associated	2
1279	unknown	Upstream	90	No	Jam Associated	2
1280	unknown	Upstream	180	No	Jam Associated	2
1281	unknown	Upstream	0	No	Jam Associated	2
1282	unknown	Upstream	0	No	Jam Associated	2
1283	unknown	Upstream	90	No	Jam Associated	2
1284	unknown	Upstream	0	No	Jam Associated	2

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1285	3.05	15.75	13.46		5	No	
1286	1.37	11.43	10.16		5	No	
1287	1.52	21.34	21.08		5	No	
1288	1.37	20.83	12.70		4	No	
1289	1.37	25.65	23.88		4	No	
1290	1.83	16.51	12.70		4	No	
1291	1.52	11.43	10.16		4	No	
1292	2.13	34.29	32.51		5	No	
1293	1.83	13.97	10.16		5	No	
1294	3.35	22.10	17.78		4	No	
1295	1.83	16.51	12.19		4	No	
1296	1.52	22.86	17.78		5	No	
1297	3.66	23.11	14.73		4	No	
1298	2.44	19.05	10.16		4	No	
1299	3.05	20.32	16.51		4	No	
1300	6.10	30.48	25.40		4	No	
1301	1.37	30.48	25.40		4	No	
1302	1.37	30.48	25.40		4	No	
1303	2.44	35.56	30.48		4	No	
1304	1.52	17.78	15.49		4	No	
1305	1.37	11.43	10.16		4	No	
1306	1.37	11.43	10.16		4	No	
1307	1.37	11.43	10.16		4	No	
1308	1.37	11.43	10.16		4	No	
1309	1.52	12.70	11.43		4	No	
1310	2.74	15.24	12.70		4	No	
1311	1.52	12.70	11.43		4	No	
1312	1.52	12.70	11.43		4	No	
1313	1.98	22.86	19.05		4	No	
1314	1.68	20.32	19.05		4	No	
1315	1.37	15.75	14.22		4	No	
1316	3.05	13.21	10.92		4	No	
1317	1.37	35.56	34.29		4	No	
1318	2.74	16.51	13.46		5	No	
1319	1.37	27.94	26.67		5	No	
1320	2.44	17.78	12.70		5	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1285	unknown	Upstream	90	No	Jam Associated	2
1286	unknown	Upstream	90	No	Jam Associated	2
1287	unknown	Upstream	90	No	Jam Associated	2
1288	unknown	Upstream	90	No	Jam Associated	2
1289	unknown	Upstream	90	No	Jam Associated	2
1290	unknown	Upstream	90	No	Jam Associated	2
1291	unknown	Upstream	90	No	Jam Associated	2
1292	unknown	Upstream	90	No	Jam Associated	2
1293	unknown	Upstream	90	No	Jam Associated	2
1294	unknown	Upstream	90	No	Jam Associated	2
1295	unknown	Upstream	90	No	Jam Associated	2
1296	unknown	Upstream	90	No	Jam Associated	2
1297	unknown	Upstream	90	No	Jam Associated	1
1298	unknown	Upstream	180	No	Jam Associated	1
1299	unknown	Upstream	90	No	Jam Associated	1
1300	unknown	Upstream	0	No	Jam Associated	1
1301	unknown	Upstream	90	No	Jam Associated	1
1302	unknown	Upstream	90	No	Jam Associated	1
1303	unknown	Upstream	180	No	Jam Associated	1
1304	unknown	Upstream	180	No	Jam Associated	2
1305	unknown	Upstream	180	No	Jam Associated	2
1306	unknown	Upstream	180	No	Jam Associated	2
1307	unknown	Upstream	180	No	Jam Associated	2
1308	unknown	Upstream	180	No	Jam Associated	2
1309	unknown	Upstream	90	No	Jam Associated	2
1310	unknown	Upstream	90	No	Jam Associated	2
1311	unknown	Upstream	90	No	Jam Associated	2
1312	unknown	Upstream	90	No	Jam Associated	2
1313	unknown	Upstream	180	No	Jam Associated	2
1314	unknown	Upstream	180	No	Jam Associated	2
1315	unknown	Upstream	0	No	Jam Associated	2
1316	unknown	Upstream	0	No	Jam Associated	2
1317	unknown	Upstream	0	No	Jam Associated	2
1318	unknown	Upstream	0	No	Jam Associated	2
1319	unknown	Upstream	90	No	Jam Associated	2
1320	unknown	Upstream	90	No	Jam Associated	2

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1321	1.52	12.70	10.16		4	No	
1322	7.62	34.54	31.75		4	No	
1323	4.27	13.21	10.16		4	No	
1324	2.74	11.43	10.16		5	No	
1325	1.83	11.43	10.16		4	No	
1326	1.37	11.43	10.16		4	No	
1327	2.29	12.70	10.16		3	No	
1328	3.66	32.00	27.94		5	No	
1329	1.83	16.51	15.24		4	No	
1330	3.66	49.53	46.99		3	No	
1331	4.27	34.29	24.89		4	No	
1332	3.05	39.37	33.02		3	No	
1333	2.44	17.78	16.51		4	No	
1334	4.27	34.80	27.94		4	No	
1335	2.13	13.97	10.16		4	No	
1336	7.01	21.59	10.16		4	No	
1337	1.83	25.40	22.86		5	No	
1338	2.74	20.32	17.78		4	No	
1339	4.27	19.30	15.24		4	No	
1340	3.35	16.51	13.21		4	No	
1341	2.13	16.51	11.43		4	No	
1342	1.83	22.86	16.51		4	No	
1343	4.88	22.86	12.70		4	No	
1344	1.52	24.13	20.32		4	No	
1345	2.13	20.32	17.78		4	No	
1346	3.66	33.02	21.34		4	No	
1347	3.66	12.70	10.16	blackwillow	3	No	
1348	4.88	25.40	20.32		4	No	
1349	4.27	30.48	27.94		4	No	
1350	3.66	20.32	15.24		4	No	
1351	1.52	12.70	10.16		4	No	
1352	3.05	15.24	11.94		4	No	
1353	6.10	15.24	10.16		4	No	
1354	2.13	12.70	10.16		5	No	
1355	2.74	17.78	12.70		5	No	
1356	3.05	19.30	13.21	blackwillow	4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1321	unknown	Upstream	0	No	Jam Associated	2
1322	unknown	Upstream	180	No	Jam Associated	2
1323	unknown	Upstream	0	No	Jam Associated	2
1324	unknown	Upstream	180	No	Jam Associated	2
1325	unknown	Upstream	180	No	Jam Associated	2
1326	unknown	Upstream	180	No	Jam Associated	2
1327	unknown	Upstream	180	No	Jam Associated	2
1328	unknown	Upstream	90	No	Jam Associated	2
1329	unknown	Upstream	0	No	Jam Associated	2
1330	unknown	Upstream	180	No	Jam Associated	1
1331	unknown	Upstream	180	No	Jam Associated	1
1332	unknown	Upstream	180	No	Jam Associated	1
1333	unknown	Upstream	0	No	Jam Associated	1
1334	unknown	Upstream	0	No	Jam Associated	1
1335	unknown	Upstream	180	No	Jam Associated	1
1336	unknown	Upstream	0	No	Jam Associated	1
1337	unknown	Upstream	90	No	Jam Associated	1
1338	unknown	Upstream	180	No	Jam Associated	1
1339	unknown	Upstream	0	No	Jam Associated	1
1340	unknown	Upstream	0	No	Jam Associated	1
1341	unknown	Upstream	180	No	Jam Associated	1
1342	unknown	Upstream	0	No	Jam Associated	1
1343	unknown	Upstream	180	No	Jam Associated	1
1344	unknown	Upstream	0	No	Jam Associated	1
1345	unknown	Upstream	0	No	Jam Associated	1
1346	unknown	Upstream	180	No	Jam Associated	1
1347	unknown	Upstream	0	No	Jam Associated	1
1348	unknown	Upstream	0	No	Jam Associated	1
1349	unknown	Upstream	180	No	Jam Associated	1
1350	unknown	Upstream	180	No	Jam Associated	1
1351	unknown	Upstream	0	No	Jam Associated	1
1352	unknown	Upstream	0	No	Jam Associated	1
1353	unknown	Upstream	90	No	Jam Associated	1
1354	unknown	Upstream	90	No	Jam Associated	1
1355	unknown	Upstream	90	No	Jam Associated	1
1356	unknown	Upstream	90	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1357	3.96	18.29	15.24		4	No	
1358	3.05	26.67	12.70		4	No	
1359	1.52	15.24	12.70		4	No	
1360	4.27	18.80	15.75		4	No	
1361	4.57	11.43	10.16		4	No	
1362	4.27	11.43	10.16		4	No	
1363	3.05	11.43	10.16		4	No	
1364	1.83	19.81	12.70		5	No	
1365	1.52	38.10	33.02		5	No	
1366	1.52	20.32	12.70		4	No	
1367	1.83	15.24	10.16		4	No	
1368	3.66	25.40	20.32		4	No	
1369	2.13	17.78	12.70		4	No	
1370	1.52	20.32	15.24		4	No	
1371	5.49	41.91	39.12	pecan	3	No	
1372	2.44	20.32	13.21		4	No	
1373	2.13	17.78	16.51		4	No	
1374	1.52	33.02	25.40		5	No	
1375	1.37	17.78	15.24		5	No	
1376	1.83	15.24	10.16		4	No	
1377	3.05	25.40	20.32		5	No	
1378	3.66	30.48	25.40		4	No	
1379	1.37	17.78	15.24		5	No	
1380	1.37	11.43	10.16		3	No	
1381	1.37	15.24	12.70		3	No	
1382	1.37	11.43	10.16		5	No	
1383	3.96	38.10	31.24		4	No	main stem, branches are 1384-1385
1384	4.27	17.78	10.16				see 1383
1385	4.57	22.86	15.24				see 1383
1386	3.66	13.97	11.43		4	No	
1387	3.66	19.05	12.70		4	No	
1388	2.44	30.48	25.40		3	No	
1389	1.37	12.70	10.16	blackwillow	3	No	
1390	1.52	25.40	20.32		5	No	
1391	2.13	12.70	10.16		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1357	unknown	Upstream	0	No	Jam Associated	1
1358	unknown	Upstream	0	No	Jam Associated	1
1359	unknown	Upstream	0	No	Jam Associated	1
1360	unknown	Upstream	0	No	Jam Associated	1
1361	unknown	Upstream	0	No	Jam Associated	1
1362	unknown	Upstream	180	No	Jam Associated	1
1363	unknown	Upstream	0	No	Jam Associated	1
1364	unknown	Upstream	90	No	Jam Associated	1
1365	unknown	Upstream	0	No	Jam Associated	1
1366	unknown	Upstream	90	No	Jam Associated	1
1367	unknown	Upstream	90	No	Jam Associated	1
1368	unknown	Upstream	90	No	Jam Associated	1
1369	unknown	Upstream	0	No	Jam Associated	1
1370	unknown	Upstream	0	No	Jam Associated	1
1371	unknown	Upstream	0	No	Jam Associated	1
1372	unknown	Upstream	90	No	Jam Associated	1
1373	unknown	Upstream	90	No	Jam Associated	1
1374	unknown	Upstream	90	No	Jam Associated	1
1375	unknown	Upstream	90	No	Jam Associated	1
1376	unknown	Upstream	180	No	Jam Associated	1
1377	unknown	Upstream	0	No	Jam Associated	1
1378	unknown	Upstream	0	No	Jam Associated	1
1379	unknown	Upstream	0	No	Jam Associated	1
1380	unknown	Upstream	0	No	Jam Associated	1
1381	unknown	Upstream	0	No	Jam Associated	1
1382	unknown	Upstream	90	No	Jam Associated	1
1383	unknown	Upstream	90	No	Jam Associated	1
1384						
1385						
1386	unknown	Upstream	90	No	Jam Associated	1
1387	unknown	Upstream	90	No	Jam Associated	1
1388	unknown	Upstream	0	No	Jam Associated	1
1389	unknown	Upstream	0	No	Jam Associated	1
1390	unknown	Upstream	0	No	Jam Associated	1
1391	unknown	Upstream	0	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1392	4.57	12.70	10.16		4	No	
1393	4.27	55.88	45.72		5	No	
1394	3.35	26.92	20.32		4	No	
1395	3.05	20.32	17.78		4	No	
1396	1.37	17.78	13.97		4	No	
1397	2.13	20.32	19.05	blackwillow	3	No	main stem, branch is 1398
1398	1.52	13.72	13.46				see 1398
1399	3.05	25.65	15.24		5	No	
1400	2.44	15.75	11.43		4	No	
1401	1.52	36.83	35.56		5	No	
1402	3.35	20.83	15.24		5	No	
1403	2.13	12.95	12.45	pecan	4	No	
1404	1.52	26.92	24.13	pecan	3	No	
1405	1.52	17.78	15.24		4	No	
1406	2.44	13.97	10.16		5	No	
1407	1.37	11.43	10.16		4	No	
1408	1.37	22.86	20.32		5	No	
1409	1.83	12.70	10.16		4	No	
1410	2.13	20.32	17.78		4	No	
1411	3.96	53.34	45.72		4	No	
1412	1.83	25.40	17.78		5	No	
1413	1.52	15.24	10.16	blackwillow	3	No	
1414	1.37	20.32	16.51		4	No	
1415	2.13	21.34	17.78		4	No	
1416	1.37	11.43	10.16		4	No	
1417	4.88	14.22	11.43		4	No	
1418	7.92	26.42	12.70		4	No	
1419	5.79	48.26	42.16		4	No	
1420	2.74	16.51	15.24		4	No	
1421	3.66	50.80	45.72		4	No	
1422	2.13	20.32	15.24		4	No	
1423	2.44	30.48	25.40		5	No	
1424	3.66	51.82	43.18		5	No	
1425	2.74	46.23	40.64		5	No	
1426	1.52	22.61	20.32		4	No	
1427	1.52	17.78	15.24		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1392	unknown	Upstream	180	No	Jam Associated	1
1393	unknown	Upstream	90	No	Jam Associated	1
1394	unknown	Upstream	0	No	Jam Associated	1
1395	unknown	Upstream	0	No	Jam Associated	1
1396	unknown	Upstream	0	No	Jam Associated	1
1397	unknown	Upstream	90	No	Jam Associated	1
1398						
1399	unknown	Upstream	180	No	Jam Associated	1
1400	unknown	Upstream	0	No	Jam Associated	1
1401	unknown	Upstream	0	No	Jam Associated	1
1402	unknown	Upstream	0	No	Jam Associated	1
1403	unknown	Upstream	0	No	Jam Associated	1
1404	unknown	Upstream	180	No	Jam Associated	1
1405	unknown	Upstream	180	No	Jam Associated	1
1406	unknown	Upstream	0	No	Jam Associated	1
1407	unknown	Upstream	180	No	Jam Associated	1
1408	unknown	Upstream	180	No	Jam Associated	1
1409	unknown	Upstream	0	No	Jam Associated	1
1410	unknown	Upstream	90	No	Jam Associated	1
1411	unknown	Upstream	180	No	Jam Associated	1
1412	unknown	Upstream	90	No	Jam Associated	1
1413	unknown	Upstream	180	No	Jam Associated	1
1414	unknown	Upstream	0	No	Jam Associated	1
1415	unknown	Upstream	90	No	Jam Associated	1
1416	unknown	Upstream	180	No	Jam Associated	1
1417	unknown	Upstream	0	No	Jam Associated	1
1418	unknown	Upstream	180	No	Jam Associated	1
1419	unknown	Upstream	180	No	Jam Associated	1
1420	unknown	Upstream	180	No	Jam Associated	1
1421	unknown	Upstream	180	No	Jam Associated	1
1422	unknown	Upstream	180	No	Jam Associated	1
1423	unknown	Upstream	180	No	Jam Associated	1
1424	unknown	Upstream	180	No	Jam Associated	1
1425	unknown	Upstream	180	No	Jam Associated	1
1426	unknown	Upstream	90	No	Jam Associated	1
1427	unknown	Upstream	90	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1428	2.13	21.34	15.24		4	No	
1429	2.74	10.67	10.16				see 1430
1430	1.83	15.24	12.70		4	No	main stem, branch is 1429
1431	1.83	22.86	20.32		5	No	
1432	1.52	15.24	13.97		5	No	
1433	3.66	18.80	10.16		4	No	
1434	1.37	23.88	22.86		5	No	
1435	4.27	17.27	16.26	pecan	5	No	
1436	3.66	43.18	38.10		4	No	
1437	1.83	20.32	16.51		4	No	
1438	4.88	29.97	13.21		4	No	
1439	3.35	38.61	23.62		5	No	
1440	3.05	22.86	29.72		5	No	
1441	7.62	57.15	35.56	pecan	5	No	
1442	1.83	25.40	24.13		4	No	
1443	3.05	23.37	11.94		4	No	
1444	4.88	36.32	30.48		5	No	
1445	2.74	26.67	20.32		5	No	
1446	1.37	26.67	25.40		4	No	
1447	1.37	20.32	19.05		5	No	
1448	2.74	17.78	12.70		4	No	
1449	1.52	20.32	17.78		4	No	
1450	1.83	12.70	10.16		4	No	
1451	1.37	11.43	10.16		5	No	
1452	1.83	22.86	17.78		5	No	
1453	1.37	11.94	10.67		5	No	
1454	1.83	15.24	12.70		4	No	
1455	3.66	16.51	15.24		4	No	
1456	1.52	13.97	12.70		4	No	
1457	3.05	20.32	16.76		4	No	
1458	4.57	25.40	20.32		4	No	
1459	1.83	27.94	25.40		5	No	
1460	2.44	30.48	17.78		5	No	
1461	2.74	38.10	35.56		4	No	
1462	2.13	19.05	15.24		4	No	
1463	1.37	22.86	21.59		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1428	unknown	Upstream	180	No	Jam Associated	1
1429						
1430	unknown	Upstream	180	No	Jam Associated	2
1431	unknown	Upstream	180	No	Jam Associated	2
1432	unknown	Upstream	180	No	Jam Associated	2
1433	unknown	Upstream	0	No	Jam Associated	1
1434	unknown	Upstream	90	No	Jam Associated	1
1435	unknown	Upstream	90	No	Jam Associated	1
1436	unknown	Upstream	90	No	Jam Associated	1
1437	unknown	Upstream	90	No	Jam Associated	1
1438	unknown	Upstream	180	Yes	Jam Associated	1
1439	unknown	Upstream	0	No	Jam Associated	1
1440	unknown	Upstream	0	No	Jam Associated	1
1441	unknown	Upstream	0	No	Jam Associated	1
1442	unknown	Upstream	180	No	Jam Associated	1
1443	unknown	Upstream	0	No	Jam Associated	1
1444	unknown	Upstream	180	No	Jam Associated	1
1445	unknown	Upstream	0	No	Jam Associated	1
1446	unknown	Upstream	180	No	Jam Associated	1
1447	unknown	Upstream	180	No	Jam Associated	1
1448	unknown	Upstream	90	No	Jam Associated	1
1449	unknown	Upstream	90	No	Jam Associated	1
1450	unknown	Upstream	180	No	Jam Associated	1
1451	unknown	Upstream	90	No	Jam Associated	1
1452	unknown	Upstream	0	No	Jam Associated	1
1453	unknown	Upstream	180	No	Jam Associated	1
1454	unknown	Upstream	90	No	Jam Associated	1
1455	unknown	Upstream	180	No	Jam Associated	1
1456	unknown	Upstream	180	No	Jam Associated	1
1457	unknown	Upstream	180	No	Jam Associated	1
1458	unknown	Upstream	180	No	Jam Associated	1
1459	unknown	Upstream	0	No	Jam Associated	1
1460	unknown	Upstream	180	No	Jam Associated	1
1461	unknown	Upstream	180	Yes	Jam Associated	1
1462	unknown	Upstream	0	No	Jam Associated	1
1463	unknown	Upstream	0	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1464	1.83	18.29	15.75		4	No	
1465	1.83	12.70	10.16		5	No	
1466	1.37	33.02	27.94		4	No	
1467	1.52	22.86	20.32		4	No	
1468	2.44	12.70	10.16		4	No	
1469	2.44	22.86	20.32		4	No	
1470	1.37	20.32	19.05		4	No	
1471	1.83	15.24	12.70		4	No	
1472	1.83	17.78	15.24		4	No	
1473	1.37	12.70	11.43		4	No	
1474	2.13	25.40	22.86		5	No	
1475	3.35	15.24	10.67		4	No	
1476	1.52	17.78	15.24		4	No	
1477	1.83	13.46	11.43		4	No	
1478	1.52	11.43	10.16		4	No	
1479	2.13	18.80	15.75		4	No	
1480	2.44	28.45	20.57				see 1481
1481	4.88	46.99	38.86		4	No	main stem, branch is 1480
1482	1.83	36.58	30.48		5	No	
1483	2.13	12.70	10.16	blackwillow	3	No	
1484	1.52	11.43	10.16		4	No	
1485	1.52	15.24	12.70		4	No	
1486	3.05	35.81	32.00				see 1488
1487	1.37	36.83	23.62				see 1488
1488	1.37	49.78	46.48	pecan	5	No	main stem, branches are 1486-1487
1489	4.27	33.02	27.94		3	No	
1490	2.74	22.86	17.78		4	No	
1491	3.35	15.24	14.48		4	No	
1492	4.27	33.02	27.94		4	No	
1493	1.37	15.24	12.70		4	No	
1494	2.74	55.88	53.34		4	No	
1495	2.74	22.86	17.78		4	No	
1496	2.13	17.78	12.70		4	No	
1497	3.66	25.40	17.78		4	No	
1498	1.52	20.32	17.78		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1464	unknown	Upstream	180	No	Jam Associated	1
1465	unknown	Upstream	90	No	Jam Associated	1
1466	unknown	Upstream	90	No	Jam Associated	1
1467	unknown	Upstream	180	No	Jam Associated	1
1468	unknown	Upstream	180	No	Jam Associated	1
1469	unknown	Upstream	90	No	Jam Associated	1
1470	unknown	Upstream	90	No	Jam Associated	1
1471	unknown	Upstream	90	No	Jam Associated	1
1472	unknown	Upstream	90	No	Jam Associated	1
1473	unknown	Upstream	90	No	Jam Associated	1
1474	unknown	Upstream	180	No	Jam Associated	1
1475	unknown	Upstream	180	No	Jam Associated	1
1476	unknown	Upstream	180	No	Jam Associated	1
1477	unknown	Upstream	0	No	Jam Associated	1
1478	unknown	Upstream	0	No	Jam Associated	1
1479	unknown	Upstream	180	No	Jam Associated	1
1480						
1481	unknown	Upstream	0	No	Jam Associated	1
1482	unknown	Upstream	180	No	Jam Associated	1
1483	unknown	Upstream	90	No	Jam Associated	1
1484	unknown	Upstream	180	No	Jam Associated	1
1485	unknown	Upstream	180	No	Jam Associated	1
1486						
1487						
1488	unknown	Upstream	0	No	Jam Associated	1
1489	unknown	Upstream	90	No	Jam Associated	1
1490	unknown	Upstream	90	No	Jam Associated	1
1491	unknown	Upstream	90	No	Jam Associated	1
1492	unknown	Upstream	90	No	Jam Associated	1
1493	unknown	Upstream	90	No	Jam Associated	1
1494	unknown	Upstream	90	No	Jam Associated	1
1495	unknown	Upstream	0	No	Jam Associated	1
1496	unknown	Upstream	0	No	Jam Associated	1
1497	unknown	Upstream	0	No	Jam Associated	1
1498	unknown	Upstream	90	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1499	1.37	12.70	11.43		5	No	
1500	2.74	17.78	12.70		5	No	
1501	3.66	27.94	22.86		5	No	
1502	1.52	15.24	12.70		5	No	
1503	3.05	40.64	38.10		4	No	
1504	1.52	13.97	12.70		5	No	
1505	1.83	15.24	12.70		5	No	
1506	1.37	11.43	10.16		4	No	
1507	1.37	24.13	22.86		4	No	
1508	1.37	15.24	13.97		4	No	
1509	2.13	22.86	20.32		4	No	
1510	4.27	15.24	11.43		4	No	
1511	1.37	12.70	11.43		4	No	
1512	1.52	17.78	15.24		4	No	
1513	1.52	11.43	10.16		4	No	
1514	1.52	17.78	15.24		4	No	
1515	2.44	27.94	22.86		4	No	
1516	1.37	12.70	11.43	blackwillow	3	No	
1517	4.88	35.56	22.86	elm	3	No	
1518	2.13	12.70	10.16	blackwillow	3	No	
1519	1.52	15.24	12.70	elm	3	No	
1520	2.74	22.86	17.78		4	No	
1521	3.05	17.78	12.70		4	No	
1522	1.37	15.24	13.97		4	No	
1523	1.52	17.78	15.24		4	No	
1524	4.57	28.45	20.32		4	No	
1525	3.35	33.02	27.94	elm	3	No	
1526	2.74	15.24	12.70		4	No	
1527	1.52	12.70	10.16		4	No	
1528	1.37	11.43	10.16		4	No	
1529	6.10	121.92	68.58		4	No	
1530	1.52	15.24	12.70		3	No	
1531	1.83	45.72	43.18		5	No	
1532	1.37	11.43	10.16		4	No	
1533	1.37	11.43	10.16		4	No	
1534	1.37	11.43	10.16		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1499	unknown	Upstream	0	No	Jam Associated	1
1500	unknown	Upstream	90	No	Jam Associated	1
1501	unknown	Upstream	90	No	Jam Associated	1
1502	unknown	Upstream	90	No	Jam Associated	1
1503	unknown	Upstream	0	No	Jam Associated	1
1504	unknown	Upstream	180	No	Jam Associated	1
1505	unknown	Upstream	180	No	Jam Associated	1
1506	unknown	Upstream	180	No	Jam Associated	1
1507	unknown	Upstream	180	No	Jam Associated	1
1508	unknown	Upstream	180	No	Jam Associated	1
1509	unknown	Upstream	0	No	Jam Associated	2
1510	unknown	Upstream	0	No	Jam Associated	2
1511	unknown	Upstream	90	No	Jam Associated	2
1512	unknown	Upstream	180	No	Jam Associated	2
1513	unknown	Upstream	90	No	Jam Associated	2
1514	unknown	Upstream	90	No	Jam Associated	2
1515	unknown	Upstream	0	No	Jam Associated	2
1516	unknown	Upstream	180	No	Jam Associated	2
1517	unknown	Upstream	0	No	Jam Associated	2
1518	unknown	Upstream	0	No	Jam Associated	2
1519	unknown	Upstream	180	No	Jam Associated	2
1520	unknown	Upstream	0	No	Jam Associated	2
1521	unknown	Upstream	0	No	Jam Associated	2
1522	unknown	Upstream	0	No	Jam Associated	2
1523	unknown	Upstream	0	No	Jam Associated	2
1524	unknown	Upstream	0	No	Jam Associated	1
1525	unknown	Upstream	180	No	Jam Associated	1
1526	unknown	Upstream	180	No	Jam Associated	1
1527	unknown	Upstream	180	No	Jam Associated	1
1528	unknown	Upstream	0	No	Jam Associated	1
1529	unknown	Upstream	90	No	Jam Associated	1
1530	unknown	Upstream	0	No	Jam Associated	1
1531	unknown	Upstream	90	No	Jam Associated	1
1532	unknown	Upstream	0	No	Jam Associated	1
1533	unknown	Upstream	0	No	Jam Associated	1
1534	unknown	Upstream	0	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1535	1.52	15.24	12.70		4	No	
1536	2.74	23.37	20.32		4	No	
1537	2.13	23.88	20.32		4	No	
1538	1.83	20.32	17.78		4	No	
1539	1.83	19.30	17.02		4	No	
1540	1.52	11.43	10.16		4	No	
1541	1.52	11.43	10.16		4	No	
1542	1.52	15.24	12.70		5	No	
1543	1.52	41.91	40.64		5	No	
1544	2.74	17.78	15.24		4	No	
1545	3.66	27.18	18.29		4	No	
1546	1.83	40.64	39.37	pecan	3	No	
1547	1.52	12.70	10.16		4	No	
1548	2.13	20.32	15.24		4	No	
1549	5.49	43.18	33.02	pecan	3	No	
1550	2.44	33.02	27.94		4	No	
1551	1.52	35.56	33.02		5	No	
1552	1.52	25.40	22.86		5	No	
1553	1.52	12.70	10.16		4	No	
1554	1.83	17.78	15.24		4	No	
1555	1.52	17.78	12.70		5	No	
1556	1.37	15.24	12.70		5	No	
1557	3.96	25.40	17.78		4	No	
1558	1.52	16.51	15.24		4	No	
1559	1.83	25.40	20.32		5	No	
1560	4.27	53.34	50.80		4	No	
1561	3.35	16.51	15.24		5	No	
1562	1.37	22.86	20.32		5	No	
1563	1.37	11.43	10.16		4	No	
1564	2.13	20.83	17.78		4	No	
1565	6.10	38.10	28.70	elm	3	No	main stem, branches are 1566-1567
1566	1.52	21.59	19.05				see 1565
1567	2.74	19.30	15.24				see 1565
1568	1.52	15.24	12.70		4	No	
1569	3.66	35.56	30.48		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1535	unknown	Upstream	0	No	Jam Associated	1
1536	unknown	Upstream	180	No	Jam Associated	1
1537	unknown	Upstream	90	No	Jam Associated	1
1538	unknown	Upstream	180	No	Jam Associated	1
1539	unknown	Upstream	0	No	Jam Associated	1
1540	unknown	Upstream	180	No	Jam Associated	1
1541	unknown	Upstream	180	No	Jam Associated	1
1542	unknown	Upstream	180	No	Jam Associated	1
1543	unknown	Upstream	90	No	Jam Associated	1
1544	unknown	Upstream	180	No	Jam Associated	1
1545	unknown	Upstream	180	No	Jam Associated	1
1546	unknown	Upstream	180	No	Jam Associated	1
1547	unknown	Upstream	0	No	Jam Associated	1
1548	unknown	Upstream	90	No	Jam Associated	1
1549	unknown	Upstream	0	No	Jam Associated	1
1550	unknown	Upstream	0	No	Jam Associated	1
1551	unknown	Upstream	0	No	Jam Associated	1
1552	unknown	Upstream	180	No	Jam Associated	1
1553	unknown	Upstream	0	No	Jam Associated	1
1554	unknown	Upstream	90	No	Jam Associated	1
1555	unknown	Upstream	180	No	Jam Associated	1
1556	unknown	Upstream	0	No	Jam Associated	1
1557	unknown	Upstream	0	No	Jam Associated	1
1558	unknown	Upstream	90	No	Jam Associated	1
1559	unknown	Upstream	90	No	Jam Associated	1
1560	unknown	Upstream	90	No	Jam Associated	1
1561	unknown	Upstream	90	No	Jam Associated	1
1562	unknown	Upstream	90	No	Jam Associated	1
1563	unknown	Upstream	90	No	Jam Associated	1
1564	unknown	Upstream	180	No	Jam Associated	1
1565	unknown	Upstream	180	No	Jam Associated	1
1566						
1567						
1568	unknown	Upstream	90	No	Jam Associated	1
1569	unknown	Upstream	90	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1570	1.52	11.43	10.16		4	No	
1571	1.52	17.78	12.70		5	No	
1572	1.83	15.24	12.70		4	No	
1573	1.37	12.70	11.43		4	No	
1574	3.05	17.78	12.70		4	No	
1575	2.13	20.32	15.24		4	No	
1576	3.96	20.32	12.70		4	No	
1577	2.13	12.70	10.16		4	No	
1578	2.13	22.86	20.32		4	No	
1579	2.13	11.43	10.16		4	No	
1580	1.37	12.70	11.43		5	No	
1581	2.13	33.02	30.48		4	No	
1582	2.74	40.64	38.10		4	No	
1583	1.37	11.43	10.16		4	No	
1584	1.83	25.40	22.86		4	No	
1585	3.66	15.24	11.43		4	No	
1586	1.52	12.70	11.43		5	No	
1587	2.74	12.70	10.16		4	No	
1588	2.74	38.61	35.56		3	No	
1589	2.44	12.70	10.16		4	No	
1590	2.13	20.32	17.78		5	No	
1591	1.83	25.40	21.59		5	No	
1592	2.74	13.21	11.94		4	No	
1593	1.37	12.70	10.16		4	No	
1594	1.52	17.78	12.70		5	No	
1595	1.83	22.86	20.32		4	No	
1596	1.52	35.56	34.29		4	No	
1597	2.13	15.24	11.43		4	No	
1598	1.83	17.78	15.24		4	No	
1599	2.13	11.43	10.16		4	No	
1600	1.52	15.75	14.48		4	No	
1601	1.37	17.78	10.16		5	No	
1602	1.83	33.02	31.75		5	No	
1603	4.27	30.48	22.86		4	No	
1604	1.52	12.70	11.43		4	No	
1605	1.37	11.43	10.16		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1570	unknown	Upstream	180	No	Jam Associated	1
1571	unknown	Upstream	90	No	Jam Associated	1
1572	unknown	Upstream	0	No	Jam Associated	1
1573	unknown	Upstream	0	No	Jam Associated	1
1574	unknown	Upstream	0	No	Jam Associated	1
1575	unknown	Upstream	90	No	Jam Associated	1
1576	unknown	Upstream	90	No	Jam Associated	1
1577	unknown	Upstream	90	No	Jam Associated	1
1578	unknown	Upstream	180	No	Jam Associated	1
1579	unknown	Upstream	0	No	Jam Associated	1
1580	unknown	Upstream	180	No	Jam Associated	1
1581	unknown	Upstream	90	No	Jam Associated	1
1582	unknown	Upstream	0	No	Jam Associated	1
1583	unknown	Upstream	0	No	Jam Associated	1
1584	unknown	Upstream	180	No	Jam Associated	2
1585	unknown	Upstream	180	No	Jam Associated	2
1586	unknown	Upstream	180	No	Jam Associated	1
1587	unknown	Upstream	0	No	Jam Associated	1
1588	unknown	Upstream	180	No	Jam Associated	1
1589	unknown	Upstream	0	No	Jam Associated	1
1590	unknown	Upstream	0	No	Jam Associated	1
1591	unknown	Upstream	90	No	Jam Associated	2
1592	unknown	Upstream	0	No	Jam Associated	1
1593	unknown	Upstream	90	No	Jam Associated	1
1594	unknown	Upstream	180	No	Jam Associated	1
1595	unknown	Upstream	90	No	Jam Associated	1
1596	unknown	Upstream	90	No	Jam Associated	1
1597	unknown	Upstream	90	No	Jam Associated	1
1598	unknown	Upstream	90	No	Jam Associated	1
1599	unknown	Upstream	90	No	Jam Associated	1
1600	unknown	Upstream	180	No	Jam Associated	1
1601	unknown	Upstream	90	No	Jam Associated	1
1602	unknown	Upstream	90	No	Jam Associated	1
1603	unknown	Upstream	90	No	Jam Associated	1
1604	unknown	Upstream	90	No	Jam Associated	1
1605	unknown	Upstream	90	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1606	2.44	50.80	49.53	pecan	4	No	
1607	1.52	11.43	10.16		4	No	
1608	1.83	11.43	10.16		4	No	
1609	8.23	30.48	20.83		4	No	
1610	1.83	18.29	16.51		4	No	
1611	2.13	11.68	10.16		4	No	
1612	1.37	15.24	16.51		4	No	
1613	1.52	11.43	10.16		4	No	
1614	1.37	11.43	10.16		4	No	
1615	2.13	11.43	10.16		4	No	
1616	1.52	12.70	11.43		4	No	
1617	1.83	22.86	20.32		4	No	
1618	2.13	33.02	30.48		5	No	
1619	1.37	12.70	10.16		4	No	
1620	1.52	11.43	10.16		4	No	
1621	1.37	11.43	10.16		5	No	
1622	1.52	22.86	20.32		4	No	
1623	1.37	15.24	12.70		5	No	
1624	5.79	48.26	38.10		4	No	
1625	2.74	22.86	19.05		4	No	
1626	4.27	29.21	23.37		4	No	
1627	2.13	21.84	20.32		5	No	
1628	4.57	33.02	25.40		4	No	
1629	2.44	15.24	10.16		4	No	
1630	1.37	15.24	13.97		4	No	
1631	1.52	15.24	12.70		4	No	
1632	1.83	15.24	12.70		4	No	
1633	1.37	25.40	24.13		4	No	
1634	1.52	14.48	12.70		4	No	
1635	2.13	17.78	12.70		4	No	
1636	3.05	12.70	10.16		4	No	
1637	4.27	17.78	12.70		4	No	
1638	4.57	30.48	22.86		4	No	
1639	3.66	27.94	25.40		4	No	
1640	2.13	17.78	15.24		4	No	
1641	4.27	38.10	33.02		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1606	unknown	Upstream	0	No	Jam Associated	1
1607	unknown	Upstream	90	No	Jam Associated	1
1608	unknown	Upstream	90	No	Jam Associated	1
1609	unknown	Upstream	0	No	Jam Associated	1
1610	unknown	Upstream	180	No	Jam Associated	1
1611	unknown	Upstream	180	No	Jam Associated	1
1612	unknown	Upstream	180	No	Jam Associated	1
1613	unknown	Upstream	0	No	Jam Associated	1
1614	unknown	Upstream	0	No	Jam Associated	1
1615	unknown	Upstream	0	No	Jam Associated	1
1616	unknown	Upstream	180	No	Jam Associated	1
1617	unknown	Upstream	180	No	Jam Associated	1
1618	unknown	Upstream	0	No	Jam Associated	1
1619	unknown	Upstream	90	No	Jam Associated	1
1620	unknown	Upstream	0	No	Jam Associated	1
1621	unknown	Upstream	0	No	Jam Associated	1
1622	unknown	Upstream	90	No	Jam Associated	1
1623	unknown	Upstream	0	No	Jam Associated	1
1624	unknown	Upstream	180	No	Jam Associated	1
1625	unknown	Upstream	0	No	Jam Associated	1
1626	unknown	Upstream	90	No	Jam Associated	1
1627	unknown	Upstream	180	No	Jam Associated	1
1628	unknown	Upstream	0	No	Jam Associated	1
1629	unknown	Upstream	90	No	Jam Associated	1
1630	unknown	Upstream	90	No	Jam Associated	1
1631	unknown	Upstream	180	No	Jam Associated	1
1632	unknown	Upstream	180	No	Jam Associated	1
1633	unknown	Upstream	180	No	Jam Associated	1
1634	unknown	Upstream	90	No	Jam Associated	1
1635	unknown	Upstream	90	No	Jam Associated	1
1636	unknown	Upstream	0	No	Jam Associated	1
1637	unknown	Upstream	90	No	Jam Associated	1
1638	unknown	Upstream	180	No	Jam Associated	1
1639	unknown	Upstream	180	No	Jam Associated	1
1640	unknown	Upstream	180	No	Jam Associated	1
1641	unknown	Upstream	180	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1642	1.52	11.43	10.16		4	No	
1643	2.13	11.43	10.16		4	No	
1644	1.37	15.24	13.97		5	No	
1645	2.13	33.02	29.21		4	No	
1646	1.52	27.94	26.67	elm	3	No	
1647	2.44	35.56	27.94		4	No	
1648	1.83	17.78	15.24		4	No	
1649	1.37	11.43	10.16		4	No	
1650	1.52	11.43	10.16		4	No	
1651	1.83	20.32	17.78		5	No	
1652	3.05	12.70	10.16		4	No	
1653	1.83	17.78	15.24		4	No	
1654	1.52	22.86	17.78		4	No	
1655	2.74	53.34	50.80		4	No	
1656	1.52	11.43	10.16		4	No	
1657	1.52	11.43	10.16		4	No	
1658	1.83	11.43	10.16		4	No	
1659	1.83	11.43	10.16		4	No	
1660	1.37	11.43	10.16		4	No	
1661	1.37	11.43	10.16		4	No	
1662	2.13	11.43	10.16		4	No	
1663	1.52	11.43	10.16		4	No	
1664	1.83	11.43	10.16		4	No	
1665	1.52	11.43	10.16		4	No	
1666	2.74	45.72	43.18		4	No	
1667	1.52	15.24	12.70		4	No	
1668	4.57	22.86	17.78		4	No	
1669	5.49	30.48	25.40		4	No	
1670	5.79	55.88	45.72		4	No	
1671	2.74	15.24	11.43		5	No	
1672	4.27	30.48	25.40		5	No	
1673	3.35	71.12	53.34		4	No	
1674	2.13	30.48	25.40		4	No	
1675	1.52	15.24	20.32	elm	3	No	
1676	1.37	15.24	12.70		5	No	
1677	1.37	15.24	12.70		5	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1642	unknown	Upstream	90	No	Jam Associated	1
1643	unknown	Upstream	90	No	Jam Associated	1
1644	unknown	Upstream	0	No	Jam Associated	1
1645	unknown	Upstream	90	No	Jam Associated	1
1646	unknown	Upstream	0	No	Jam Associated	1
1647	unknown	Upstream	90	No	Jam Associated	1
1648	unknown	Upstream	180	No	Jam Associated	1
1649	unknown	Upstream	0	No	Jam Associated	1
1650	unknown	Upstream	90	No	Jam Associated	1
1651	unknown	Upstream	90	No	Jam Associated	1
1652	unknown	Upstream	180	No	Jam Associated	1
1653	unknown	Upstream	180	No	Jam Associated	1
1654	unknown	Upstream	180	No	Jam Associated	1
1655	unknown	Upstream	0	No	Jam Associated	1
1656	unknown	Upstream	0	No	Jam Associated	1
1657	unknown	Upstream	0	No	Jam Associated	1
1658	unknown	Upstream	0	No	Jam Associated	1
1659	unknown	Upstream	90	No	Jam Associated	1
1660	unknown	Upstream	90	No	Jam Associated	1
1661	unknown	Upstream	90	No	Jam Associated	1
1662	unknown	Upstream	90	No	Jam Associated	1
1663	unknown	Upstream	90	No	Jam Associated	1
1664	unknown	Upstream	180	No	Jam Associated	1
1665	unknown	Upstream	180	No	Jam Associated	1
1666	unknown	Upstream	90	No	Jam Associated	1
1667	unknown	Upstream	90	No	Jam Associated	1
1668	unknown	Upstream	0	No	Jam Associated	1
1669	unknown	Upstream	90	No	Jam Associated	1
1670	unknown	Upstream	0	No	Jam Associated	1
1671	unknown	Upstream	90	No	Jam Associated	1
1672	unknown	Upstream	180	No	Jam Associated	1
1673	unknown	Upstream	0	No	Jam Associated	1
1674	unknown	Upstream	180	No	Jam Associated	1
1675	unknown	Upstream	90	No	Jam Associated	1
1676	unknown	Upstream	90	No	Jam Associated	1
1677	unknown	Upstream	90	No	Jam Associated	1

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1678	1.37	15.24	12.70		5	No	
1679	2.44	12.70	10.16		4	No	
1680	2.74	15.24	20.32		5	No	
1681	4.57	25.40	20.32		4	No	
1682	5.49	27.94	20.32		4	No	
1683	1.37	25.40	20.32		5	No	
1684	1.83	11.43	10.16		5	No	
1685	1.52	11.43	10.16		4	No	
1686	3.35	15.24	10.16		4	No	
1687	1.37	11.43	10.16		4	No	
1688	1.37	11.43	10.16		4	No	
1689	1.37	11.43	10.16		4	No	
1690	1.37	11.43	10.16		4	No	
1691	2.44	66.04	60.96		5	No	
1692	1.37	15.24	12.70		5	No	
1693	1.37	15.24	12.70		5	No	
1694	1.37	15.24	12.70		5	No	
1695	1.37	15.24	12.70		5	No	
1696	1.37	25.40	20.32		4	No	main stem, branches are 1697-1698
1697	1.83	20.32	15.24				see 1696
1698	1.52	17.78	12.70				see 1696
1699	2.13	12.70	10.16	eastern redcedar	4	No	
1700	2.74	20.32	15.24	pecan	3	No	
1701	1.52	12.70	10.16		4	No	
1702	1.52	12.70	10.16		4	No	
1703	1.52	12.70	10.16		5	No	
1704	3.05	20.32	15.24		4	No	
1705	1.52	11.43	10.16		4	No	
1706	1.52	11.43	10.16		4	No	
1707	1.52	11.43	10.16		5	No	
1708	1.52	11.43	10.16		5	No	
1709	3.35	25.40	15.24		5	No	
1710	1.68	15.24	10.16	elm	3	No	
1711	3.66	30.48	25.40		4	No	
1712	2.44	25.40	20.32		5	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1678	unknown	Upstream	90	No	Jam Associated	1
1679	unknown	Upstream	180	No	Jam Associated	1
1680	unknown	Upstream	0	No	Jam Associated	1
1681	unknown	Upstream	0	No	Jam Associated	1
1682	unknown	Upstream	180	No	Jam Associated	1
1683	unknown	Upstream	0	No	Jam Associated	1
1684	unknown	Upstream	180	No	Jam Associated	1
1685	unknown	Upstream	180	No	Jam Associated	1
1686	unknown	Upstream	90	No	Jam Associated	1
1687	unknown	Upstream	90	No	Jam Associated	1
1688	unknown	Upstream	90	No	Jam Associated	1
1689	unknown	Upstream	90	No	Jam Associated	1
1690	unknown	Upstream	90	No	Jam Associated	1
1691	unknown	Upstream	0	No	Jam Associated	1
1692	unknown	Upstream	90	No	Jam Associated	1
1693	unknown	Upstream	90	No	Jam Associated	1
1694	unknown	Upstream	90	No	Jam Associated	1
1695	unknown	Upstream	90	No	Jam Associated	1
1696	unknown	Upstream	90	No	Jam Associated	1
1697						
1698						
1699	unknown	Upstream	90	No	Jam Associated	1
1700	unknown	Upstream	90	No	Jam Associated	1
1701	unknown	Upstream	90	No	Jam Associated	1
1702	unknown	Upstream	90	No	Jam Associated	1
1703	unknown	Upstream	90	No	Jam Associated	1
1704	unknown	Upstream	0	No	Jam Associated	1
1705	unknown	Upstream	90	No	Jam Associated	2
1706	unknown	Upstream	90	No	Jam Associated	2
1707	unknown	Upstream	90	No	Jam Associated	2
1708	unknown	Upstream	90	No	Jam Associated	2
1709	unknown	Upstream	0	No	Jam Associated	2
1710	unknown	Upstream	90	No	Jam Associated	2
1711	unknown	Upstream	90	No	Jam Associated	2
1712	unknown	Upstream	90	No	Jam Associated	2

Table A6. (Continued)

Log ID	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Degree of Decay	Branch Presence	Notes
1713	1.83	12.70	10.16		4	No	
1714	2.13	12.70	10.16		4	No	
1715	2.13	12.70	11.43		4	No	
1716	1.37	16.51	15.24		4	No	
1717	5.49	27.94	15.24		4	No	
1718	2.74	27.94	15.24		4	No	
1719	3.96	22.86	17.78		3	No	
1720	5.18	20.32	12.70		4	No	

Table A6. (Continued).

Log ID	Potential Source	Origin	Bank Orientation	Root Wad	Position	Stage Contact
1713	unknown	Upstream	90	No	Jam Associated	1
1714	unknown	Upstream	90	No	Jam Associated	1
1715	unknown	Upstream	90	No	Jam Associated	1
1716	unknown	Upstream	0	No	Jam Associated	1
1717	unknown	Upstream	90	No	Jam Associated	1
1718	unknown	Upstream	0	No	Jam Associated	1
1719	unknown	Upstream	180	No	Jam Associated	1
1720	unknown	Upstream	0	No	Jam Associated	1

Table A7. Instream large woody debris volume calculations for the Calaveras site using Smalian's log volume formula.

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
400	0.056	0.037	2.13	0.099	0.099	
401	0.053	0.041	4.27	0.200	0.200	
402	0.047	0.025	3.35	0.120	0.120	
403	0.018	0.010	4.27	0.061	0.061	
404	0.048	0.029	1.83	0.070	0.070	
405	1.167	0.811	4.88	4.824	4.824	
406	0.292	0.051	2.13	0.365	0.365	
407	0.061	0.041	2.74	0.140	0.140	
408	0.657	0.183	15.24	6.398	6.866	main stem
409	0.146	0.046	4.88	0.469		see 408
410	0.114	0.025	11.89	0.825	0.825	
411	0.041	0.018	9.14	0.271	0.271	
412	0.073	0.041	3.66	0.208	0.208	
413	0.087	0.041	8.53	0.546	0.546	
414	0.067	0.040	5.79	0.310	0.310	
415	0.014	0.008	1.83	0.020	0.020	
416	0.015	0.008	1.37	0.016	0.016	
417	0.029	0.021	2.13	0.053	0.053	
418	0.035	0.026	7.01	0.212	0.212	
419	0.018	0.012	4.27	0.063	0.063	
420	0.067	0.025	8.84	0.406	0.406	
421	0.035	0.017	8.23	0.214	0.214	
422	0.018	0.010	2.29	0.033	0.033	
423	0.095	0.054	7.01	0.522	0.522	
424	0.041	0.018	4.57	0.136	0.136	
425	0.051	0.032	5.18	0.215	0.215	
426	0.117	0.086	4.27	0.432	0.432	
427	0.020	0.008	1.37	0.019	0.019	
428	0.025	0.013	2.83	0.054	0.054	
429	0.045	0.031	4.57	0.173	0.173	
430	0.061	0.015	3.96	0.152	0.152	
431	0.051	0.023	2.44	0.090	0.090	
432	0.019	0.010	5.49	0.082	0.082	
433	0.047	0.015	3.35	0.104	0.193	main stem
434	0.047	0.018	2.74	0.089		see 433

Table A7. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
435	0.056	0.046	2.13	0.108	0.108	
436	0.041	0.029	3.05	0.106	0.106	
437	0.064	0.037	3.66	0.183	0.183	
438	0.021	0.010	2.13	0.034	0.034	
439	0.032	0.025	2.59	0.074	0.074	
440	0.086	0.046	3.96	0.260	0.260	
441	0.114	0.053	4.27	0.356	0.356	
442	0.015	0.010	1.37	0.018	0.018	
443	0.032	0.018	1.83	0.046	0.046	
444	0.657	0.175	22.56	9.383	9.383	
445	0.021	0.013	1.98	0.034	0.034	
446	0.102	0.026	5.49	0.352	0.428	main stem
447	0.026	0.012	3.96	0.076		see 446
448	0.130	0.107	1.37	0.162	0.162	
449	0.172	0.112	3.05	0.433	0.570	main stem
450	0.030	0.011	6.71	0.137		see 449
451	0.037	0.010	1.98	0.047	0.047	
452	0.073	0.044	1.83	0.107	0.107	
453	0.032	0.016	2.74	0.066	0.066	
454	0.056	0.043	3.35	0.166	0.166	
455	0.038	0.013	1.52	0.039	0.039	
456	0.120	0.086	4.27	0.439	0.439	
457	0.037	0.024	4.42	0.134	0.134	
458	0.056	0.051	1.52	0.081	0.081	
459	0.164	0.046	2.74	0.288	0.288	
460	0.061	0.025	2.74	0.118	0.118	
461	0.025	0.013	3.96	0.074	0.074	
462	0.114	0.061	3.35	0.294	0.294	
463	0.146	0.130	2.59	0.358	0.979	main stem
464	0.045	0.029	2.29	0.085		see 463
465	0.119	0.086	4.88	0.498		see 463
466	0.028	0.018	1.68	0.039		see 463
467	0.018	0.013	4.57	0.071	0.179	main stem
468	0.032	0.018	4.27	0.108		see 467
469	0.041	0.010	5.18	0.133	0.133	

Table A7. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
470	0.130	0.073	7.01	0.710	0.710	
471	0.025	0.008	1.83	0.030	0.030	
472	0.051	0.032	1.52	0.063	0.063	
473	0.044	0.015	2.29	0.068	0.068	
474	0.292	0.164	3.96	0.903	0.903	
475	0.130	0.029	13.72	1.085	1.085	
476	0.086	0.015	13.11	0.662	0.662	
477	0.067	0.037	2.90	0.150	0.150	
478	0.025	0.013	2.44	0.046	0.046	
479	0.021	0.013	1.83	0.031	0.031	
480	0.073	0.061	5.18	0.348	0.348	
481	0.025	0.018	2.13	0.046	0.046	
482	0.130	0.114	4.27	0.520	0.520	
483	0.061	0.021	4.11	0.170	0.170	
484	0.131	0.114	3.35	0.411	0.411	
485	0.017	0.008	3.35	0.042	0.042	
486	0.036	0.034	4.11	0.144	0.144	
487	0.021	0.008	1.83	0.027	0.027	
488	0.025	0.021	4.72	0.108	0.108	
489	0.032	0.016	1.52	0.037	0.037	
490	0.223	0.130	3.66	0.646	1.312	main stem
491	0.084	0.019	5.49	0.285		see 490
492	0.057	0.033	5.79	0.261		see 490
493	0.023	0.018	5.79	0.121		see 490
494	0.053	0.047	4.27	0.212	0.212	
495	0.043	0.013	4.27	0.120	0.120	
496	0.022	0.013	3.20	0.056	0.056	
497	0.083	0.062	4.51	0.328	0.328	
498	0.079	0.064	2.13	0.152	0.152	
499	0.018	0.009	4.42	0.060	0.060	
500	0.014	0.011	4.57	0.056	0.056	
501	0.062	0.049	1.37	0.076	0.076	
502	0.027	0.015	3.66	0.077	0.077	
503	0.059	0.032	3.66	0.166	0.166	
504	0.197	0.034	4.72	0.545	0.545	

Table A7. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
505	0.083	0.047	3.66	0.237	0.237	
506	0.094	0.052	3.05	0.222	0.222	
507	0.552	0.245	4.57	1.822	1.822	
508	0.152	0.087	3.05	0.364	0.625	main stem
509	0.077	0.046	1.98	0.121		see 508
510	0.099	0.066	1.37	0.113		see 508
511	0.013	0.008	2.59	0.027		see 508
512	0.038	0.026	1.68	0.054	0.054	
513	0.016	0.008	1.83	0.022	0.022	
514	0.022	0.021	2.44	0.053	0.053	
515	0.090	0.073	1.98	0.161	0.161	
516	0.143	0.125	3.81	0.510	0.510	
517	0.049	0.037	3.35	0.144	0.144	
518	0.141	0.066	5.49	0.568	0.568	
519	0.064	0.023	7.80	0.339	0.339	
520	0.053	0.019	7.01	0.251	0.251	
521	0.203	0.126	4.88	0.803	0.803	
522	0.016	0.013	1.83	0.026	0.026	
523	0.029	0.008	4.27	0.080	0.080	
524	0.020	0.016	3.35	0.060	0.060	
525	0.102	0.068	10.97	0.935	0.935	
526	0.102	0.053	7.01	0.543	0.543	
527	0.025	0.012	7.92	0.145	0.145	
528	0.148	0.109	3.05	0.393	0.393	
529	0.053	0.023	3.75	0.141	0.141	
530	0.010	0.008	1.58	0.014	0.014	
531	0.074	0.054	2.44	0.156	0.156	
532	0.131	0.105	4.42	0.522	0.522	
533	0.018	0.011	1.52	0.022	0.022	
534	0.064	0.057	2.59	0.156	0.156	
535	0.047	0.030	2.13	0.082	0.082	
536	0.025	0.011	1.37	0.024	0.024	
537	0.019	0.008	6.10	0.084	0.084	
538	0.015	0.009	1.83	0.021	0.021	

Table A7. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
539	0.263	0.259	1.37	0.358		see 543
540	0.811	0.397	3.54	2.136		see 543
541	0.487	0.397	3.66	1.617		see 543
542	0.183	0.177	3.05	0.549		see 543
543	1.167	0.732	3.35	3.184	7.843	main stem
544	0.011	0.008	1.83	0.018	0.018	
545	0.055	0.042	3.05	0.147	0.147	
546	0.101	0.060	1.25	0.101	0.101	
547	0.015	0.013	1.37	0.019	0.019	
548	0.420	0.146	3.05	0.864	0.864	
549	0.064	0.041	1.68	0.088	0.088	
550	0.026	0.015	3.66	0.076	0.076	
551	0.026	0.021	2.29	0.054	0.054	
552	0.028	0.028	1.98	0.055	0.055	
553	0.025	0.016	1.52	0.031	0.031	
554	0.140	0.117	1.37	0.176	0.176	
555	0.036	0.020	2.13	0.060	0.060	
556	0.046	0.032	1.37	0.054	0.054	
557	0.051	0.018	9.14	0.315	0.315	
558	0.061	0.035	4.27	0.205	0.205	
559	0.073	0.044	5.49	0.320	0.320	
560	0.126	0.114	3.05	0.367	0.367	
561	0.032	0.012	3.96	0.088	0.088	
562	0.032	0.008	3.35	0.068	0.068	
563	0.031	0.013	6.10	0.133	0.133	
564	0.032	0.015	7.62	0.182	0.182	
565	0.112	0.052	3.66	0.300	0.300	
566	0.230	0.038	4.27	0.572	0.572	
567	0.018	0.008	1.37	0.018	0.018	
568	0.026	0.015	2.44	0.050	0.050	
569	0.073	0.032	3.96	0.207	0.207	
570	0.041	0.008	4.27	0.105	0.105	
571	0.092	0.061	3.96	0.304	0.304	
572	0.015	0.008	7.62	0.087	0.087	
573	0.035	0.023	1.68	0.049	0.049	

Table A7. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
574	0.046	0.037	2.13	0.089	0.089	
575	0.015	0.008	1.83	0.021	0.021	
576	0.014	0.012	1.83	0.023	0.023	
577	0.268	0.073	9.75	1.663	1.663	
578	0.032	0.011	7.01	0.153	0.153	
579	0.215	0.057	11.28	1.534	1.534	
580	0.029	0.021	3.05	0.076	0.076	
581	0.062	0.023	10.67	0.458	0.458	
582	0.099	0.037	11.58	0.787	0.787	
583	0.105	0.055	3.66	0.292	0.292	
584	0.088	0.036	4.57	0.284	0.348	main stem
585	0.021	0.014	3.66	0.064		see 584
586	0.150	0.053	3.51	0.355	0.355	
587	0.013	0.008	2.44	0.026	0.026	
588	0.026	0.018	2.13	0.046	0.046	
589	0.026	0.016	2.44	0.051	0.051	
590	0.041	0.032	1.83	0.067	0.067	
591	0.018	0.015	1.52	0.026	0.026	
592	0.041	0.018	3.35	0.099	0.099	
593	0.197	0.082	3.35	0.467	0.467	
594	0.099	0.025	4.27	0.265	0.265	
595	0.138	0.123	6.10	0.796	0.796	
596	0.397	0.292	3.66	1.260	1.260	
597	0.030	0.021	2.44	0.063	0.063	
598	0.023	0.008	3.05	0.048	0.048	

Table A8. Instream large woody debris volume calculations for the Floresville site using Smalian's log volume formula.

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
2000	0.091	0.073	5.03	0.412	0.412	
2001	0.013	0.008	2.13	0.022	0.022	
2002	0.053	0.008	4.57	0.139	0.139	
2003	0.164	0.107	2.44	0.330	0.603	main stem
2004	0.035	0.019	2.74	0.075		see 2003
2005	0.052	0.041	3.05	0.141		see 2003
2006	0.021	0.013	3.35	0.057		see 2003
2007	0.026	0.013	4.88	0.093	0.093	
2008	0.329	0.292	2.44	0.758	0.758	
2009	0.183	0.130	3.05	0.476	0.476	
2010	0.061	0.021	4.27	0.176	0.176	
2011	0.029	0.021	1.83	0.046	0.046	
2012	0.164	0.114	5.18	0.721	0.721	
2013	0.037	0.023	1.52	0.046	0.046	
2014	0.173	0.073	6.71	0.826	0.826	
2015	0.245	0.164	3.66	0.749	0.930	main stem
2016	0.037	0.013	1.68	0.041	0.041	
2017	0.051	0.026	1.52	0.058	0.058	
2018	0.058	0.041	3.66	0.181		see 2015
2019	0.044	0.038	1.98	0.081	0.081	
2020	0.018	0.017	3.05	0.054	0.054	
2021	0.073	0.054	4.27	0.270	0.461	main stem
2022	0.051	0.018	3.05	0.105		see 2021
2023	0.061	0.051	1.52	0.085		see 2021
2024	0.012	0.009	1.37	0.014	0.014	
2025	0.013	0.008	1.37	0.014	0.014	
2026	0.030	0.018	3.35	0.081	0.081	
2027	0.032	0.008	1.37	0.028	0.028	
2028	0.073	0.037	2.74	0.150	0.150	
2029	0.011	0.008	1.52	0.015	0.015	
2030	0.042	0.023	2.13	0.069	0.069	
2031	0.079	0.051	2.13	0.139	0.139	
2032	0.114	0.086	6.71	0.669	0.669	

Table A8. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
2033	0.657	0.621	4.57	2.920	8.034	main stem
2034	0.183	0.032	10.67	1.149		see 2033
2035	0.369	0.343	4.57	1.627		see 2033
2036	0.173	0.114	3.35	0.482		see 2033
2037	0.285	0.280	1.52	0.430		see 2033
2038	0.153	0.130	2.44	0.345		see 2033
2039	0.172	0.073	8.84	1.081		see 2033
2040	0.026	0.009	1.83	0.032	0.032	
2041	0.099	0.018	7.62	0.448	0.448	
2042	0.033	0.018	2.13	0.055	0.055	
2043	0.025	0.019	2.74	0.060	0.060	
2044	0.018	0.008	1.83	0.024	0.024	
2045	0.011	0.057	3.35	0.114	0.114	
2046	0.020	0.014	2.13	0.037	0.037	
2047	0.029	0.013	3.66	0.075	0.075	
2048	0.010	0.008	1.83	0.017	0.017	
2049	0.022	0.012	3.05	0.052	0.052	
2050	0.051	0.037	1.83	0.080	0.080	
2051	0.010	0.008	1.52	0.014	0.014	
2052	0.018	0.013	2.13	0.033	0.033	
2053	0.086	0.061	3.66	0.269	0.269	
2054	0.122	0.080	2.74	0.277	0.277	
2055	0.032	0.026	1.83	0.053	0.053	
2056	0.114	0.111	3.05	0.343	0.343	
2057	0.146	0.114	1.83	0.238	0.238	
2058	0.026	0.018	2.74	0.061	0.061	
2059	0.032	0.025	3.05	0.087	0.087	
2060	0.046	0.011	4.27	0.121	0.121	
2061	0.041	0.013	4.88	0.131		see 2062
2062	0.095	0.047	4.27	0.303	0.434	main stem
2063	0.025	0.018	2.74	0.059	0.059	
2064	0.037	0.029	4.57	0.149	0.149	
2065	0.021	0.018	2.44	0.048	0.048	
2066	0.029	0.008	3.05	0.056	0.056	
2067	0.032	0.013	3.05	0.069	0.069	

Table A8. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
2068	0.039	0.013	5.79	0.152	0.152	
2069	0.061	0.041	1.37	0.070	0.070	
2070	0.041	0.025	1.52	0.050	0.050	
2071	0.051	0.008	4.57	0.134	0.134	
2072	0.032	0.022	3.05	0.083	0.083	
2073	0.292	0.268	7.32	2.048	2.048	
2074	0.046	0.037	5.49	0.226	0.226	
2075	0.223	0.146	1.98	0.366	0.608	main stem
2076	0.051	0.013	5.49	0.174		see 2075
2077	0.051	0.018	1.98	0.068		see 2075
2078	0.025	0.021	1.83	0.042	0.042	
2079	0.032	0.013	5.49	0.124	0.124	
2080	0.025	0.021	3.66	0.085	0.085	
2081	0.025	0.008	3.35	0.055	0.055	
2082	0.025	0.009	1.68	0.029	0.029	
2083	0.015	0.008	2.13	0.025	0.025	
2084	0.025	0.008	1.83	0.030	0.030	
2085	0.013	0.008	2.13	0.022	0.022	
2086	0.057	0.051	3.05	0.164	0.164	
2087	0.021	0.013	6.10	0.104	0.104	
2088	0.021	0.008	2.59	0.038	0.038	
2089	0.013	0.008	3.05	0.032	0.032	
2090	0.015	0.013	2.90	0.041	0.041	
2091	0.021	0.013	1.68	0.029	0.029	
2092	0.032	0.031	4.27	0.135	0.135	
2093	0.039	0.019	5.49	0.159	0.482	main stem
2094	0.067	0.029	6.71	0.323		see 2093
2095	0.011	0.008	5.49	0.053	0.053	
2096	0.013	0.012	4.57	0.056	0.056	
2097	0.021	0.020	3.66	0.075	0.075	
2098	0.025	0.023	3.35	0.081	0.081	
2099	0.086	0.041	3.35	0.212	0.212	

Table A8. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
2100	0.234	0.150	5.49	1.054	1.566	main stem
2101	0.074	0.066	1.83	0.128		see 2100
2102	0.044	0.026	2.74	0.095		see 2100
2103	0.021	0.021	4.88	0.104		see 2100
2104	0.055	0.020	1.37	0.051		see 2100
2105	0.041	0.010	5.18	0.133		see 2100
2106	0.026	0.019	3.05	0.070	0.070	
2107	0.061	0.008	7.62	0.264	0.264	
2108	0.078	0.073	2.44	0.184	0.184	
2109	0.046	0.029	3.96	0.147	0.147	
2110	0.041	0.021	2.13	0.067	0.067	
2111	0.073	0.067	4.42	0.309	0.309	
2112	0.037	0.028	3.66	0.119	0.119	
2113	0.130	0.086	4.27	0.459	0.579	main stem
2114	0.083	0.074	1.52	0.120		see 2113
2115	0.018	0.008	1.37	0.018	0.018	
2116	0.037	0.019	2.29	0.064	0.064	
2117	0.032	0.008	1.68	0.034	0.034	
2118	0.051	0.008	1.52	0.045	0.045	
2119	0.021	0.013	2.44	0.042	0.042	
2120	0.270	0.021	7.92	1.156	1.481	main stem
2121	0.028	0.018	5.49	0.126		see 2120
2122	0.038	0.008	8.53	0.198		see 2120
2123	0.016	0.010	2.90	0.037	0.037	
2124	0.021	0.014	3.66	0.065	0.065	
2125	0.675	0.456	4.57	2.586	2.586	
2126	0.011	0.008	3.35	0.032	0.032	
2127	0.114	0.019	7.32	0.488	0.488	
2128	0.099	0.041	3.05	0.214	0.214	
2129	0.051	0.041	6.10	0.280	0.280	
2130	0.051	0.044	7.62	0.360	0.360	
2131	0.035	0.018	1.83	0.049	0.049	
2132	0.061	0.041	2.44	0.125	0.125	
2133	0.032	0.025	1.52	0.044	0.044	
2134	0.018	0.014	1.37	0.022	0.022	

Table A8. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
2135	0.014	0.008	1.68	0.019	0.019	
2136	0.025	0.023	6.71	0.162	0.162	
2137	0.021	0.008	6.71	0.099	0.099	
2138	0.099	0.041	5.49	0.385	0.385	
2139	0.079	0.029	3.96	0.213	0.213	
2140	0.051	0.032	2.44	0.101	0.101	
2141	0.041	0.025	6.10	0.201	0.201	
2142	0.032	0.021	3.66	0.098	0.098	
2143	0.018	0.010	4.27	0.061	0.061	
2144	0.025	0.013	1.83	0.034	0.034	
2145	0.018	0.010	3.35	0.048	0.048	
2146	0.013	0.008	1.83	0.019	0.019	
2147	0.061	0.008	6.10	0.212	0.212	
2148	0.164	0.122	4.57	0.654	1.478	main stem
2149	0.055	0.051	1.83	0.096		see 2148
2150	0.023	0.013	1.52	0.027		see 2148
2151	0.041	0.038	2.29	0.091		see 2148
2152	0.038	0.021	2.74	0.082		see 2148
2153	0.013	0.008	1.37	0.014		see 2148
2154	0.099	0.061	4.57	0.367		see 2148
2155	0.032	0.018	3.96	0.100		see 2148
2156	0.035	0.032	1.37	0.046		see 2148
2157	0.029	0.008	5.18	0.097	0.097	
2158	0.033	0.022	2.13	0.059	0.059	
2159	0.245	0.087	5.64	0.937	0.937	
2160	0.042	0.025	3.05	0.102	0.102	
2161	0.013	0.009	1.83	0.020	0.020	
2162	0.064	0.052	3.96	0.228	0.372	main stem
2163	0.045	0.018	4.57	0.144		see 2162
2164	0.058	0.022	5.18	0.207	0.207	
2165	0.023	0.021	2.44	0.055	0.055	
2166	0.018	0.008	3.66	0.048	0.048	
2167	0.032	0.013	3.96	0.089	0.089	
2168	0.013	0.010	1.52	0.017	0.017	
2169	0.073	0.051	2.74	0.170	0.170	

Table A8. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
2170	0.223	0.183	4.88	0.991	1.608	main stem
2171	0.099	0.051	3.05	0.229		see 2170
2172	0.086	0.051	3.66	0.249		see 2170
2173	0.035	0.031	2.74	0.090		see 2170
2174	0.033	0.031	1.52	0.049		see 2170
2175	0.021	0.013	2.44	0.042	0.042	
2176	0.130	0.051	4.27	0.385	0.385	
2177	0.073	0.018	4.57	0.208	0.208	
2178	0.183	0.084	1.37	0.183	0.183	
2179	0.013	0.008	3.05	0.032	0.032	
2180	0.130	0.086	2.44	0.263	0.263	
2181	0.073	0.013	3.96	0.170	0.170	
2182	0.018	0.008	2.74	0.036	0.036	
2183	0.018	0.013	1.37	0.021	0.021	
2184	0.051	0.018	3.96	0.137	0.137	
2185	0.051	0.018	3.05	0.105	0.105	
2186	0.073	0.019	3.96	0.182	0.288	main stem
2187	0.061	0.008	3.05	0.106		see 2186
2188	0.123	0.054	2.90	0.256	0.256	
2189	0.172	0.074	2.90	0.356	0.356	
2190	0.172	0.075	2.59	0.320	0.320	
2191	0.230	0.153	3.05	0.584	0.831	main stem
2192	0.066	0.054	2.44	0.146		see 2191
2193	0.061	0.033	2.13	0.101		see 2191
2194	0.032	0.018	6.71	0.170	0.198	main stem
2195	0.013	0.008	2.74	0.028		see 2194
2196	0.013	0.008	4.88	0.051	0.051	
2197	0.013	0.010	2.44	0.028	0.028	
2198	0.073	0.025	6.10	0.298	0.298	
2199	0.164	0.130	3.35	0.493	0.493	
2200	0.053	0.037	4.27	0.192	0.370	main stem
2201	0.034	0.013	3.66	0.086		see 2200
2202	0.029	0.008	4.88	0.091		see 2200
2203	0.028	0.020	1.37	0.033	0.033	
2204	0.032	0.029	3.05	0.093	0.093	

Table A8. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
2205	0.114	0.086	2.44	0.243	0.243	
2206	0.080	0.065	4.27	0.310	0.310	
2207	0.046	0.032	5.18	0.202	0.202	
2208	0.013	0.010	3.05	0.036	0.036	
2209	0.018	0.008	2.90	0.038	0.038	
2210	0.032	0.009	2.74	0.056	0.056	
2211	0.037	0.009	2.74	0.064	0.064	
2212	0.018	0.008	2.13	0.028	0.028	
2213	0.056	0.037	6.10	0.282	0.282	
2214	0.018	0.009	3.96	0.053	0.053	
2215	0.051	0.032	1.83	0.076	0.076	
2216	0.025	0.022	1.98	0.046	0.046	
2217	0.102	0.058	3.66	0.293	0.586	main stem
2218	0.048	0.026	2.56	0.095		see 2217
2219	0.026	0.008	3.20	0.055		see 2217
2220	0.037	0.008	3.05	0.068		see 2217
2221	0.037	0.008	3.35	0.075		see 2217
2222	0.016	0.014	3.05	0.047	0.047	
2223	0.018	0.008	3.96	0.052	1.256	main stem
2224	0.329	0.133	4.57	1.057		see 2223
2225	0.062	0.025	3.35	0.146		see 2223
2226	0.088	0.073	3.96	0.319	0.319	
2227	0.022	0.013	3.35	0.058	0.058	
2228	0.021	0.013	1.52	0.025	0.025	
2229	0.061	0.021	2.74	0.113	0.113	
2230	0.026	0.018	4.27	0.093	0.093	
2231	0.026	0.018	3.81	0.083	0.083	
2232	0.018	0.032	3.05	0.077	0.077	
2233	0.245	0.164	5.49	1.123	1.123	
2234	0.041	0.025	3.66	0.120	0.120	
2235	0.013	0.008	2.13	0.022	0.022	

Table A9. Instream large woody debris volume calculations for the Falls City site using Smalian's log volume formula.

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
300	0.018	0.008	2.44	0.032	0.032	
301	0.061	0.046	3.35	0.179	0.179	
302	0.041	0.037	2.62	0.103	0.103	
303	0.034	0.021	2.44	0.067	0.067	
304	0.046	0.016	1.83	0.056	0.056	
305	0.013	0.008	3.35	0.035	0.035	
306	0.018	0.008	7.47	0.098	0.098	
307	0.025	0.032	4.27	0.122	0.122	
308	0.041	0.008	3.66	0.090	0.090	
309	0.021	0.013	2.13	0.036	0.036	
310	0.032	0.021	3.35	0.090	0.090	
311	0.032	0.018	3.05	0.077	0.077	
312	0.061	0.011	5.49	0.198	0.198	
313	0.073	0.010	4.27	0.178	0.178	
314	0.164	0.018	9.45	0.862	0.862	
315	0.032	0.010	3.96	0.085	0.085	
316	0.032	0.008	3.96	0.080	0.080	
317	0.018	0.008	1.52	0.020	0.020	
318	0.011	0.008	1.37	0.013	0.013	
319	0.015	0.009	1.37	0.017	0.017	
320	0.051	0.041	1.68	0.077	0.077	
321	0.025	0.013	2.74	0.051	0.051	
322	0.130	0.130	4.33	0.561	0.798	main stem
323	0.079	0.061	9.75	0.685	0.685	
324	0.046	0.025	6.71	0.237		see 322
325	0.021	0.009	3.66	0.055	0.055	
326	0.487	0.164	15.24	4.962	4.962	
327	0.032	0.018	2.99	0.076	0.076	
328	0.114	0.032	5.49	0.402	0.402	
329	0.099	0.041	3.66	0.257	0.257	
330	0.150	0.140	2.93	0.424	0.424	
331	0.429	0.203	15.15	4.785	4.785	
332	0.022	0.008	5.06	0.076	0.076	
333	0.022	0.015	2.59	0.048	0.048	

Table A9. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
334	0.114	0.065	8.35	0.746	0.979	main stem
335	0.074	0.022	5.58	0.268	0.268	
336	0.072	0.037	4.27	0.233		see 334
337	0.015	0.012	2.74	0.038	0.038	
338	0.022	0.008	6.68	0.101	0.101	
339	0.016	0.009	2.13	0.026	0.026	
340	0.019	0.013	1.52	0.024	0.024	
341	0.010	0.008	1.83	0.017	0.017	
342	0.018	0.008	1.37	0.018	0.018	
343	0.268	0.164	7.62	1.647	1.647	
344	0.130	0.073	3.66	0.371	0.371	
345	0.130	0.114	3.05	0.371	0.371	
346	0.086	0.032	6.10	0.360	0.360	
347	0.827	0.603	10.36	7.410	7.410	
348	0.170	0.099	9.02	1.213	1.213	
349	0.096	0.044	1.83	0.128	0.244	main stem
350	0.096	0.055	1.52	0.115		see 349
351	0.183	0.130	7.32	1.144	1.144	
352	0.203	0.183	2.13	0.411	0.411	
353	0.013	0.010	1.52	0.017	0.017	
354	0.223	0.130	12.19	2.153	2.153	
355	0.247	0.203	3.35	0.755		see 356
356	0.317	0.223	6.71	1.811	2.566	main stem
357	0.203	0.130	6.10	1.013	1.013	
358	0.061	0.043	10.67	0.556	0.556	
359	0.015	0.010	3.05	0.037	0.037	
360	0.203	0.130	3.35	0.557	0.557	
361	0.051	0.025	1.83	0.069	0.069	
362	0.032	0.025	2.13	0.061	0.061	

Table A10. Instream large woody debris volume calculations for the Charco site using Smalian's log volume formula.

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
600	0.141	0.092	4.88	0.570	0.570	
601	0.057	0.039	3.96	0.191	0.191	
602	0.018	0.013	1.52	0.024	0.024	
603	0.061	0.041	6.40	0.328	0.328	
604	0.164	0.067	9.14	1.057	1.154	main stem
605	0.015	0.013	4.27	0.060		see 604
606	0.029	0.013	1.83	0.038		see 604
607	0.051	0.018	6.40	0.221	0.221	
608	0.099	0.086	7.01	0.648	0.648	
609	0.098	0.051	5.18	0.385	0.385	
610	0.015	0.008	1.37	0.016	0.016	
611	0.066	0.025	3.96	0.180	0.180	
612	0.025	0.016	3.05	0.063	0.063	
613	0.183	0.130	4.88	0.762	1.059	main stem
614	0.061	0.041	5.79	0.296		see 613
615	0.099	0.087	1.52	0.142	0.142	
616	0.024	0.013	3.05	0.057	0.057	
617	0.050	0.041	1.37	0.062	0.062	
618	0.079	0.014	4.88	0.228	0.228	
619	0.175	0.067	4.27	0.517	0.517	
620	0.239	0.162	8.53	1.711	1.711	
621	0.098	0.091	1.37	0.130	0.130	
622	0.090	0.051	3.66	0.257	0.257	
623	0.107	0.019	6.40	0.401	0.401	
624	0.254	0.159	5.18	1.070	1.628	main stem
625	0.090	0.061	3.66	0.276		see 624
626	0.066	0.043	5.18	0.282		see 624
627	0.019	0.016	4.27	0.074	0.074	
628	0.073	0.046	4.88	0.289	0.289	
629	0.099	0.048	3.66	0.269	0.269	
630	0.059	0.045	3.35	0.174	0.174	
631	0.086	0.021	4.88	0.261	0.261	
632	0.080	0.036	3.05	0.177	0.177	
633	0.215	0.125	3.66	0.622	0.622	
634	0.025	0.008	1.37	0.023	0.023	

Table A10. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
635	0.015	0.009	2.13	0.025	0.025	
636	0.061	0.041	4.88	0.250	0.250	
637	0.037	0.019	1.83	0.052	0.052	
638	0.022	0.008	1.83	0.028	0.028	
639	0.041	0.026	1.37	0.046	0.046	
640	0.025	0.013	1.83	0.034	0.034	
641	0.104	0.018	2.13	0.130	0.130	
642	0.023	0.018	1.98	0.041	0.041	
643	0.088	0.033	1.37	0.083	0.083	
644	0.025	0.008	2.44	0.040	0.040	
645	0.026	0.024	1.37	0.035	0.035	
646	0.034	0.013	3.66	0.085	0.085	
647	0.053	0.041	1.37	0.064		see 648
648	0.092	0.047	2.74	0.191	0.255	main stem
649	0.046	0.022	3.05	0.103	0.103	
650	0.077	0.011	11.28	0.495	0.495	
651	0.052	0.023	6.71	0.252	0.252	
652	0.183	0.159	2.59	0.443	0.980	main stem
653	0.150	0.020	4.57	0.389		see 652
654	0.036	0.029	4.57	0.149		see 652
655	0.015	0.009	1.52	0.019	0.019	
656	0.130	0.061	6.71	0.640	0.802	main stem
657	0.051	0.025	4.27	0.161		see 656
658	0.026	0.018	1.83	0.041	0.041	
659	0.028	0.026	2.13	0.058	0.058	
660	0.077	0.045	3.66	0.222	0.222	
661	0.028	0.014	1.52	0.032	0.032	
662	0.082	0.045	3.66	0.231	0.231	
663	0.019	0.008	6.10	0.082	0.082	
664	0.033	0.027	1.83	0.055	0.055	
665	0.014	0.008	1.37	0.015	0.015	
666	0.223	0.140	3.35	0.609	0.632	main stem
667	0.017	0.011	1.68	0.024		see 666
668	0.091	0.035	7.32	0.460	0.460	
669	0.078	0.049	1.83	0.116	0.116	

Table A10. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
670	0.023	0.015	4.27	0.080	0.080	
671	0.017	0.013	2.13	0.032	0.032	
672	0.073	0.031	7.16	0.372	0.372	
673	0.136	0.057	1.68	0.162	0.162	
674	0.117	0.047	8.53	0.699	0.699	
675	0.017	0.011	1.83	0.025	0.025	
676	0.067	0.045	5.49	0.307	0.355	main stem
677	0.016	0.016	3.05	0.048		see 676
678	0.034	0.016	2.13	0.053	0.053	
679	0.019	0.013	4.27	0.069	0.069	
680	0.062	0.021	4.27	0.177	0.177	
681	0.114	0.090	1.52	0.155	0.373	main stem
682	0.044	0.018	3.05	0.095		see 681
683	0.037	0.030	3.66	0.123		see 681
684	0.011	0.008	2.13	0.020	0.020	
685	0.022	0.008	2.44	0.037	0.037	
686	0.039	0.019	4.57	0.134	0.134	
687	0.064	0.041	2.44	0.128	0.128	
688	0.058	0.039	2.13	0.104	0.104	
689	0.011	0.008	1.37	0.013	0.013	
690	0.029	0.011	4.42	0.088	0.088	
691	0.032	0.029	2.44	0.074	0.074	
692	0.126	0.088	3.05	0.327	0.327	
693	0.015	0.010	3.35	0.041	0.041	
694	0.029	0.011	2.13	0.043	0.043	
695	0.046	0.021	3.66	0.123	0.123	
696	0.052	0.051	1.37	0.070	0.070	
697	0.456	0.297	4.88	1.836	1.836	
698	0.046	0.037	1.52	0.063	0.063	
699	0.017	0.016	2.13	0.035	0.035	
700	0.120	0.104	1.52	0.171	0.171	
701	0.236	0.136	6.40	1.193	1.193	

Table A10. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
702	0.397	0.292	4.27	1.470	3.682	main stem
703	0.162	0.049	5.18	0.547		see 702
704	0.080	0.051	1.37	0.090		see 702
705	0.236	0.119	1.37	0.243		see 702
706	0.285	0.079	6.71	1.220		see 702
707	0.086	0.061	1.52	0.112		see 702
708	0.073	0.008	8.23	0.334	0.334	
709	0.029	0.013	3.66	0.075	0.075	
710	0.026	0.013	2.44	0.047	0.047	
711	0.033	0.029	1.52	0.048	0.048	
712	0.199	0.164	7.32	1.327	2.185	main stem
713	0.055	0.053	3.66	0.197		see 712
714	0.036	0.032	3.05	0.104		see 712
715	0.021	0.008	2.44	0.036		see 712
716	0.025	0.013	2.74	0.051		see 712
717	0.122	0.032	6.10	0.470		see 712
718	0.045	0.008	6.10	0.161	0.161	
719	0.034	0.019	3.05	0.082	0.082	
720	0.343	0.292	3.66	1.160	3.638	main stem
721	0.228	0.172	4.57	0.913		see 720
722	0.116	0.061	6.40	0.566		see 720
723	0.023	0.021	1.83	0.040		see 720
724	0.043	0.031	3.35	0.124		see 720
725	0.135	0.078	6.10	0.648		see 720
726	0.013	0.008	1.37	0.014		see 720
727	0.099	0.043	2.44	0.173		see 720
728	0.073	0.028	8.53	0.430	0.430	
729	0.183	0.122	2.44	0.371	0.371	
730	0.397	0.223	4.88	1.514	2.314	main stem
731	0.099	0.008	6.40	0.344		see 730
732	0.021	0.013	1.37	0.023		see 730
733	0.138	0.114	2.74	0.346		see 730
734	0.042	0.015	3.05	0.087		see 730

Table A10. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
735	0.153	0.150	1.83	0.277	0.872	main stem
736	0.037	0.018	5.18	0.144		see 735
737	0.090	0.088	1.52	0.136		see 735
738	0.054	0.038	3.66	0.168		see 735
739	0.041	0.039	1.83	0.073		see 735
740	0.015	0.013	1.52	0.021		see 735
741	0.021	0.013	3.05	0.052		see 735
742	0.065	0.040	1.52	0.080	0.080	
743	0.164	0.014	10.67	0.949	0.949	
744	1.167	0.937	3.05	3.207	12.896	main stem
745	0.586	0.292	9.14	4.012		see 744
746	0.203	0.008	9.14	0.964		see 744
747	0.130	0.008	7.32	0.504		see 744
748	0.213	0.133	6.40	1.107		see 744
749	0.572	0.397	3.35	1.625		see 744
750	0.168	0.153	4.27	0.685		see 744
751	0.157	0.133	3.05	0.442		see 744
752	0.136	0.119	2.74	0.350		see 744
753	0.243	0.136	9.14	1.734	2.410	main stem
754	0.018	0.010	3.35	0.046		see 753
755	0.059	0.014	7.32	0.268		see 753
756	0.082	0.017	7.32	0.361		see 753
757	0.025	0.021	4.57	0.106	0.106	
758	0.010	0.008	1.37	0.013	0.013	
759	0.029	0.015	1.37	0.030	0.030	
760	0.018	0.008	1.83	0.024	0.024	
761	0.027	0.025	1.83	0.047	0.047	
762	0.025	0.008	3.66	0.060	0.060	
763	0.029	0.019	2.74	0.066	0.066	
764	0.013	0.013	2.13	0.028	0.028	
765	0.073	0.035	5.49	0.296	0.296	
766	0.015	0.013	1.37	0.019	0.019	
767	0.014	0.010	2.74	0.032	0.032	
768	0.042	0.029	2.13	0.075	0.075	
769	0.021	0.013	1.83	0.031	0.031	

Table A10. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
770	0.013	0.008	1.37	0.014	0.014	
771	0.099	0.061	2.13	0.171	0.171	
772	0.029	0.018	1.37	0.033	0.033	
773	0.051	0.014	3.05	0.099	0.099	
774	0.013	0.010	1.37	0.016	0.016	
775	0.027	0.025	1.83	0.047	0.047	
776	0.021	0.008	2.13	0.031	0.031	
777	0.022	0.018	1.83	0.037	0.037	
778	0.013	0.008	2.44	0.025	0.025	
779	0.035	0.029	1.83	0.058	0.058	
780	0.014	0.008	2.44	0.027	0.027	
781	0.014	0.013	1.83	0.025	0.025	
782	0.028	0.016	2.74	0.060	0.060	
783	0.073	0.047	5.18	0.310	0.310	
784	0.130	0.092	4.57	0.508	0.508	
785	0.009	0.008	1.37	0.011	0.011	
786	0.130	0.061	7.92	0.757	0.757	
787	0.013	0.008	1.83	0.019	0.019	
788	0.048	0.018	2.74	0.090	0.090	
789	0.041	0.037	1.52	0.059	0.059	
790	0.036	0.019	4.57	0.126	0.126	
791	0.013	0.008	1.83	0.019	0.019	
792	0.021	0.018	4.27	0.085	0.085	
793	0.026	0.008	3.66	0.063	0.063	
794	0.015	0.008	3.66	0.043	0.043	
795	0.041	0.025	2.44	0.080	0.080	
796	0.130	0.067	4.57	0.450	0.450	
797	0.032	0.014	3.05	0.070	0.070	
798	0.164	0.138	1.83	0.276	0.276	
799	0.018	0.008	2.44	0.032	0.032	
800	0.019	0.015	2.44	0.042	0.042	
801	0.025	0.018	1.52	0.033	0.033	
802	0.019	0.013	2.13	0.034	0.034	
803	0.012	0.011	1.37	0.015	0.015	
804	0.055	0.032	4.27	0.184	0.184	

Table A10. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
805	0.047	0.025	4.27	0.153	0.153	
806	0.011	0.008	1.37	0.013	0.013	
807	0.041	0.010	1.37	0.035	0.035	
808	0.034	0.011	1.83	0.041	0.041	
809	0.025	0.021	1.52	0.035	0.035	
810	0.122	0.037	6.71	0.531	0.531	
811	0.017	0.008	4.27	0.054	0.054	
812	0.018	0.010	1.83	0.026	0.026	
813	0.086	0.022	4.57	0.246	0.246	
814	0.049	0.045	2.74	0.128	0.242	main stem
815	0.047	0.037	2.74	0.114		see 814
816	0.051	0.025	3.96	0.150	0.150	
817	0.183	0.051	6.71	0.783	0.783	
818	0.034	0.029	3.66	0.114	0.114	
819	0.046	0.043	2.44	0.108	0.108	
820	0.032	0.031	1.83	0.058	0.058	
821	0.013	0.008	4.88	0.051	0.051	
822	0.019	0.013	1.37	0.022	0.022	
823	0.025	0.021	1.37	0.032	0.032	
824	0.028	0.022	3.05	0.076	0.076	
825	0.029	0.020	1.52	0.038	0.038	
826	0.067	0.055	4.27	0.260	0.260	
827	0.018	0.016	1.83	0.031	0.031	
828	0.035	0.010	5.64	0.126	0.126	
829	0.049	0.041	2.74	0.123	0.123	
830	0.025	0.016	1.52	0.031	0.031	
831	0.317	0.193	5.49	1.397	2.265	main stem
832	0.078	0.037	4.57	0.264		see 831
833	0.130	0.114	2.13	0.260		see 831
834	0.048	0.037	3.66	0.154		see 831
835	0.055	0.041	3.96	0.190		see 831
836	0.025	0.018	3.05	0.066	0.066	
837	0.037	0.010	4.57	0.109	0.109	
838	0.119	0.034	5.18	0.396	0.396	
839	0.021	0.015	2.13	0.038	0.038	

Table A10. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
840	0.055	0.051	1.83	0.096	0.096	
841	0.029	0.018	2.74	0.065	0.065	
842	0.023	0.021	1.52	0.034	0.034	
843	0.019	0.013	1.52	0.024	0.024	
844	0.270	0.211	6.40	1.540	2.467	main stem
845	0.051	0.028	7.62	0.299		see 844
846	0.109	0.095	4.27	0.437		see 844
847	0.073	0.041	3.35	0.191		see 844
848	0.329	0.268	4.57	1.366	1.366	
849	0.209	0.179	2.74	0.532	0.972	main stem
850	0.092	0.080	2.13	0.184		see 849
851	0.067	0.045	4.57	0.256		see 849
852	0.029	0.021	2.74	0.068	0.068	
853	0.042	0.032	2.13	0.079	0.079	
854	0.032	0.023	1.52	0.042	0.042	
855	0.020	0.015	3.05	0.054	0.054	
856	0.073	0.061	1.37	0.092	0.092	
857	0.047	0.013	3.66	0.109	0.109	
858	0.032	0.028	2.44	0.072	0.072	
859	0.236	0.117	6.71	1.185	1.185	
860	0.027	0.013	4.57	0.091	0.091	
861	0.329	0.164	9.14	2.257	2.257	
862	0.067	0.061	3.35	0.215	0.215	
863	0.021	0.018	2.74	0.053	0.053	
864	0.079	0.008	9.14	0.399	0.399	
865	0.009	0.008	1.37	0.012	0.012	
866	0.020	0.009	1.83	0.026	0.026	
867	0.029	0.018	1.83	0.043	0.043	
868	0.032	0.029	2.13	0.065	0.065	
869	0.099	0.077	7.32	0.644	0.733	main stem
870	0.047	0.037	2.13	0.089		see 869
871	0.043	0.022	4.57	0.148	0.148	
872	0.077	0.037	3.05	0.173	0.173	
873	0.032	0.029	3.96	0.121	0.121	
874	0.074	0.041	1.83	0.105	0.105	

Table A10. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
875	0.114	0.061	2.74	0.240	0.240	
876	0.036	0.013	4.57	0.111	0.111	
877	0.013	0.013	1.83	0.023	0.023	
878	0.021	0.012	2.13	0.036	0.036	
879	0.018	0.011	3.66	0.054	0.054	
880	0.015	0.013	2.44	0.034	0.034	
881	0.099	0.092	2.13	0.204	0.204	
882	0.013	0.010	1.52	0.018	0.018	
883	0.657	0.343	9.14	4.568	4.568	
884	0.173	0.073	4.27	0.526	0.526	
885	0.018	0.013	2.74	0.042	0.042	
886	0.033	0.013	3.66	0.085	0.085	
887	0.032	0.010	3.05	0.065	0.065	
888	0.037	0.019	4.57	0.128	0.128	
889	0.015	0.008	3.96	0.046	0.046	
890	0.021	0.008	6.71	0.097	0.097	
891	0.099	0.092	3.05	0.292	0.292	
892	0.057	0.051	1.52	0.082	0.082	
893	0.073	0.056	6.10	0.393	0.506	main stem
894	0.023	0.008	3.66	0.056		see 893
895	0.025	0.013	3.05	0.057		see 893
896	0.079	0.034	3.66	0.207	0.207	
897	0.107	0.056	9.14	0.742	0.742	
898	0.046	0.013	3.96	0.116	0.116	
899	0.032	0.025	2.74	0.079	0.079	
900	0.164	0.146	2.74	0.426	0.426	
901	0.051	0.041	2.74	0.126	0.126	

Table A11. Instream large woody debris volume calculations for the Goliad site using Smalian's log volume formula.

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
100	0.252	0.155	9.60	1.955	1.955	
101	0.164	0.056	2.96	0.325	0.325	
102	0.183	0.114	5.70	0.846	0.846	
103	0.086	0.043	5.49	0.353	0.353	
104	0.013	0.008	3.66	0.038	0.038	
105	0.013	0.008	2.13	0.022	0.022	
106	0.015	0.008	4.57	0.054	0.054	
107	0.073	0.008	9.42	0.382	0.382	
108	0.051	0.008	8.99	0.264	0.264	
109	0.051	0.013	4.21	0.133	0.133	
110	0.021	0.008	4.08	0.060	0.060	
111	0.086	0.025	3.99	0.221	0.221	
112	0.027	0.008	2.23	0.039	0.039	
113	0.029	0.029	3.78	0.108	0.108	
114	0.164	0.017	6.07	0.550	0.550	
115	0.061	0.041	2.44	0.125	0.125	
116	0.010	0.008	3.93	0.036	0.036	
117	0.037	0.019	3.54	0.099	0.099	
118	0.015	0.009	1.74	0.021	0.021	
119	0.143	0.073	4.11	0.444	0.444	
120	0.088	0.032	4.72	0.285	0.285	
121	0.105	0.018	4.21	0.259	0.259	
122	0.123	0.105	2.59	0.296	0.296	
123	0.047	0.026	1.62	0.059	0.059	
124	0.036	0.014	2.90	0.072	0.072	
125	0.263	0.073	2.77	0.466	0.466	
126	0.059	0.018	3.35	0.130	0.130	
127	0.025	0.013	4.27	0.080	0.080	
128	0.795	0.105	19.20	8.638	8.638	
129	0.292	0.027	5.79	0.923	0.923	
130	0.018	0.005	4.27	0.049	0.049	
131	0.493	0.191	5.18	1.772	1.772	
132	0.164	0.099	7.32	0.964	0.964	
133	0.013	0.008	2.80	0.029	0.029	
134	0.012	0.008	2.90	0.029	0.029	

Table A11. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
135	0.236	0.047	13.23	1.873	1.873	
136	0.073	0.032	7.62	0.402	0.402	
137	0.025	0.008	4.88	0.080	0.080	
138	0.017	0.010	3.05	0.042	0.042	
139	0.041	0.025	4.88	0.161	0.161	
140	0.051	0.018	4.57	0.158	0.158	
141	0.128	0.086	6.71	0.717	0.717	
142	0.493	0.292	4.57	1.795	1.795	
143	0.032	0.018	2.13	0.054	0.054	
144	0.292	0.245	2.74	0.737	0.737	
145	0.041	0.025	2.13	0.070	0.070	
146	0.245	0.130	2.59	0.486	0.486	
147	0.026	0.026	2.44	0.064	0.064	
148	0.059	0.047	3.35	0.177	0.177	
149	0.059	0.026	2.13	0.091	0.091	
150	0.029	0.013	2.44	0.050	0.050	
151	0.047	0.026	3.66	0.133	0.133	
152	0.572	0.105	17.68	5.985	8.655	main stem
153	0.322	0.059	14.02	2.670		see 152
154	0.123	0.073	3.96	0.389	0.389	
155	0.088	0.047	5.49	0.370	0.370	
156	0.029	0.018	3.63	0.085	0.085	
157	0.019	0.019	2.47	0.047	0.047	
158	0.026	0.012	3.32	0.063	0.063	
159	0.236	0.073	2.44	0.377	0.377	
160	0.105	0.019	5.24	0.325	0.325	
161	0.047	0.019	3.05	0.101	0.101	
162	0.061	0.047	4.51	0.244	0.244	
163	0.088	0.018	3.11	0.166	0.166	
164	0.420	0.187	3.54	1.073	1.073	
165	0.013	0.008	4.27	0.044	0.044	
166	0.030	0.026	1.89	0.053	0.053	
167	0.059	0.047	2.83	0.150	0.150	
168	0.012	0.008	1.83	0.018	0.018	
169	0.073	0.036	4.88	0.265	0.265	

Table A11. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
170	0.018	0.013	3.96	0.061	0.061	
171	0.051	0.018	5.03	0.173	0.173	
172	0.143	0.059	3.08	0.311	0.311	
173	0.073	0.047	5.58	0.334	0.334	
174	0.114	0.094	8.63	0.896	0.896	
175	0.047	0.030	2.74	0.105	0.105	
176	0.143	0.088	10.67	1.234	1.234	
177	0.059	0.018	2.56	0.099	0.099	
178	0.088	0.059	1.77	0.130	0.130	
179	0.073	0.047	2.74	0.164	0.164	
180	0.088	0.026	6.10	0.349	0.349	
181	0.033	0.026	2.44	0.073	0.073	
182	0.049	0.029	5.94	0.229	0.229	
183	0.019	0.017	1.89	0.034	0.034	
184	0.041	0.008	4.66	0.115	0.115	
185	0.041	0.012	2.74	0.072	0.072	
186	0.657	0.164	7.92	3.253	3.253	
187	0.025	0.008	4.27	0.070	0.070	
188	0.025	0.013	3.35	0.063	0.063	
189	0.059	0.037	8.32	0.402	0.402	
190	0.164	0.008	6.58	0.567	0.567	
191	0.203	0.099	3.66	0.552	0.552	
192	0.353	0.322	5.76	1.944	1.944	
193	0.292	0.098	7.32	1.426	1.426	
194	0.532	0.026	13.11	3.658	3.658	
195	0.032	0.010	2.74	0.059	0.059	
196	0.018	0.013	1.52	0.024	0.024	
197	0.043	0.008	3.81	0.097	0.097	
198	0.032	0.018	1.68	0.042	0.042	
199	0.532	0.041	10.67	3.056	3.056	
200	0.032	0.010	4.11	0.088	0.088	
201	0.263	0.123	5.94	1.149	1.149	
202	0.245	0.203	2.65	0.594	0.594	
203	0.086	0.041	2.59	0.164	0.164	
204	0.032	0.008	3.05	0.062	0.062	

Table A11. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
205	0.073	0.051	2.29	0.141	0.141	
206	0.026	0.008	2.07	0.036	0.036	
207	0.059	0.011	2.99	0.105	0.105	
208	0.099	0.078	3.35	0.297	0.297	
209	0.018	0.008	1.37	0.018	0.018	
210	0.032	0.008	2.04	0.041	0.041	
211	0.051	0.018	4.27	0.147	0.147	
212	0.018	0.008	1.83	0.024	0.024	
213	0.032	0.018	3.66	0.093	0.093	
214	0.051	0.032	6.10	0.253	0.253	
215	0.073	0.018	6.10	0.278	0.278	
216	0.047	0.036	3.05	0.126	0.126	
217	0.059	0.047	2.13	0.113	0.113	
218	0.456	0.245	5.33	1.870	1.870	
219	0.292	0.026	11.83	1.877	1.877	
220	0.203	0.130	15.36	2.553	2.553	
221	0.164	0.099	5.46	0.719	0.719	
222	0.032	0.010	5.79	0.124	0.124	
223	0.086	0.051	4.02	0.274	0.274	
224	0.051	0.021	3.26	0.118	0.118	
225	0.067	0.013	2.23	0.089	0.089	
226	0.073	0.025	5.49	0.268	0.268	
227	0.138	0.092	3.51	0.404	0.404	
228	0.114	0.114	2.44	0.278	0.278	
229	0.036	0.008	4.27	0.094	0.094	
230	0.114	0.052	6.40	0.530	0.530	
231	0.095	0.067	4.27	0.346	0.346	
232	0.025	0.018	4.33	0.093	0.093	
233	0.164	0.130	9.14	1.344		see 235
234	0.069	0.020	7.92	0.355		see 235
235	0.657	0.397	15.85	8.352	10.051	main stem
236	0.519	0.343	8.23	3.544	3.544	
237	0.164	0.073	5.49	0.651	0.942	main stem
238	0.130	0.061	3.05	0.291		see 237
239	0.083	0.009	3.96	0.183	0.183	

Table A11. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
240	0.032	0.011	7.92	0.173	0.173	
241	0.119	0.012	6.40	0.417	0.417	
242	0.456	0.077	12.80	3.410	3.410	
243	0.032	0.021	1.37	0.037	0.037	
244	0.010	0.009	1.43	0.013	0.013	
245	0.016	0.014	2.93	0.044	0.044	
246	0.114	0.065	5.18	0.463	0.463	
247	0.054	0.013	2.80	0.093	0.093	
248	0.183	0.146	1.71	0.281	0.281	
249	0.027	0.013	1.68	0.033	0.033	
250	0.079	0.037	5.03	0.291	0.291	
251	0.056	0.025	2.74	0.111	0.111	
252	0.025	0.018	1.37	0.030	0.030	
253	0.018	0.013	1.37	0.021	0.021	
240	0.032	0.011	7.92	0.173	0.173	
241	0.119	0.012	6.40	0.417	0.417	
242	0.456	0.077	12.80	3.410	3.410	
243	0.032	0.021	1.37	0.037	0.037	
244	0.010	0.009	1.43	0.013	0.013	
245	0.016	0.014	2.93	0.044	0.044	
246	0.114	0.065	5.18	0.463	0.463	
247	0.054	0.013	2.80	0.093	0.093	
248	0.183	0.146	1.71	0.281	0.281	
249	0.027	0.013	1.68	0.033	0.033	
250	0.079	0.037	5.03	0.291	0.291	
251	0.056	0.025	2.74	0.111	0.111	
252	0.025	0.018	1.37	0.030	0.030	
253	0.018	0.013	1.37	0.021	0.021	

Table A12. Instream large woody debris volume calculations for the McFaddin site using Smalian's log volume formula.

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1000	0.082	0.037	4.88	0.289	0.289	
1001	0.033	0.019	3.66	0.096	0.096	
1002	0.080	0.061	4.27	0.302	0.302	
1003	0.078	0.051	7.62	0.490	0.490	
1004	0.037	0.025	2.74	0.085	0.085	
1005	0.166	0.123	4.27	0.617	0.617	
1006	0.029	0.025	1.37	0.037	0.037	
1007	0.025	0.018	1.83	0.039	0.039	
1008	0.041	0.037	1.52	0.059	0.059	
1009	0.046	0.041	1.37	0.060	0.060	
1010	0.025	0.018	2.44	0.053	0.053	
1011	0.018	0.013	1.52	0.024	0.024	
1012	0.073	0.061	2.13	0.143	0.143	
1013	0.092	0.073	1.83	0.151	0.151	
1014	0.203	0.099	4.88	0.736	0.736	
1015	0.213	0.086	5.18	0.774	0.774	
1016	0.022	0.015	1.83	0.034	0.034	
1017	0.013	0.010	1.83	0.021	0.021	
1018	0.032	0.015	3.96	0.095	0.095	
1019	0.079	0.073	1.37	0.104	0.104	
1020	0.088	0.037	4.27	0.268	0.268	
1021	0.051	0.032	3.05	0.127	0.127	
1022	0.061	0.051	3.05	0.171	0.171	
1023	0.041	0.025	4.57	0.151	0.151	
1024	0.099	0.073	3.66	0.315	0.315	
1025	0.061	0.041	2.74	0.140	0.140	
1026	0.099	0.086	1.83	0.169	0.169	
1027	0.021	0.008	2.44	0.035	0.035	
1028	0.032	0.015	2.44	0.058	0.058	
1029	0.025	0.014	4.27	0.083	0.083	
1030	0.058	0.056	3.05	0.174	0.174	
1031	0.010	0.008	1.83	0.017	0.017	
1032	0.015	0.011	1.52	0.020	0.020	
1033	0.051	0.041	1.52	0.070	0.070	
1034	0.082	0.073	1.83	0.141	0.141	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1035	0.369	0.317	3.66	1.255	1.255	
1036	0.032	0.019	3.35	0.086	0.086	
1037	0.203	0.130	6.71	1.114	1.114	
1038	0.036	0.018	4.27	0.115	0.115	
1039	0.099	0.061	4.57	0.367	0.367	
1040	0.077	0.057	6.71	0.448	0.448	
1041	0.013	0.010	1.37	0.016	0.016	
1042	0.033	0.025	1.37	0.040	0.040	
1043	0.051	0.015	2.44	0.080	0.080	
1044	0.032	0.018	1.37	0.035	0.035	
1045	0.041	0.025	1.83	0.060	0.060	
1046	0.099	0.073	3.66	0.315	0.315	
1047	0.013	0.008	1.68	0.017	0.017	
1048	0.010	0.008	3.05	0.028	0.028	
1049	0.013	0.008	4.57	0.047	0.047	
1050	0.023	0.023	1.37	0.031	0.031	
1051	0.277	0.114	4.88	0.955	0.955	
1052	0.022	0.014	2.13	0.039	0.039	
1053	0.011	0.010	1.52	0.016	0.016	
1054	0.035	0.021	4.27	0.119	0.119	
1055	0.021	0.019	1.52	0.031	0.031	
1056	0.019	0.014	2.13	0.035	0.035	
1057	0.173	0.136	3.66	0.566	0.566	
1058	0.026	0.013	2.74	0.052	0.052	
1059	0.027	0.022	1.52	0.037	0.037	
1060	0.010	0.008	2.74	0.025	0.025	
1061	0.032	0.025	1.37	0.039	0.039	
1062	0.252	0.203	3.35	0.762	0.762	
1063	0.074	0.030	4.88	0.254	0.254	
1064	0.099	0.041	3.96	0.278	0.278	
1065	0.086	0.077	2.44	0.198	0.198	
1066	0.146	0.051	4.88	0.481	0.481	
1067	0.021	0.013	2.13	0.036	0.036	
1068	0.010	0.008	1.52	0.014	0.014	
1069	0.011	0.008	2.74	0.026	0.026	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1070	0.011	0.009	1.37	0.013	0.013	
1071	0.018	0.013	3.96	0.060	0.060	
1072	0.086	0.061	3.66	0.269	0.269	
1073	0.183	0.066	6.10	0.758	0.758	
1074	0.014	0.009	1.83	0.021	0.021	
1075	0.114	0.068	2.44	0.222	0.222	
1076	0.133	0.061	9.14	0.888	0.888	
1077	0.010	0.008	4.27	0.039	0.039	
1078	0.016	0.008	1.83	0.022	0.022	
1079	0.013	0.008	1.37	0.014	0.014	
1080	0.008	0.008	1.37	0.011	0.011	
1081	0.024	0.012	2.13	0.038	0.038	
1082	0.016	0.008	1.37	0.016	0.016	
1083	0.025	0.010	1.83	0.032	0.032	
1084	0.013	0.010	1.52	0.017	0.017	
1085	0.032	0.018	2.44	0.062	0.062	
1086	0.021	0.013	3.35	0.057	0.057	
1087	0.020	0.014	2.74	0.046	0.046	
1088	0.030	0.009	1.83	0.036	0.036	
1089	0.050	0.039	2.44	0.108	0.108	
1090	0.023	0.013	1.37	0.024	0.024	
1091	0.010	0.008	1.37	0.013	0.013	
1092	0.051	0.032	2.44	0.101	0.101	
1093	0.102	0.077	4.88	0.436	0.436	
1094	0.038	0.032	2.13	0.076	0.076	
1095	0.061	0.051	1.37	0.077	0.077	
1096	0.018	0.013	1.37	0.021	0.021	
1097	0.025	0.008	1.83	0.030	0.030	
1098	0.018	0.010	1.37	0.019	0.019	
1099	0.034	0.018	1.83	0.048	0.048	
1100	0.045	0.029	2.13	0.078	0.078	
1101	0.025	0.023	1.37	0.033	0.033	
1102	0.010	0.008	6.10	0.056	0.056	
1103	0.010	0.008	5.49	0.050	0.050	
1104	0.010	0.008	5.18	0.048	0.048	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1105	0.010	0.008	4.27	0.039	0.039	
1106	0.146	0.114	2.74	0.357	0.357	
1107	0.025	0.018	1.52	0.033	0.033	
1108	0.086	0.061	3.05	0.224	0.224	
1109	0.041	0.029	2.74	0.095	0.095	
1110	0.029	0.025	1.83	0.049	0.049	
1111	0.025	0.018	3.66	0.079	0.079	
1112	0.075	0.067	1.37	0.098	0.098	
1113	0.041	0.032	3.35	0.123	0.123	
1114	0.245	0.223	3.05	0.714	0.714	
1115	0.051	0.025	2.74	0.104	0.104	
1116	0.173	0.130	3.05	0.462	0.462	
1117	0.010	0.008	1.83	0.017	0.017	
1118	0.010	0.008	2.13	0.020	0.020	
1119	0.010	0.008	1.37	0.013	0.013	
1120	0.010	0.008	1.83	0.017	0.017	
1121	0.010	0.008	1.52	0.014	0.014	
1122	0.010	0.008	2.74	0.025	0.025	
1123	0.010	0.008	1.37	0.013	0.013	
1124	0.010	0.008	1.52	0.014	0.014	
1125	0.010	0.008	2.44	0.022	0.022	
1126	0.010	0.008	1.37	0.013	0.013	
1127	0.041	0.032	1.37	0.050	0.050	
1128	0.025	0.018	1.52	0.033	0.033	
1129	0.021	0.008	3.66	0.054	0.054	
1130	0.018	0.013	1.52	0.024	0.024	
1131	0.041	0.008	6.40	0.157	0.157	
1132	0.061	0.056	1.37	0.080	0.080	
1133	0.018	0.015	2.13	0.035	0.035	
1134	0.155	0.053	4.27	0.444	0.444	
1135	0.078	0.061	5.49	0.382	0.382	
1136	0.021	0.008	1.83	0.027	0.027	
1137	0.041	0.025	1.37	0.045	0.045	
1138	0.025	0.008	4.27	0.070	0.070	
1139	0.043	0.028	3.05	0.108	0.108	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1140	0.008	0.018	1.37	0.018	0.018	
1141	0.036	0.032	1.37	0.047	0.047	
1142	0.025	0.013	2.74	0.051	0.051	
1143	0.051	0.032	3.05	0.127	0.127	
1144	0.037	0.013	3.05	0.075	0.075	
1145	0.257	0.223	3.81	0.914	0.914	
1146	0.029	0.021	1.83	0.046	0.046	
1147	0.047	0.034	2.13	0.086	0.086	
1148	0.111	0.073	2.44	0.224	0.224	
1149	0.090	0.044	3.05	0.203	0.203	
1150	0.051	0.032	2.44	0.101	0.101	
1151	0.029	0.018	2.13	0.050	0.050	
1152	0.075	0.023	9.75	0.479	0.479	
1153	0.037	0.018	2.13	0.059	0.059	
1154	0.034	0.008	2.44	0.051	0.051	
1155	0.040	0.026	3.05	0.101	0.101	
1156	0.021	0.013	2.13	0.036	0.036	
1157	0.010	0.008	1.37	0.013	0.013	
1158	0.051	0.061	1.83	0.102	0.102	
1159	0.015	0.013	1.37	0.019	0.019	
1160	0.099	0.046	1.83	0.133	0.133	
1161	0.010	0.008	3.05	0.028	0.028	
1162	0.369	0.203	3.05	0.872	0.872	
1163	0.083	0.018	7.92	0.401	0.401	
1164	0.079	0.041	1.83	0.110	0.110	
1165	0.053	0.032	4.27	0.182	0.182	
1166	0.021	0.013	1.83	0.031	0.031	
1167	0.029	0.018	2.44	0.057	0.057	
1168	0.044	0.025	2.44	0.084	0.084	
1169	0.203	0.130	4.88	0.811	0.811	
1170	0.032	0.021	6.10	0.164	0.164	
1171	0.018	0.013	1.83	0.028	0.028	
1172	0.183	0.056	7.32	0.873	0.873	
1173	0.078	0.061	1.83	0.127	0.127	
1174	0.030	0.010	6.10	0.123	0.123	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1175	0.013	0.010	2.13	0.024	0.024	
1176	0.013	0.008	2.44	0.026	0.026	
1177	0.037	0.025	1.83	0.056	0.056	
1178	0.099	0.086	1.37	0.127	0.127	
1179	0.032	0.026	3.05	0.089	0.089	
1180	0.018	0.010	1.83	0.026	0.026	
1181	0.029	0.015	3.96	0.087	0.087	
1182	0.051	0.032	3.66	0.152	0.152	
1183	0.057	0.026	1.83	0.076	0.076	
1184	0.083	0.028	1.83	0.101	0.101	
1185	0.025	0.018	1.52	0.033	0.033	
1186	0.011	0.008	3.05	0.029	0.029	
1187	0.034	0.032	1.37	0.046	0.046	
1188	0.236	0.203	1.83	0.402	0.402	
1189	0.094	0.071	6.10	0.501	0.501	
1190	0.075	0.053	2.44	0.156	0.156	
1191	0.036	0.032	1.37	0.047	0.047	
1192	0.041	0.032	2.44	0.090	0.090	
1193	0.054	0.032	3.96	0.171	0.171	
1194	0.049	0.032	2.13	0.087	0.087	
1195	0.013	0.008	2.44	0.025	0.025	
1196	0.032	0.018	2.74	0.069	0.069	
1197	0.056	0.051	2.13	0.114	0.114	
1198	0.041	0.025	3.35	0.110	0.110	
1199	0.018	0.013	2.13	0.033	0.033	
1200	0.051	0.041	1.52	0.070	0.070	
1201	0.073	0.051	4.27	0.264	0.264	
1202	0.183	0.138	5.49	0.880	0.880	
1203	0.021	0.016	1.37	0.026	0.026	
1204	0.018	0.008	5.18	0.067	0.067	
1205	0.073	0.041	4.27	0.243	0.243	
1206	0.013	0.010	1.52	0.017	0.017	
1207	0.073	0.061	1.83	0.123	0.123	
1208	0.164	0.130	3.96	0.582	0.582	
1209	0.010	0.008	1.83	0.017	0.017	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1210	0.010	0.008	1.52	0.014	0.014	
1211	0.010	0.008	1.83	0.017	0.017	
1212	0.164	0.146	1.52	0.237	0.237	
1213	0.051	0.024	4.57	0.171	0.171	
1214	0.013	0.008	1.52	0.016	0.016	
1215	0.018	0.013	2.13	0.033	0.033	
1216	0.041	0.037	1.37	0.053	0.053	
1217	0.025	0.013	2.74	0.051	0.051	
1218	0.073	0.025	3.05	0.149	0.149	
1219	0.061	0.032	3.05	0.143	0.143	
1220	0.056	0.041	2.74	0.133	0.133	
1221	0.019	0.010	2.44	0.036	0.036	
1222	0.010	0.008	1.52	0.014	0.014	
1223	0.078	0.073	1.37	0.103	0.103	
1224	0.043	0.073	5.79	0.335	0.335	
1225	0.099	0.061	6.71	0.539	0.539	
1226	0.010	0.008	1.37	0.013	0.013	
1227	0.015	0.008	1.52	0.017	0.017	
1228	0.034	0.025	1.52	0.045	0.045	
1229	0.032	0.026	2.74	0.080	0.080	
1230	0.023	0.018	1.37	0.028	0.028	
1231	0.013	0.008	2.74	0.028	0.028	
1232	0.035	0.018	5.18	0.138	0.138	
1233	0.043	0.021	3.66	0.118	0.118	
1234	0.016	0.015	1.83	0.029	0.029	
1235	0.051	0.032	3.35	0.139	0.139	
1236	0.013	0.010	2.13	0.024	0.024	
1237	0.010	0.008	1.83	0.017	0.017	
1238	0.015	0.010	2.74	0.035	0.035	
1239	0.114	0.099	1.83	0.195	0.195	
1240	0.043	0.025	1.83	0.062	0.062	
1241	0.013	0.010	2.13	0.024	0.024	
1242	0.032	0.013	5.79	0.131	0.131	
1243	0.012	0.009	3.35	0.035	0.035	
1244	0.183	0.114	2.74	0.407	0.407	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1245	0.061	0.034	2.44	0.116	0.116	
1246	0.018	0.013	1.37	0.021	0.021	
1247	0.073	0.051	2.13	0.132	0.132	
1248	0.078	0.049	6.10	0.386	0.386	
1249	0.099	0.032	6.40	0.422	0.422	
1250	0.023	0.019	1.83	0.039	0.039	
1251	0.060	0.042	3.35	0.171	0.171	
1252	0.019	0.009	2.74	0.038	0.038	
1253	0.022	0.013	2.44	0.042	0.042	
1254	0.032	0.026	1.83	0.054	0.054	
1255	0.014	0.008	2.13	0.023	0.023	
1256	0.019	0.013	2.74	0.044	0.044	
1257	0.057	0.041	4.88	0.239	0.239	
1258	0.096	0.018	6.71	0.383	0.383	
1259	0.041	0.019	4.27	0.129	0.129	
1260	0.086	0.045	3.05	0.199	0.199	
1261	0.369	0.292	2.74	0.907	0.907	
1262	0.203	0.075	2.44	0.339	0.339	
1263	0.047	0.032	6.40	0.253	0.253	
1264	0.043	0.031	3.96	0.146	0.146	
1265	0.060	0.031	5.18	0.236	0.236	
1266	0.025	0.018	2.13	0.046	0.046	
1267	0.051	0.025	1.37	0.052	0.052	
1268	0.343	0.292	1.83	0.580	0.580	
1269	0.061	0.018	5.79	0.230	0.230	
1270	0.010	0.008	1.37	0.013	0.013	
1271	0.010	0.008	1.37	0.013	0.013	
1272	0.010	0.008	1.37	0.013	0.013	
1273	0.010	0.008	1.37	0.013	0.013	
1274	0.026	0.013	1.37	0.027	0.027	
1275	0.016	0.008	1.83	0.022	0.022	
1276	0.037	0.027	2.13	0.068	0.068	
1277	0.010	0.008	1.37	0.013	0.013	
1278	0.010	0.008	1.37	0.013	0.013	
1279	0.010	0.008	1.37	0.013	0.013	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1280	0.079	0.052	2.13	0.140	0.140	
1281	0.029	0.013	2.74	0.056	0.056	
1282	0.114	0.032	4.27	0.312	0.312	
1283	0.114	0.051	3.66	0.301	0.301	
1284	0.073	0.051	1.37	0.085	0.085	
1285	0.019	0.014	3.05	0.051	0.051	
1286	0.010	0.008	1.37	0.013	0.013	
1287	0.036	0.035	1.52	0.054	0.054	
1288	0.034	0.013	1.37	0.032	0.032	
1289	0.052	0.045	1.37	0.066	0.066	
1290	0.021	0.013	1.83	0.031	0.031	
1291	0.010	0.008	1.52	0.014	0.014	
1292	0.092	0.083	2.13	0.187	0.187	
1293	0.015	0.008	1.83	0.021	0.021	
1294	0.038	0.025	3.35	0.106	0.106	
1295	0.021	0.012	1.83	0.030	0.030	
1296	0.041	0.025	1.52	0.050	0.050	
1297	0.042	0.017	3.66	0.108	0.108	
1298	0.029	0.008	2.44	0.045	0.045	
1299	0.032	0.021	3.05	0.082	0.082	
1300	0.073	0.051	6.10	0.377	0.377	
1301	0.073	0.051	1.37	0.085	0.085	
1302	0.073	0.051	1.37	0.085	0.085	
1303	0.099	0.073	2.44	0.210	0.210	
1304	0.025	0.019	1.52	0.033	0.033	
1305	0.010	0.008	1.37	0.013	0.013	
1306	0.010	0.008	1.37	0.013	0.013	
1307	0.010	0.008	1.37	0.013	0.013	
1308	0.010	0.008	1.37	0.013	0.013	
1309	0.013	0.010	1.52	0.017	0.017	
1310	0.018	0.013	2.74	0.042	0.042	
1311	0.013	0.010	1.52	0.017	0.017	
1312	0.013	0.010	1.52	0.017	0.017	
1313	0.041	0.029	1.98	0.069	0.069	
1314	0.032	0.029	1.68	0.051	0.051	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1315	0.019	0.016	1.37	0.024	0.024	
1316	0.014	0.009	3.05	0.035	0.035	
1317	0.099	0.092	1.37	0.131	0.131	
1318	0.021	0.014	2.74	0.049	0.049	
1319	0.061	0.056	1.37	0.080	0.080	
1320	0.025	0.013	2.44	0.046	0.046	
1321	0.013	0.008	1.52	0.016	0.016	
1322	0.094	0.079	7.62	0.659	0.659	
1323	0.014	0.008	4.27	0.047	0.047	
1324	0.010	0.008	2.74	0.025	0.025	
1325	0.010	0.008	1.83	0.017	0.017	
1326	0.010	0.008	1.37	0.013	0.013	
1327	0.013	0.008	2.29	0.024	0.024	
1328	0.080	0.061	3.66	0.259	0.259	
1329	0.021	0.018	1.83	0.036	0.036	
1330	0.193	0.173	3.66	0.670	0.670	
1331	0.092	0.049	4.27	0.301	0.301	
1332	0.122	0.086	3.05	0.316	0.316	
1333	0.025	0.021	2.44	0.056	0.056	
1334	0.095	0.061	4.27	0.334	0.334	
1335	0.015	0.008	2.13	0.025	0.025	
1336	0.037	0.008	7.01	0.157	0.157	
1337	0.051	0.041	1.83	0.084	0.084	
1338	0.032	0.025	2.74	0.079	0.079	
1339	0.029	0.018	4.27	0.101	0.101	
1340	0.021	0.014	3.35	0.059	0.059	
1341	0.021	0.010	2.13	0.034	0.034	
1342	0.041	0.021	1.83	0.057	0.057	
1343	0.041	0.013	4.88	0.131	0.131	
1344	0.046	0.032	1.52	0.060	0.060	
1345	0.032	0.025	2.13	0.061	0.061	
1346	0.086	0.036	3.66	0.222	0.222	
1347	0.013	0.008	3.66	0.038	0.038	
1348	0.051	0.032	4.88	0.203	0.203	
1349	0.073	0.061	4.27	0.286	0.286	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1350	0.032	0.018	3.66	0.093	0.093	
1351	0.013	0.008	1.52	0.016	0.016	
1352	0.018	0.011	3.05	0.045	0.045	
1353	0.018	0.008	6.10	0.080	0.080	
1354	0.013	0.008	2.13	0.022	0.022	
1355	0.025	0.013	2.74	0.051	0.051	
1356	0.029	0.014	3.05	0.065	0.065	
1357	0.026	0.018	3.96	0.088	0.088	
1358	0.056	0.013	3.05	0.104	0.104	
1359	0.018	0.013	1.52	0.024	0.024	
1360	0.028	0.019	4.27	0.101	0.101	
1361	0.010	0.008	4.57	0.042	0.042	
1362	0.010	0.008	4.27	0.039	0.039	
1363	0.010	0.008	3.05	0.028	0.028	
1364	0.031	0.013	1.83	0.040	0.040	
1365	0.114	0.086	1.52	0.152	0.152	
1366	0.032	0.013	1.52	0.034	0.034	
1367	0.018	0.008	1.83	0.024	0.024	
1368	0.051	0.032	3.66	0.152	0.152	
1369	0.025	0.013	2.13	0.040	0.040	
1370	0.032	0.018	1.52	0.039	0.039	
1371	0.138	0.120	5.49	0.708	0.708	
1372	0.032	0.014	2.44	0.056	0.056	
1373	0.025	0.021	2.13	0.049	0.049	
1374	0.086	0.051	1.52	0.104	0.104	
1375	0.025	0.018	1.37	0.030	0.030	
1376	0.018	0.008	1.83	0.024	0.024	
1377	0.051	0.032	3.05	0.127	0.127	
1378	0.073	0.051	3.66	0.226	0.226	
1379	0.025	0.018	1.37	0.030	0.030	
1380	0.010	0.008	1.37	0.013	0.013	
1381	0.018	0.013	1.37	0.021	0.021	
1382	0.010	0.008	1.37	0.013	0.013	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1383	0.114	0.077	3.96	0.378	0.584	main stem
1384	0.025	0.008	4.27	0.070		see 1383
1385	0.041	0.018	4.57	0.136		see 1383
1386	0.015	0.010	3.66	0.047	0.047	
1387	0.029	0.013	3.66	0.075	0.075	
1388	0.073	0.051	2.44	0.151	0.151	
1389	0.013	0.008	1.37	0.014	0.014	
1390	0.051	0.032	1.52	0.063	0.063	
1391	0.013	0.008	2.13	0.022	0.022	
1392	0.013	0.008	4.57	0.047	0.047	
1393	0.245	0.164	4.27	0.874	0.874	
1394	0.057	0.032	3.35	0.150	0.150	
1395	0.032	0.025	3.05	0.087	0.087	
1396	0.025	0.015	1.37	0.028	0.028	
1397	0.032	0.029	2.13	0.065	0.087	main stem
1398	0.015	0.014	1.52	0.022		see 1397
1399	0.052	0.018	3.05	0.107	0.107	
1400	0.019	0.010	2.44	0.036	0.036	
1401	0.107	0.099	1.52	0.157	0.157	
1402	0.034	0.018	3.35	0.088	0.088	
1403	0.013	0.012	2.13	0.027	0.027	
1404	0.057	0.046	1.52	0.078	0.078	
1405	0.025	0.018	1.52	0.033	0.033	
1406	0.015	0.008	2.44	0.029	0.029	
1407	0.010	0.008	1.37	0.013	0.013	
1408	0.041	0.032	1.37	0.050	0.050	
1409	0.013	0.008	1.83	0.019	0.019	
1410	0.032	0.025	2.13	0.061	0.061	
1411	0.223	0.164	3.96	0.768	0.768	
1412	0.051	0.025	1.83	0.069	0.069	
1413	0.018	0.008	1.52	0.020	0.020	
1414	0.032	0.021	1.37	0.037	0.037	
1415	0.036	0.025	2.13	0.065	0.065	
1416	0.010	0.008	1.37	0.013	0.013	
1417	0.016	0.010	4.88	0.064	0.064	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1418	0.055	0.013	7.92	0.267	0.267	
1419	0.183	0.140	5.79	0.934	0.934	
1420	0.021	0.018	2.74	0.054	0.054	
1421	0.203	0.164	3.66	0.671	0.671	
1422	0.032	0.018	2.13	0.054	0.054	
1423	0.073	0.051	2.44	0.151	0.151	
1424	0.211	0.146	3.66	0.653	0.653	
1425	0.168	0.130	2.74	0.408	0.408	
1426	0.040	0.032	1.52	0.055	0.055	
1427	0.025	0.018	1.52	0.033	0.033	
1428	0.036	0.018	2.13	0.058	0.058	
1429	0.009	0.008	2.74	0.023		see 1430
1430	0.018	0.013	1.83	0.028	0.052	main stem
1431	0.041	0.032	1.83	0.067	0.067	
1432	0.018	0.015	1.52	0.026	0.026	
1433	0.028	0.008	3.66	0.066	0.066	
1434	0.045	0.041	1.37	0.059	0.059	
1435	0.023	0.021	4.27	0.094	0.094	
1436	0.146	0.114	3.66	0.476	0.476	
1437	0.032	0.021	1.83	0.049	0.049	
1438	0.071	0.014	4.88	0.205	0.205	
1439	0.117	0.044	3.35	0.270	0.270	
1440	0.041	0.069	3.05	0.168	0.168	
1441	0.257	0.099	7.62	1.356	1.356	
1442	0.051	0.046	1.83	0.088	0.088	
1443	0.043	0.011	3.05	0.082	0.082	
1444	0.104	0.073	4.88	0.431	0.431	
1445	0.056	0.032	2.74	0.121	0.121	
1446	0.056	0.051	1.37	0.073	0.073	
1447	0.032	0.029	1.37	0.042	0.042	
1448	0.025	0.013	2.74	0.051	0.051	
1449	0.032	0.025	1.52	0.044	0.044	
1450	0.013	0.008	1.83	0.019	0.019	
1451	0.010	0.008	1.37	0.013	0.013	
1452	0.041	0.025	1.83	0.060	0.060	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1453	0.011	0.009	1.37	0.014	0.014	
1454	0.018	0.013	1.83	0.028	0.028	
1455	0.021	0.018	3.66	0.073	0.073	
1456	0.015	0.013	1.52	0.021	0.021	
1457	0.032	0.022	3.05	0.083	0.083	
1458	0.051	0.032	4.57	0.190	0.190	
1459	0.061	0.051	1.83	0.102	0.102	
1460	0.073	0.025	2.44	0.119	0.119	
1461	0.114	0.099	2.74	0.293	0.293	
1462	0.029	0.018	2.13	0.050	0.050	
1463	0.041	0.037	1.37	0.053	0.053	
1464	0.026	0.019	1.83	0.042	0.042	
1465	0.013	0.008	1.83	0.019	0.019	
1466	0.086	0.061	1.37	0.101	0.101	
1467	0.041	0.032	1.52	0.056	0.056	
1468	0.013	0.008	2.44	0.025	0.025	
1469	0.041	0.032	2.44	0.090	0.090	
1470	0.032	0.029	1.37	0.042	0.042	
1471	0.018	0.013	1.83	0.028	0.028	
1472	0.025	0.018	1.83	0.039	0.039	
1473	0.013	0.010	1.37	0.016	0.016	
1474	0.051	0.041	2.13	0.098	0.098	
1475	0.018	0.009	3.35	0.046	0.046	
1476	0.025	0.018	1.52	0.033	0.033	
1477	0.014	0.010	1.83	0.022	0.022	
1478	0.010	0.008	1.52	0.014	0.014	
1479	0.028	0.019	2.13	0.050	0.050	
1480	0.064	0.033	2.44	0.118		see 1481
1481	0.173	0.119	4.88	0.712	0.830	main stem
1482	0.105	0.073	1.83	0.163	0.163	
1483	0.013	0.008	2.13	0.022	0.022	
1484	0.010	0.008	1.52	0.014	0.014	
1485	0.018	0.013	1.52	0.024	0.024	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1486	0.101	0.080	3.05	0.276		see 1488
1487	0.107	0.044	1.37	0.103		see 1488
1488	0.195	0.170	1.37	0.250	0.629	main stem
1489	0.086	0.061	4.27	0.314	0.314	
1490	0.041	0.025	2.74	0.090	0.090	
1491	0.018	0.016	3.35	0.058	0.058	
1492	0.086	0.061	4.27	0.314	0.314	
1493	0.018	0.013	1.37	0.021	0.021	
1494	0.245	0.223	2.74	0.643	0.643	
1495	0.041	0.025	2.74	0.090	0.090	
1496	0.025	0.013	2.13	0.040	0.040	
1497	0.051	0.025	3.66	0.138	0.138	
1498	0.032	0.025	1.52	0.044	0.044	
1499	0.013	0.010	1.37	0.016	0.016	
1500	0.025	0.013	2.74	0.051	0.051	
1501	0.061	0.041	3.66	0.187	0.187	
1502	0.018	0.013	1.52	0.024	0.024	
1503	0.130	0.114	3.05	0.371	0.371	
1504	0.015	0.013	1.52	0.021	0.021	
1505	0.018	0.013	1.83	0.028	0.028	
1506	0.010	0.008	1.37	0.013	0.013	
1507	0.046	0.041	1.37	0.060	0.060	
1508	0.018	0.015	1.37	0.023	0.023	
1509	0.041	0.032	2.13	0.078	0.078	
1510	0.018	0.010	4.27	0.061	0.061	
1511	0.013	0.010	1.37	0.016	0.016	
1512	0.025	0.018	1.52	0.033	0.033	
1513	0.010	0.008	1.52	0.014	0.014	
1514	0.025	0.018	1.52	0.033	0.033	
1515	0.061	0.041	2.44	0.125	0.125	
1516	0.013	0.010	1.37	0.016	0.016	
1517	0.099	0.041	4.88	0.342	0.342	
1518	0.013	0.008	2.13	0.022	0.022	
1519	0.018	0.013	1.52	0.024	0.024	
1520	0.041	0.025	2.74	0.090	0.090	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1521	0.025	0.013	3.05	0.057	0.057	
1522	0.018	0.015	1.37	0.023	0.023	
1523	0.025	0.018	1.52	0.033	0.033	
1524	0.064	0.032	4.57	0.219	0.219	
1525	0.086	0.061	3.35	0.246	0.246	
1526	0.018	0.013	2.74	0.042	0.042	
1527	0.013	0.008	1.52	0.016	0.016	
1528	0.010	0.008	1.37	0.013	0.013	
1529	1.167	0.369	6.10	4.684	4.684	
1530	0.018	0.013	1.52	0.024	0.024	
1531	0.164	0.146	1.83	0.284	0.284	
1532	0.010	0.008	1.37	0.013	0.013	
1533	0.010	0.008	1.37	0.013	0.013	
1534	0.010	0.008	1.37	0.013	0.013	
1535	0.018	0.013	1.52	0.024	0.024	
1536	0.043	0.032	2.74	0.103	0.103	
1537	0.045	0.032	2.13	0.082	0.082	
1538	0.032	0.025	1.83	0.052	0.052	
1539	0.029	0.023	1.83	0.048	0.048	
1540	0.010	0.008	1.52	0.014	0.014	
1541	0.010	0.008	1.52	0.014	0.014	
1542	0.018	0.013	1.52	0.024	0.024	
1543	0.138	0.130	1.52	0.204	0.204	
1544	0.025	0.018	2.74	0.059	0.059	
1545	0.058	0.026	3.66	0.154	0.154	
1546	0.130	0.122	1.83	0.230	0.230	
1547	0.013	0.008	1.52	0.016	0.016	
1548	0.032	0.018	2.13	0.054	0.054	
1549	0.146	0.086	5.49	0.637	0.637	
1550	0.086	0.061	2.44	0.179	0.179	
1551	0.099	0.086	1.52	0.141	0.141	
1552	0.051	0.041	1.52	0.070	0.070	
1553	0.013	0.008	1.52	0.016	0.016	
1554	0.025	0.018	1.83	0.039	0.039	
1555	0.025	0.013	1.52	0.029	0.029	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1556	0.018	0.013	1.37	0.021	0.021	
1557	0.051	0.025	3.96	0.150	0.150	
1558	0.021	0.018	1.52	0.030	0.030	
1559	0.051	0.032	1.83	0.076	0.076	
1560	0.223	0.203	4.27	0.909	0.909	
1561	0.021	0.018	3.35	0.066	0.066	
1562	0.041	0.032	1.37	0.050	0.050	
1563	0.010	0.008	1.37	0.013	0.013	
1564	0.034	0.025	2.13	0.063	0.063	
1565	0.114	0.065	6.10	0.545	0.659	main stem
1566	0.037	0.029	1.52	0.050		see 1565
1567	0.029	0.018	2.74	0.065		see 1565
1568	0.018	0.013	1.52	0.024	0.024	
1569	0.099	0.073	3.66	0.315	0.315	
1570	0.010	0.008	1.52	0.014	0.014	
1571	0.025	0.013	1.52	0.029	0.029	
1572	0.018	0.013	1.83	0.028	0.028	
1573	0.013	0.010	1.37	0.016	0.016	
1574	0.025	0.013	3.05	0.057	0.057	
1575	0.032	0.018	2.13	0.054	0.054	
1576	0.032	0.013	3.96	0.089	0.089	
1577	0.013	0.008	2.13	0.022	0.022	
1578	0.041	0.032	2.13	0.078	0.078	
1579	0.010	0.008	2.13	0.020	0.020	
1580	0.013	0.010	1.37	0.016	0.016	
1581	0.086	0.073	2.13	0.169	0.169	
1582	0.130	0.114	2.74	0.334	0.334	
1583	0.010	0.008	1.37	0.013	0.013	
1584	0.051	0.041	1.83	0.084	0.084	
1585	0.018	0.010	3.66	0.052	0.052	
1586	0.013	0.010	1.52	0.017	0.017	
1587	0.013	0.008	2.74	0.028	0.028	
1588	0.117	0.099	2.74	0.297	0.297	
1589	0.013	0.008	2.44	0.025	0.025	
1590	0.032	0.025	2.13	0.061	0.061	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1591	0.051	0.037	1.83	0.080	0.080	
1592	0.014	0.011	2.74	0.034	0.034	
1593	0.013	0.008	1.37	0.014	0.014	
1594	0.025	0.013	1.52	0.029	0.029	
1595	0.041	0.032	1.83	0.067	0.067	
1596	0.099	0.092	1.52	0.146	0.146	
1597	0.018	0.010	2.13	0.030	0.030	
1598	0.025	0.018	1.83	0.039	0.039	
1599	0.010	0.008	2.13	0.020	0.020	
1600	0.019	0.016	1.52	0.027	0.027	
1601	0.025	0.008	1.37	0.023	0.023	
1602	0.086	0.079	1.83	0.151	0.151	
1603	0.073	0.041	4.27	0.243	0.243	
1604	0.013	0.010	1.52	0.017	0.017	
1605	0.010	0.008	1.37	0.013	0.013	
1606	0.203	0.193	2.44	0.482	0.482	
1607	0.010	0.008	1.52	0.014	0.014	
1608	0.010	0.008	1.83	0.017	0.017	
1609	0.073	0.034	8.23	0.440	0.440	
1610	0.026	0.021	1.83	0.044	0.044	
1611	0.011	0.008	2.13	0.020	0.020	
1612	0.018	0.021	1.37	0.027	0.027	
1613	0.010	0.008	1.52	0.014	0.014	
1614	0.010	0.008	1.37	0.013	0.013	
1615	0.010	0.008	2.13	0.020	0.020	
1616	0.013	0.010	1.52	0.017	0.017	
1617	0.041	0.032	1.83	0.067	0.067	
1618	0.086	0.073	2.13	0.169	0.169	
1619	0.013	0.008	1.37	0.014	0.014	
1620	0.010	0.008	1.52	0.014	0.014	
1621	0.010	0.008	1.37	0.013	0.013	
1622	0.041	0.032	1.52	0.056	0.056	
1623	0.018	0.013	1.37	0.021	0.021	
1624	0.183	0.114	5.79	0.860	0.860	
1625	0.041	0.029	2.74	0.095	0.095	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1626	0.067	0.043	4.27	0.234	0.234	
1627	0.037	0.032	2.13	0.075	0.075	
1628	0.086	0.051	4.57	0.312	0.312	
1629	0.018	0.008	2.44	0.032	0.032	
1630	0.018	0.015	1.37	0.023	0.023	
1631	0.018	0.013	1.52	0.024	0.024	
1632	0.018	0.013	1.83	0.028	0.028	
1633	0.051	0.046	1.37	0.066	0.066	
1634	0.016	0.013	1.52	0.022	0.022	
1635	0.025	0.013	2.13	0.040	0.040	
1636	0.013	0.008	3.05	0.032	0.032	
1637	0.025	0.013	4.27	0.080	0.080	
1638	0.073	0.041	4.57	0.261	0.261	
1639	0.061	0.051	3.66	0.205	0.205	
1640	0.025	0.018	2.13	0.046	0.046	
1641	0.114	0.086	4.27	0.426	0.426	
1642	0.010	0.008	1.52	0.014	0.014	
1643	0.010	0.008	2.13	0.020	0.020	
1644	0.018	0.015	1.37	0.023	0.023	
1645	0.086	0.067	2.13	0.163	0.163	
1646	0.061	0.056	1.52	0.089	0.089	
1647	0.099	0.061	2.44	0.196	0.196	
1648	0.025	0.018	1.83	0.039	0.039	
1649	0.010	0.008	1.37	0.013	0.013	
1650	0.010	0.008	1.52	0.014	0.014	
1651	0.032	0.025	1.83	0.052	0.052	
1652	0.013	0.008	3.05	0.032	0.032	
1653	0.025	0.018	1.83	0.039	0.039	
1654	0.041	0.025	1.52	0.050	0.050	
1655	0.223	0.203	2.74	0.584	0.584	
1656	0.010	0.008	1.52	0.014	0.014	
1657	0.010	0.008	1.52	0.014	0.014	
1658	0.010	0.008	1.83	0.017	0.017	
1659	0.010	0.008	1.83	0.017	0.017	
1660	0.010	0.008	1.37	0.013	0.013	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1661	0.010	0.008	1.37	0.013	0.013	
1662	0.010	0.008	2.13	0.020	0.020	
1663	0.010	0.008	1.52	0.014	0.014	
1664	0.010	0.008	1.83	0.017	0.017	
1665	0.010	0.008	1.52	0.014	0.014	
1666	0.164	0.146	2.74	0.426	0.426	
1667	0.018	0.013	1.52	0.024	0.024	
1668	0.041	0.025	4.57	0.151	0.151	
1669	0.073	0.051	5.49	0.339	0.339	
1670	0.245	0.164	5.79	1.186	1.186	
1671	0.018	0.010	2.74	0.039	0.039	
1672	0.073	0.051	4.27	0.264	0.264	
1673	0.397	0.223	3.35	1.041	1.041	
1674	0.073	0.051	2.13	0.132	0.132	
1675	0.018	0.032	1.52	0.039	0.039	
1676	0.018	0.013	1.37	0.021	0.021	
1677	0.018	0.013	1.37	0.021	0.021	
1678	0.018	0.013	1.37	0.021	0.021	
1679	0.013	0.008	2.44	0.025	0.025	
1680	0.018	0.032	2.74	0.069	0.069	
1681	0.051	0.032	4.57	0.190	0.190	
1682	0.061	0.032	5.49	0.257	0.257	
1683	0.051	0.032	1.37	0.057	0.057	
1684	0.010	0.008	1.83	0.017	0.017	
1685	0.010	0.008	1.52	0.014	0.014	
1686	0.018	0.008	3.35	0.044	0.044	
1687	0.010	0.008	1.37	0.013	0.013	
1688	0.010	0.008	1.37	0.013	0.013	
1689	0.010	0.008	1.37	0.013	0.013	
1690	0.010	0.008	1.37	0.013	0.013	
1691	0.343	0.292	2.44	0.773	0.773	
1692	0.018	0.013	1.37	0.021	0.021	
1693	0.018	0.013	1.37	0.021	0.021	
1694	0.018	0.013	1.37	0.021	0.021	
1695	0.018	0.013	1.37	0.021	0.021	

Table A12. (Continued).

Log Number	Butt Area (m^2)	Top Area (m^2)	Length (m)	Individual Piece Volume (m^3)	Total Piece Volume (m^3)	Notes
1696	0.051	0.032	1.37	0.057	0.132	main stem
1697	0.032	0.018	1.83	0.046		see 1696
1698	0.025	0.013	1.52	0.029		see 1696
1699	0.013	0.008	2.13	0.022	0.022	
1700	0.032	0.018	2.74	0.069	0.069	
1701	0.013	0.008	1.52	0.016	0.016	
1702	0.013	0.008	1.52	0.016	0.016	
1703	0.013	0.008	1.52	0.016	0.016	
1704	0.032	0.018	3.05	0.077	0.077	
1705	0.010	0.008	1.52	0.014	0.014	
1706	0.010	0.008	1.52	0.014	0.014	
1707	0.010	0.008	1.52	0.014	0.014	
1708	0.010	0.008	1.52	0.014	0.014	
1709	0.051	0.018	3.35	0.116	0.116	
1710	0.018	0.008	1.68	0.022	0.022	
1711	0.073	0.051	3.66	0.226	0.226	
1712	0.051	0.032	2.44	0.101	0.101	
1713	0.013	0.008	1.83	0.019	0.019	
1714	0.013	0.008	2.13	0.022	0.022	
1715	0.013	0.010	2.13	0.024	0.024	
1716	0.021	0.018	1.37	0.027	0.027	
1717	0.061	0.018	5.49	0.218	0.218	
1718	0.061	0.018	2.74	0.109	0.109	
1719	0.041	0.025	3.96	0.131	0.131	
1720	0.032	0.013	5.18	0.117	0.117	

Table A13. Bankside vegetation inventory and individual tree volume from the Calaveras site collected on June 28, 2011 using six 0.04 hectare fixed radius plots on both sides of the river for a total of 12 plots set 15.2 meters in from the edge of the bank.

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
pecan	23.1	25	10.06	0.160
pecan	30.0	30	13.72	0.383
pecan	33.0	35	15.24	0.523
pecan	40.4	40	9.75	0.494
pecan	45.5	45	17.37	1.145
pecan	49.8	50	16.76	1.326
pecan	53.8	55	20.42	1.899
pecan	67.1	65	15.85	2.283
pecan	67.8	70	24.69	3.654
pecan	70.1	70	22.86	3.613
pecan	70.6	70	22.25	3.568
pecan	82.8	85	20.73	4.572
pecan	90.4	90	23.16	6.099
pecan	95.8	95	25.30	7.474

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A14. Bankside vegetation inventory and individual tree volume from the Floresville site collected from August 23-25, 2011 using six 0.04 hectare fixed radius plots on both sides of the river for a total of 12 plots set 15.2 meters in from the edge of the bank.

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
boxelder	10.2	10	11.89	0.047
boxelder	11.7	10	9.14	0.048
boxelder	11.4	10	10.06	0.050
boxelder	11.4	10	9.14	0.046
boxelder	11.4	10	4.57	0.024
boxelder	10.2	10	7.62	0.031
boxelder	11.4	10	7.62	0.038
cedar elm	11.4	10	6.10	0.031
cedar elm	11.4	10	4.57	0.023
cedar elm	11.4	10	9.75	0.048
cedar elm	11.4	10	8.23	0.041
chittamwood	11.4	10	6.10	0.030
eastern cottonwood	10.2	10	9.14	0.036
eastern cottonwood	10.2	10	9.14	0.036
eastern cottonwood	11.4	10	9.14	0.046
eastern cottonwood	11.4	10	7.62	0.038
sugarberry	10.9	10	7.62	0.035
sugarberry	11.4	10	5.49	0.028
sugarberry	10.2	10	4.57	0.019
sugarberry	10.2	10	4.57	0.019
sugarberry	10.2	10	5.49	0.022
sugarberry	11.4	10	4.57	0.024
sugarberry	11.4	10	9.14	0.046
boxelder	14.2	15	9.14	0.057
boxelder	13.0	15	8.53	0.044
boxelder	13.2	15	9.75	0.055
cedar elm	12.7	15	13.72	0.093
cedar elm	13.7	15	6.71	0.045
cedar elm	14.0	15	9.14	0.065
cedar elm	14.0	15	11.58	0.084
cedar elm	12.7	15	7.62	0.048
cedar elm	16.3	15	9.14	0.080
chittamwood	14.0	15	9.14	0.058

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A14. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
chittamwood	15.5	15	10.06	0.078
chittamwood	16.0	15	10.67	0.088
eastern cottonwood	15.2	15	11.58	0.086
saffron-plum	14.0	15	6.10	0.033
saffron-plum	15.2	15	6.10	0.040
sugarberry	14.0	15	7.62	0.047
sugarberry	14.5	15	9.14	0.061
sugarberry	17.0	15	10.67	0.096
sugarberry	13.5	15	17.68	0.114
sugarberry	12.7	15	6.10	0.031
sugarberry	16.5	15	9.14	0.077
sugarberry	12.7	15	5.49	0.027
sugarberry	12.7	15	10.06	0.057
sugarberry	15.2	15	6.10	0.042
sugarberry	15.2	15	7.62	0.054
sugarberry	15.2	15	7.62	0.054
sugarberry	15.2	15	9.14	0.067
sugarberry	16.5	15	9.14	0.077
sugarberry	12.7	15	9.14	0.051
sugarberry	16.0	15	9.14	0.073
sugarberry	12.7	15	7.32	0.039
sugarberry	17.3	15	9.14	0.083
boxelder	21.6	20	13.72	0.200
boxelder	18.8	20	13.72	0.153
cedar elm	20.8	20	20.73	0.289
cedar elm	18.8	20	6.10	0.067
cedar elm	20.3	20	17.07	0.226
cedar elm	18.5	20	18.90	0.214
cedar elm	18.8	20	19.51	0.226
chinaberry	19.6	20	12.19	0.150
chinaberry	20.3	20	15.24	0.205
chittamwood	19.8	20	12.19	0.154
chittamwood	21.6	20	12.19	0.182
chittamwood	20.3	20	11.28	0.148
eastern cottonwood	17.8	20	13.72	0.138
eastern cottonwood	17.8	20	7.62	0.069

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A14. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
eastern cottonwood	17.8	20	10.67	0.104
eastern cottonwood	17.8	20	11.58	0.114
eastern cottonwood	18.3	20	10.67	0.109
eastern cottonwood	20.8	20	21.34	0.299
mesquite	20.3	20	4.57	0.052
mesquite	20.3	20	4.57	0.052
saffron-plum	17.8	20	8.53	0.083
saffron-plum	20.3	20	6.10	0.074
saffron-plum	20.3	20	4.57	0.052
sugarberry	21.6	20	8.53	0.119
sugarberry	22.4	20	10.67	0.161
sugarberry	20.3	20	17.37	0.222
sugarberry	21.8	20	21.34	0.315
sugarberry	19.1	20	10.67	0.118
sugarberry	21.6	20	10.67	0.151
sugarberry	20.3	20	7.62	0.094
sugarberry	20.3	20	10.67	0.134
sugarberry	20.1	20	14.33	0.178
sugarberry	21.8	20	15.85	0.232
boxelder	22.9	25	10.36	0.165
cedar elm	24.1	25	16.76	0.306
cedar elm	26.7	25	16.76	0.371
cedar elm	26.2	25	12.80	0.272
eastern cottonwood	22.9	25	13.72	0.224
eastern cottonwood	25.4	25	21.34	0.438
eastern cottonwood	25.4	25	19.81	0.406
eastern cottonwood	25.4	25	18.29	0.373
eastern cottonwood	25.4	25	19.81	0.406
eastern cottonwood	25.4	25	19.81	0.406
eastern cottonwood	26.7	25	18.29	0.411
sugarberry	24.1	25	7.92	0.138
sugarberry	25.4	25	12.19	0.238
sugarberry	23.9	25	14.33	0.249
sugarberry	25.4	25	16.76	0.330
sugarberry	25.4	25	19.51	0.385
sugarberry	25.4	25	19.51	0.385

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A14. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
sugarberry	26.2	25	19.81	0.415
sugarberry	26.2	25	12.80	0.266
boxelder	29.2	30	15.24	0.414
chinaberry	31.2	30	9.14	0.289
chinaberry	31.5	30	16.15	0.496
eastern cottonwood	29.7	30	19.81	0.551
eastern cottonwood	30.5	30	21.34	0.620
pecan	28.2	30	18.29	0.460
pecan	32.0	30	18.29	0.594
sugarberry	31.5	30	17.68	0.526
sugarberry	30.5	30	12.19	0.346
sugarberry	27.9	30	17.68	0.420
sugarberry	30.0	30	16.76	0.455
sugarberry	30.5	30	17.68	0.495
sugarberry	27.9	30	10.67	0.260
sugarberry	29.2	30	20.73	0.532
sugarberry	29.2	30	12.19	0.320
sugarberry	27.9	30	13.72	0.330
boxelder	33.0	35	13.72	0.470
eastern cottonwood	33.0	35	21.34	0.722
sugarberry	33.0	35	14.02	0.460
sugarberry	33.0	35	13.72	0.451
sugarberry	33.0	35	17.68	0.576
cedar elm	38.9	40	20.73	0.969
chinaberry	41.9	40	6.10	0.338
eastern cottonwood	40.6	40	20.42	1.031
sugarberry	38.1	40	17.98	0.770
sugarberry	38.1	40	18.29	0.783
sugarberry	38.1	40	17.68	0.758
sugarberry	38.1	40	15.24	0.656
cedar elm	43.2	45	18.29	1.054
sugarberry	45.0	45	18.90	1.116
ash	48.3	50	21.34	1.513

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A14. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
sugarberry	55.9	55	16.76	1.519
pecan	64.8	65	26.52	3.581
American elm	69.9	70	25.91	3.909
bur oak	94.0	95	19.81	5.612
eastern cottonwood	101.6	100	30.18	9.285

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A15. Bankside vegetation inventory and individual tree volume from the Falls City site collected on June 23, 2011 using six 0.04 hectare fixed radius plots on both sides of the river for a total of 12 plots set 15.2 meters in from the edge of the bank.

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
American elm	10.2	10	4.27	0.017
American elm	11.4	10	5.79	0.029
crapemyrtle	11.9	10	6.71	0.036
mesquite	10.4	10	4.57	0.020
mesquite	10.7	10	3.66	0.017
mesquite	10.4	10	3.96	0.017
mesquite	10.4	10	4.27	0.018
mesquite	10.7	10	4.27	0.019
mesquite	11.4	10	6.10	0.030
mesquite	11.4	10	4.27	0.022
mesquite	11.9	10	5.18	0.028
American elm	15.2	15	6.10	0.046
crapemyrtle	13.5	15	4.27	0.016
crapemyrtle	12.7	15	5.33	0.022
mesquite	13.2	15	4.88	0.020
mesquite	13.2	15	6.10	0.030
mesquite	13.2	15	4.88	0.020
mesquite	13.2	15	4.27	0.015
mesquite	13.5	15	5.18	0.023
mesquite	13.7	15	3.96	0.015
mesquite	14.0	15	4.27	0.018
mesquite	15.5	15	5.79	0.038
mesquite	13.0	15	5.79	0.026
mesquite	15.5	15	7.01	0.049
mesquite	16.3	15	6.10	0.045
sugarberry	13.7	15	4.57	0.024
sugarberry	14.0	15	4.57	0.025
sugarberry	14.2	15	8.23	0.053
sugarberry	17.0	15	7.92	0.069
sugarberry	14.0	15	6.10	0.036
American elm	18.3	20	10.36	0.112
American elm	21.8	20	10.36	0.155
mesquite	21.3	20	5.49	0.072

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A15. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
mesquite	20.3	20	9.14	0.118
mesquite	20.3	20	6.10	0.074
mesquite	19.8	20	6.10	0.070
mesquite	18.8	20	6.40	0.066
sugarberry	18.0	20	6.71	0.064
sugarberry	19.8	20	10.36	0.124
sugarberry	20.8	20	7.32	0.094
sugarberry	21.6	20	8.23	0.115
sugarberry	18.3	20	7.32	0.073
sugarberry	17.8	20	10.36	0.101
sugarberry	20.1	20	7.62	0.091
American elm	24.1	25	7.01	0.125
American elm	24.9	25	10.97	0.211
black willow	23.1	25	8.53	0.137
mesquite	23.9	25	9.75	0.175
mesquite	24.4	25	9.75	0.183
mesquite	25.9	25	6.71	0.138
mesquite	26.4	25	8.53	0.187
mesquite	26.7	25	6.40	0.139
mesquite	26.7	25	7.01	0.154
mesquite	23.1	25	5.79	0.092
mesquite	23.4	25	5.79	0.094
mesquite	23.4	25	4.88	0.077
mesquite	25.4	25	5.79	0.112
mesquite	26.4	25	6.10	0.129
sugarberry	24.1	25	14.33	0.254
black willow	27.9	30	12.50	0.316
black willow	28.2	30	12.19	0.314
black willow	28.4	30	9.75	0.259
black willow	31.2	30	3.96	0.135
boxelder	23.4	30	8.53	0.140
mesquite	31.2	30	9.75	0.307
mesquite	27.9	30	6.10	0.169
mesquite	30.0	30	9.75	0.285
sugarberry	30.0	30	11.28	0.312
sugarberry	31.2	30	9.75	0.294

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A15. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
sugarberry	29.7	30	7.01	0.197
cedar elm	34.8	35	10.67	0.396
mesquite	32.5	35	10.36	0.348
mesquite	35.1	35	8.53	0.333
mesquite	40.1	40	16.15	0.781
mesquite	43.2	45	9.75	0.553
sugarberry	46.2	45	17.37	1.085
sugarberry	45.7	45	12.80	0.787
mesquite	50.8	50	10.67	0.821
mesquite	47.8	50	10.06	0.689
pecan	50.8	50	19.51	1.612
sugarberry	50.8	50	12.80	0.966
pecan	53.3	55	15.24	1.383
sugarberry	53.6	55	20.42	1.701
sugarberry	62.2	60	19.20	2.149
sugarberry	29.7	30	7.01	0.197
cedar elm	34.8	35	10.67	0.396
mesquite	32.5	35	10.36	0.348
mesquite	35.1	35	8.53	0.333
mesquite	40.1	40	16.15	0.781
mesquite	43.2	45	9.75	0.553
sugarberry	46.2	45	17.37	1.085
sugarberry	45.7	45	12.80	0.787
mesquite	50.8	50	10.67	0.821
mesquite	47.8	50	10.06	0.689
pecan	50.8	50	19.51	1.612
sugarberry	50.8	50	12.80	0.966
pecan	53.3	55	15.24	1.383
sugarberry	53.6	55	20.42	1.701
sugarberry	62.2	60	19.20	2.149

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A16. Bankside vegetation inventory and individual tree volume from the Charco site collected from July 12-13, 2011 using six 0.04 hectare fixed radius plots on both sides of the river for a total of 12 plots set 15.2 meters in from the edge of the bank.

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
ash	10.7	10	6.40	0.027
boxelder	10.2	10	8.23	0.033
boxelder	10.4	10	6.10	0.026
boxelder	10.7	10	3.66	0.017
boxelder	11.2	10	5.49	0.027
boxelder	11.2	10	5.79	0.028
boxelder	11.4	10	7.92	0.040
boxelder	10.2	10	8.53	0.034
boxelder	11.9	10	8.53	0.046
cedar elm	10.2	10	4.57	0.019
mesquite	10.2	10	5.79	0.023
mesquite	10.2	10	5.79	0.023
mesquite	10.7	10	5.79	0.025
mesquite	11.4	10	5.79	0.029
anacua	15.5	15	7.01	0.049
boxelder	15.0	15	12.80	0.094
boxelder	13.0	15	8.23	0.042
boxelder	14.0	15	8.23	0.048
boxelder	15.2	15	8.23	0.056
boxelder	15.2	15	8.23	0.056
boxelder	16.0	15	7.01	0.050
boxelder	15.2	15	7.92	0.053
boxelder	12.7	15	7.62	0.036
boxelder	12.7	15	8.23	0.041
boxelder	15.2	15	8.23	0.056
boxelder	16.5	15	11.28	0.096
cedar elm	15.2	15	7.32	0.057
cedar elm	15.2	15	7.92	0.062
cedar elm	16.5	15	7.32	0.065
chittamwood	12.7	15	7.01	0.034
mesquite	15.7	15	5.79	0.040
sugarberry	15.5	15	11.28	0.086
sugarberry	17.0	15	12.19	0.111

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A16. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
sugarberry	15.2	15	10.67	0.079
sugarberry	17.8	20	8.23	0.079
sugarberry	17.8	20	7.92	0.075
sugarberry	18.3	20	8.23	0.083
sugarberry	18.5	20	8.23	0.085
American elm	20.3	20	3.66	0.044
boxelder	18.3	20	6.71	0.063
boxelder	18.5	20	8.23	0.083
boxelder	21.8	20	8.23	0.117
boxelder	22.1	20	8.23	0.119
boxelder	17.8	20	9.14	0.086
boxelder	19.3	20	6.40	0.067
boxelder	20.3	20	5.79	0.066
cedar elm	21.6	20	8.23	0.119
chittamwood	17.8	20	9.14	0.090
chittamwood	19.1	20	7.01	0.076
sugarberry	20.8	20	11.28	0.149
sugarberry	20.8	20	8.53	0.111
boxelder	23.6	25	4.57	0.069
cedar elm	23.6	25	8.53	0.147
cedar elm	26.9	25	9.75	0.218
chittamwood	24.4	25	7.32	0.134
chittamwood	26.7	25	7.01	0.154
live oak	22.9	25	5.79	0.091
mesquite	22.9	25	8.53	0.139
sugarberry	24.9	25	15.24	0.288
sugarberry	24.6	25	5.18	0.092
sugarberry	25.7	25	10.06	0.199
sugarberry	26.9	25	12.80	0.281
sugarberry	23.1	25	8.23	0.131
sugarberry	24.9	25	10.36	0.194
sugarberry	27.4	25	10.67	0.242
chittamwood	28.4	30	7.92	0.217
sugarberry	28.7	30	10.97	0.281
sugarberry	30.7	30	5.79	0.176
sugarberry	29.0	30	9.14	0.241

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A16. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
American elm	40.6	40	13.11	0.666
anacua	40.6	40	11.28	0.567
sugarberry	38.1	40	17.07	0.732
sugarberry	39.4	40	16.46	0.753
sugarberry	44.5	45	16.46	0.953
pecan	59.7	60	14.33	1.630
pecan	63.5	65	24.99	3.242
pecan	116.3	115	32.00	13.967

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A17. Bankside vegetation inventory and individual tree volume from the Goliad site collected on June 10, 2011 and June 16, 2011 using six 0.04 hectare fixed radius plots on both sides of the river for a total of 12 plots set 15.2 meters in from the edge of the bank.

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
American elm	10.2	10	6.71	0.027
American elm	11.4	10	5.79	0.029
ash	10.2	10	7.92	0.030
boxelder	10.2	10	4.57	0.019
boxelder	10.4	10	6.10	0.026
cedar elm	11.2	10	5.94	0.029
cedar elm	11.2	10	6.40	0.031
eastern redbud	10.9	10	5.49	0.025
sugarberry	10.2	10	4.57	0.019
sugarberry	11.9	10	4.88	0.027
sugarberry	12.4	10	5.79	0.035
sugarberry	10.2	10	4.27	0.018
sugarberry	10.2	10	8.84	0.035
sugarberry	10.7	10	16.46	0.071
American elm	13.2	15	5.79	0.036
American elm	17.3	15	7.32	0.070
American elm	13.2	15	8.23	0.054
American elm	16.0	15	7.32	0.061
American elm	14.7	15	11.58	0.090
ash	12.7	15	10.67	0.063
boxelder	15.0	15	9.14	0.062
cedar elm	17.3	15	8.23	0.079
cedar elm	13.0	15	5.49	0.033
cedar elm	15.2	15	8.84	0.070
cedar elm	14.0	15	9.14	0.065
pecan	14.0	15	3.05	0.005
pecan	14.0	15	5.18	0.014
sugarberry	16.3	15	6.40	0.050
sugarberry	15.5	15	7.01	0.051
sugarberry	16.5	15	7.01	0.057
sugarberry	12.7	15	10.67	0.061
sugarberry	13.5	15	6.40	0.036
sugarberry	14.0	15	5.79	0.034

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A17. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
sugarberry	15.7	15	8.53	0.065
sugarberry	16.5	15	7.92	0.066
sugarberry	12.7	15	8.53	0.047
sugarberry	12.7	15	6.40	0.033
sugarberry	14.2	15	8.84	0.057
sugarberry	13.5	15	7.32	0.042
sugarberry	16.5	15	9.75	0.082
American elm	20.8	20	6.71	0.090
ash	18.3	20	4.88	0.043
ash	17.8	20	5.18	0.044
boxelder	19.6	20	10.67	0.125
cedar elm	18.3	20	9.75	0.105
cedar elm	17.8	20	4.57	0.044
cedar elm	20.3	20	6.10	0.077
elm	17.8	20	8.23	0.083
pecan	17.8	20	11.58	0.110
pecan	19.1	20	8.84	0.090
sugarberry	17.8	20	9.91	0.096
sugarberry	17.8	20	7.62	0.072
sugarberry	18.3	20	7.01	0.070
sugarberry	21.1	20	8.23	0.109
sugarberry	22.4	20	4.88	0.070
sugarberry	20.8	20	11.28	0.149
sugarberry	21.6	20	7.92	0.110
sugarberry	21.6	20	12.80	0.182
sugarberry	19.8	20	9.75	0.116
sugarberry	20.8	20	10.36	0.136
American elm	26.7	25	13.11	0.289
American elm	24.4	25	10.06	0.185
cedar elm	23.1	25	8.84	0.146
cedar elm	23.6	25	8.53	0.147
pecan	26.2	25	13.72	0.291
pecan	24.9	25	10.06	0.187
pecan	22.9	25	9.14	0.140
sugarberry	22.9	25	8.84	0.139
sugarberry	22.9	25	10.97	0.174

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A17. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
sugarberry	23.6	25	14.33	0.244
sugarberry	24.9	25	9.75	0.182
sugarberry	25.9	25	12.80	0.261
sugarberry	22.9	25	9.75	0.154
sugarberry	24.1	25	5.49	0.093
sugarberry	22.9	25	10.36	0.164
sugarberry	24.4	25	14.63	0.265
sugarberry	23.4	25	7.01	0.113
sugarberry	26.4	25	16.15	0.343
American elm	27.9	30	14.33	0.346
cedar elm	29.2	30	16.00	0.423
cedar elm	31.0	30	17.68	0.526
cedar elm	30.2	30	12.19	0.342
pecan	29.7	30	13.11	0.359
sugarberry	30.5	30	8.23	0.239
sugarberry	29.0	30	12.80	0.330
sugarberry	31.8	30	8.23	0.258
sugarberry	29.5	30	7.62	0.210
sugarberry	30.5	30	15.54	0.437
sugarberry	27.9	30	8.53	0.212
sugarberry	30.5	30	10.36	0.297
sugarberry	31.5	30	11.28	0.342
sugarberry	28.7	30	14.63	0.369
ash	35.6	35	15.85	0.619
boxelder	33.0	35	4.57	0.168
boxelder	36.8	35	10.97	0.466
cedar elm	36.8	35	7.92	0.327
cedar elm	36.3	35	9.75	0.393
sugarberry	37.1	35	13.72	0.562
sugarberry	34.5	35	7.62	0.280
boxelder	38.1	40	9.14	0.417
cedar elm	40.6	40	18.29	0.934
cedar elm	38.6	40	10.06	0.459
pecan	40.6	40	15.24	0.797
sugarberry	38.1	40	10.67	0.464
sugarberry	42.4	40	12.80	0.680

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A17. (Continued).

Species	Diameter at Breast Height (cm)	Diameter Class (cm)	Height (m)	Volume (m^3)*
boxelder	43.2	45	8.84	0.512
cedar elm	44.2	45	13.11	0.788
pecan	52.1	50	19.20	1.667
cedar elm	53.8	55	15.24	1.363
pecan	54.9	55	13.72	1.315
pecan	56.4	55	17.68	1.799
pecan	76.2	75	26.52	4.959

*Volume was calculated using equations CU000067 and CU000068 from the Southern Forest Inventory and Analysis Volume Equation User's Guide. Gen. Tech. Rep. SRS-138.

Table A18. Bankside vegetation inventory plot summary from the Calaveras site, data collected on June 28, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots set 15.2 meters in from the edge of the bank.

Plot*	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Left-1	0	0.00	0.000
Left-2	75	11.29	74.849
Left-3	50	2.99	13.577
Left-4	25	17.72	186.846
Left-5	25	9.62	89.192
Left-6	50	15.56	138.805
Right-1	0	0.00	0.000
Right-2	50	25.53	242.816
Right-3	0	0.00	0.000
Right-4	0	0.00	0.000
Right-5	0	0.00	0.000
Right-6	75	25.62	183.735

*Bankside directions were determined facing downstream.

Table A19. Bankside vegetation inventory plot summary from the Floresville site, data collected from August 23-25, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots set 15.2 meters in from the edge of the bank.

Plot*	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Left-1	350	31.51	206.002
Left-2	250	12.32	118.398
Left-3	425	10.55	45.145
Left-4	350	6.63	23.955
Left-5	0	0.00	0.000
Left-6	275	17.43	92.933
Right-1	250	23.12	173.338
Right-2	425	21.60	123.749
Right-3	150	8.74	50.122
Right-4	175	32.99	315.243
Right-5	500	20.27	139.869
Right-6	425	19.09	130.397

*Bankside directions were determined facing downstream.

Table A20. Bankside vegetation inventory plot summary from the Falls City site, data collected on June 23, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots set 15.2 meters in from the edge of the bank.

Plot*	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Left-1	175	7.61	33.944
Left-2	275	17.57	65.478
Left-3	0	0.00	0.000
Left-4	225	9.03	34.937
Left-5	225	17.87	57.070
Left-6	125	22.68	165.488
Right-1	450	13.89	48.830
Right-2	75	2.90	5.389
Right-3	0	0.00	0.000
Right-4	50	8.88	43.814
Right-5	275	12.96	45.795
Right-6	225	6.87	17.063

*Bankside directions were determined facing downstream.

Table A21. Bankside vegetation inventory plot summary from the Charco site, data collected from July 12-13, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots set 15.2 meters in from the edge of the bank.

Plot*	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Left-1	175	13.16	76.382
Left-2	125	3.93	10.825
Left-3	150	2.45	6.974
Left-4	125	7.26	31.240
Left-5	300	13.89	40.694
Left-6	375	7.56	20.837
Right-1	175	8.00	35.957
Right-2	125	2.99	7.795
Right-3	75	1.33	4.596
Right-4	0	0.00	0.000
Right-5	25	25.97	349.178
Right-6	275	20.52	138.643

*Bankside directions were determined facing downstream.

Table A22. Bankside vegetation inventory plot summary from the Goliad site, data collected on June 10, 2011 and June 16, 2011 using six 0.04 hectare fixed radius plots on both sides of the lower San Antonio river, for a total of 12 plots set 15.2 meters in from the edge of the bank.

Plot*	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Left-1	275	17.33	75.016
Left-2	300	17.52	81.247
Left-3	250	21.84	138.468
Left-4	125	3.24	8.928
Left-5	425	11.29	43.751
Left-6	175	4.32	14.605
Right-1	175	13.06	71.267
Right-2	125	3.04	8.776
Right-3	275	15.56	56.772
Right-4	175	18.70	72.509
Right-5	300	19.54	158.458
Right-6	200	8.74	42.561

*Bankside directions were determined facing downstream.

Table A23. Bankside vegetation inventory mean, standard deviation, standard error, coefficient of variation, 95 percent confidence interval, and percent error calculated for Calaveras site.

	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Mean	29.2	9.0	77.5
Standard Deviation	29.8	10.1	89.7
Standard Error	8.6	2.9	25.9
Coefficient of Variation (%)	102.3	111.5	115.8
95% Confidence Interval (Upper Limit)	48.1	15.4	134.5
95% Confidence Interval (Lower Limit)	10.2	2.6	20.5
Percent Error	65.0	71.8	73.6

Table A24. Bankside vegetation inventory mean, standard deviation, standard error, coefficient of variation, 95 percent confidence interval, and percent error calculated for Floresville site.

	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Mean	297.9	17.0	118.3
Standard Deviation	143.2	9.9	87.2
Standard Error	41.3	2.8	25.2
Coefficient of Variation (%)	48.1	57.9	73.8
95% Confidence Interval (Upper Limit)	388.9	23.3	173.7
95% Confidence Interval (Lower Limit)	207.0	10.8	62.9
Percent Error	30.5	36.8	46.8

Table A25. Bankside vegetation inventory mean, standard deviation, standard error, coefficient of variation, 95 percent confidence interval, and percent error calculated for Falls City site.

	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Mean	175.0	10.0	43.2
Standard Deviation	132.3	7.2	44.4
Standard Error	38.2	2.1	12.8
Coefficient of Variation (%)	75.6	72.0	102.9
95% Confidence Interval (Upper Limit)	259.0	14.6	71.3
95% Confidence Interval (Lower Limit)	91.0	5.4	15.0
Percent Error	48.0	45.7	65.3

Table A26. Bankside vegetation inventory mean, standard deviation, standard error, coefficient of variation, 95 percent confidence interval, and percent error calculated for Charco site.

	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Mean	160.4	8.9	60.3
Standard Deviation	110.5	8.0	99.1
Standard Error	31.9	2.3	28.6
Coefficient of Variation (%)	68.9	90.2	164.4
95% Confidence Interval (Upper Limit)	230.6	14.0	123.2
95% Confidence Interval (Lower Limit)	90.2	3.8	0.0
Percent Error	43.7	57.3	104.4

Table A27. Bankside vegetation inventory mean, standard deviation, standard error, coefficient of variation, 95 percent confidence interval, and percent error calculated for Goliad site.

	Trees per Hectare	Basal Area per Hectare (m^2)	Volume per Hectare (m^3)
Mean	233.3	12.8	64.4
Standard Deviation	87.5	6.7	47.2
Standard Error	25.3	1.9	13.6
Coefficient of Variation (%)	37.5	51.9	73.3
95% Confidence Interval (Upper Limit)	288.9	17.1	94.3
95% Confidence Interval (Lower Limit)	177.8	8.6	34.4
Percent Error	23.8	33.0	46.5

Table A28. Calaveras bankside riparian down large woody debris data collection.

Bank	Plot	Diameter			Species	Distance from Bank (m)	Notes
		Length (m)	Butt (cm)	Top (cm)			
Left	**1**	-	-	-	-	-	No down LWD, pasture
	2	-	-	-	-	-	No down LWD, old pecan orchard, widely spaced mature trees
	3	-	-	-	-	-	No down LWD, old pecan orchard, widely spaced mature trees
	4	-	-	-	-	-	No down LWD, old pecan orchard, widely spaced mature trees
	5	-	-	-	-	-	No down LWD, old pecan orchard, widely spaced mature trees, grassy understory
	6	-	-	-	-	-	No down LWD, old pecan orchard, widely spaced mature trees
Right	**1**	-	-	-	-	-	No down LWD, mostly open field, few scattered trees
	2	5.49	28.70	22.61	pecan	11.89	
	3	-	-	-	-	-	No down LWD, pasture
	4	-	-	-	-	-	No down LWD, pasture
	5	-	-	-	-	-	No down LWD, pasture
	6	-	-	-	-	-	No down LWD, pasture

Table A29. Floresville bankside riparian down large woody debris data collection.

Bank	Plot	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Distance from Bank (m)	Notes
Left	**1**	1.37	11.43	10.16	unknown	15.54	highly decayed
		1.37	17.27	10.16	unknown	15.85	
		2.13	12.70	10.16	chinaberry	16.46	
		3.66	20.32	15.24	chinaberry	16.46	
	2	1.37	10.67	10.16	elm	15.24	
	3	-	-	-	-	-	no down LWD
	4	-	-	-	-	-	no down LWD
	5	-	-	-	-	-	no down LWD
	6	-	-	-	-	-	no down LWD
Right	**1**	2.74	36.32	34.29	unknown	13.11	Main stem
		3.96	22.86	21.84	unknown	15.24	Branch
	2	-	-	-	-	-	no down LWD
	3	4.27	15.24	11.68	sugarberry	12.19	
		2.74	18.54	10.16	sugarberry	15.24	
	4	2.44	17.27	15.24	sugarberry	14.94	Branch
		1.83	20.32	19.81	sugarberry	14.63	Branch
		2.13	13.46	10.16	sugarberry	14.63	Branch
		3.35	25.40	19.30	sugarberry	12.19	Main stem
		1.37	12.70	13.97	sugarberry	14.63	Branch
		1.68	21.59	17.78	unknown	17.07	
	5	3.05	12.70	10.41	cottonwood	15.85	
		1.83	11.43	10.16	cottonwood	15.24	
		2.13	10.67	10.16	cottonwood	14.63	
		1.37	10.67	10.16	cottonwood	13.11	
		1.52	10.41	10.16	cottonwood	14.33	
		3.66	13.97	10.16	cottonwood	15.24	
	6	3.05	11.18	10.16	unknown	18.29	
		4.88	25.40	13.97	unknown	14.63	

Table A30. Falls City bankside riparian down large woody debris data collection.

Bank	Plot	Length (m)	Diameter Butt (cm)	Diameter Top (cm)	Species	Distance from Bank (m)	Notes
Left	**1**	5.70	23.88	17.78	mesquite	18.59	Lightning strike
		3.96	21.08	10.16	mesquite	18.59	
	2	-	-	-	-	-	No down LWD
	3	-	-	-	-	-	No down LWD, pasture
	4	4.21	19.81	15.24	sugarberry	14.33	Very decayed
		4.54	26.92	19.05	mesquite	15.85	Very decayed
	5	1.52	12.19	10.16	mesquite	14.63	Decayed
		5.49	22.86	15.24	mesquite	14.33	Decayed
	6	-	-	-	-	-	No down LWD
Right	**1**	-	-	-	-	-	No down LWD, mesquite thicket
	2	-	-	-	-	-	No down LWD
	3	-	-	-	-	-	No down LWD, pasture
	4	-	-	-	-	-	No down LWD, pasture
	5	-	-	-	-	-	No down LWD
	6	-	-	-	-	-	No down LWD

Table A31. Charco bankside riparian down large woody debris data collection.

Bank	Plot	Length (m)	Diameter		Species	Distance from Bank (m)	Notes
			Butt (cm)	Top (cm)			
Left	**1**	-	-	-	-	-	No down LWD
	2	-	-	-	-	-	No down LWD, pasture
	3	-	-	-	-	-	No down LWD
	4	2.13	21.34	17.02	unknown	15.24	Decayed
	5	2.74	18.54	17.02	sugarberry	15.24	Decayed
	5	2.44	12.70	10.16	sugarberry	15.24	Decayed
	5	1.37	15.24	10.16	sugarberry	15.24	Decayed
	5	1.37	10.41	10.16	sugarberry	15.24	Decayed
	5	1.83	15.24	10.67	anacua	16.76	Decayed
	6	-	-	-	-	-	No down LWD
Right	**1**	3.35	12.70	10.16	unknown	15.24	
		1.37	13.97	12.70	unknown	15.24	
	2	-	-	-	-	-	No down LWD
	3	3.66	19.05	16.51	elm	12.19	
	4	-	-	-	-	-	No down LWD, pasture near a farm
	5	1.83	19.81	19.05	pecan	14.63	
		1.37	16.51	15.24	pecan	14.63	
	6	2.13	15.49	13.97	unknown	21.34	
		1.37	11.43	10.16	unknown	21.34	

Table A32. Goliad bankside riparian down large woody debris data collection.

Bank	Plot	Length (m)	Diameter		Species	Distance from Bank (m)	Notes
			Butt (cm)	Top (cm)			
Left	**1**	2.13	39.62	33.53	unknown	15.24	Pieces rotten, partially buried in the soil
		1.52	30.48	30.48	unknown	15.24	
		1.52	33.53	15.24	unknown	19.20	
	2	-	-	-	-	-	No down LWD
	3	-	-	-	-	-	No down LWD
	4	1.83	33.02	30.48	unknown	13.41	Very decayed
	5	1.52	33.02	33.02	unknown	12.19	Highly decayed
		2.13	12.70	10.16	unknown	18.29	Very decayed
	6	1.52	35.56	25.40	unknown	11.58	Extremely decayed
Right	**1**	1.52	12.70	10.16	unknown	14.63	Very decayed, drainage area
		1.52	20.32	17.78	unknown	12.80	
		3.66	60.96	53.34	unknown	15.24	
		3.35	42.67	36.58	unknown	15.24	
		1.83	25.40	17.78	unknown	15.24	
	2	-	-	-	-	-	No down LWD
	3	3.75	50.80	50.80	unknown	13.72	Very decayed
		2.13	15.75	10.16	unknown	12.80	Very decayed
		5.18	40.64	20.32	unknown	19.20	Very decayed
	4	-	-	-	-	-	No down LWD
	5	1.52	11.43	10.16	sugarberry	15.24	Decayed
	6	1.37	33.02	22.86	unknown	15.24	
		1.37	12.70	12.70	unknown	14.63	

Table A33. McFaddin bankside riparian down large woody debris data collection.

Bank	Plot	Length (m)	Diameter		Species	Distance from Bank (m)	Notes
			Butt (cm)	Top (cm)			
Left	**-**	-	-	-	-	-	No riparian forest structure, low flat area that frequently floods
Right	**-**	-	-	-	-	-	

Table A34. Calaveras bankside riparian down large woody debris volume calculations using Smalian's log volume.

	Butt Diameter (cm)	Pieces per Hectare	Piece Volume (m^3)	Volume per Hectare (m^3)	Notes
	28.70	20.8	0.288	5.991	
Total		**20.8**		**5.991**	

Table A35. Floresville bankside riparian down large woody debris volume calculations using Smalian's log volume.

	Butt Diameter (cm)	Pieces per Hectare	Piece Volume (m^3)	Volume per Hectare (m^3)	Notes
	12.70	20.8	0.022	0.462	
	20.32	20.8	0.093	1.931	
	11.43	20.8	0.013	0.262	
	17.27	20.8	0.022	0.451	
	10.67	20.8	0.012	0.244	
	36.32	20.8	0.269	8.841	Main stem
	22.86	-	0.156	-	Branch segment
	15.24	20.8	0.062	1.287	
	18.54	20.8	0.048	1.003	
	21.59	20.8	0.051	1.073	
	17.27	20.8	0.051	5.952	Main stem
	20.32	-	0.058	-	Branch segment
	13.46	-	0.024	-	Branch segment
	25.40	-	0.134	-	Branch segment
	12.70	-	0.019	-	Branch segment
	12.70	20.8	0.032	0.673	
	11.43	20.8	0.017	0.350	
	10.67	20.8	0.018	0.379	
	10.67	20.8	0.012	0.244	
	10.41	20.8	0.013	0.264	
	13.97	20.8	0.043	0.893	
	11.18	20.8	0.027	0.569	
	25.40	20.8	0.161	3.353	
Total		**375.0**		**28.228**	

Table A36. Falls City bankside riparian down large woody debris volume calculations using Smalian's log volume.

	Butt Diameter (cm)	Pieces per Hectare	Piece Volume (m^3)	Volume per Hectare (m^3)	Notes
	23.88	20.8	0.198	4.132	
	21.08	20.8	0.085	1.775	
	26.92	20.8	0.194	4.042	
	19.81	20.8	0.103	2.150	
	12.19	20.8	0.015	0.314	
	22.86	20.8	0.163	3.388	
Total		**125.0**		**15.802**	

Table A37. Charco bankside riparian down large woody debris volume calculations using Smalian's log volume.

	Butt Diameter (cm)	Pieces per Hectare	Piece Volume (m^3)	Volume per Hectare (m^3)	Notes
	21.34	20.8	0.062	1.300	
	15.24	20.8	0.025	0.518	
	18.54	20.8	0.068	1.422	
	12.70	20.8	0.025	0.528	
	15.24	20.8	0.018	0.376	
	10.41	20.8	0.011	0.238	
	12.70	20.8	0.035	0.726	
	13.97	20.8	0.019	0.400	
	19.05	20.8	0.091	1.902	
	19.81	20.8	0.054	1.130	
	16.51	20.8	0.027	0.566	
	15.49	20.8	0.036	0.760	
	11.43	20.8	0.013	0.262	
Total		**270.8**		**10.127**	

Table A38. Goliad bankside riparian down large woody debris volume calculations using Smalian's log volume.

	Butt Diameter (cm)	Pieces per Hectare	Piece Volume (m^3)	Volume per Hectare (m^3)	Notes
	39.62	20.8	0.226	4.703	
	30.48	20.8	0.111	2.317	
	33.53	20.8	0.081	1.691	
	33.02	20.8	0.145	3.021	
	33.02	20.8	0.131	2.719	
	12.70	20.8	0.022	0.462	
	35.56	20.8	0.114	2.381	
	12.70	20.8	0.016	0.330	
	20.32	20.8	0.044	0.909	
	60.96	20.8	0.942	19.634	
	42.67	20.8	0.416	8.664	
	25.40	20.8	0.069	1.438	
	50.80	20.8	0.760	15.831	
	15.75	20.8	0.029	0.613	
	40.64	20.8	0.420	8.752	
	11.43	20.8	0.014	0.292	
	33.02	20.8	0.087	1.810	
	12.70	20.8	0.017	0.362	
Total		**375.0**		**75.928**	

Table A39. Chi-Square values from the Two-Way Contingency Table analysis of the degree of decay category.

Site	Decay Class				
	1	2	3	4	5
Calaveras	3.96	8.14	3.80	7.82	1.84
Floresville	25.72	44.45	26.98	15.92	4.52
Falls City	0.50	0.24	19.83	1.56	2.19
Charco	2.03	0.22	0.61	0.17	2.33
Goliad	0.06	3.23	43.48	11.41	0.78
McFaddin	6.06	34.01	56.40	31.41	0.13

Table A40. Chi-Square values from the Two-Way Contingency Table analysis of the bank orientation category.

Site	Decay Class		
	0	90	180
Calaveras	4.16	4.73	0.002
Floresville	9.92	7.21	0.80
Falls City	0.28	1.88	5.66
Charco	0.22	0.82	2.98
Goliad	9.28	3.59	2.97
McFaddin	19.94	5.87	8.76

Table A41. Chi-Square values from the Two-Way Contingency Table analysis of the stage contact category.

Site	Decay Class			
	1	2	3	4
Calaveras	0.04	0.03	0.35	0.35
Floresville	0.54	0.71	0.37	0.37
Falls City	0.03	0.03	0.12	30.56
Charco	33.01	53.63	0.47	0.47
Goliad	6.02	12.48	24.76	1.68
McFaddin	3.11	4.20	1.40	1.40

Table A42. Chi-Square values from the Two-Way Contingency Table analysis of the position category.

Site	LWD Position		
	Individual Piece	Fallen Tree	Debris Jam Associated
Calaveras	27.20	6.90	12.64
Floresville	112.62	5.28	32.79
Falls City	12.52	24.11	9.17
Charco	1.22	0.44	0.26
Goliad	57.56	51.53	34.02
McFaddin	174.7	20.03	73.60

Table A43. Chi-Square values from the Two-Way Contingency Table analysis of the origin category.

Site	LWD Origin		
	Unknown	Local	Upstream
Calaveras	0.41	34.46	5.56
Floresville	377.66	0.22	83.35
Falls City	1.59	29.99	1.72
Charco	22.77	1.99	7.71
Goliad	68.17	97.64	54.83
McFaddin	120.2	64.29	64.77

Table A44. Chi-Square values from the Two-Way Contingency Table analysis of the branch presence category.

Site	Branch Presence	
	Yes	No
Calaveras	6.77	0.17
Floresville	1.17	0.03
Falls City	13.94	0.36
Charco	0.63	0.02
Goliad	14.09	0.36
McFaddin	17.70	0.45

Table A45. Chi-Square values from the Two-Way Contingency Table analysis of the root wad presence category.

Site	Root Wad Presence	
	Yes	No
Calaveras	0.41	0.02
Floresville	19.52	0.72
Falls City	1.74	0.06
Charco	0.24	0.01
Goliad	11.11	0.41
McFaddin	17.79	0.65

Table A46. Chi-Square values from the Two-Way Contingency Table analysis of the potential source category.

Site	Decay Class				
	Unknown	Erosion	Windthrow	Wind Snap	Cut
Calaveras	2.56	11.71	2.13	3.89	55.62
Floresville	0.03	3.13	0.02	0.66	0.66
Falls City	2.47	33.26	2.44	7.61	0.70
Charco	0.06	0.84	0.23	2.81	2.81
Goliad	3.45	0.83	59.05	29.49	2.80
McFaddin	4.22	27.49	8.39	8.39	8.39