



Biomass from Logging Residue and Mill Residue in East Texas, 2005

By

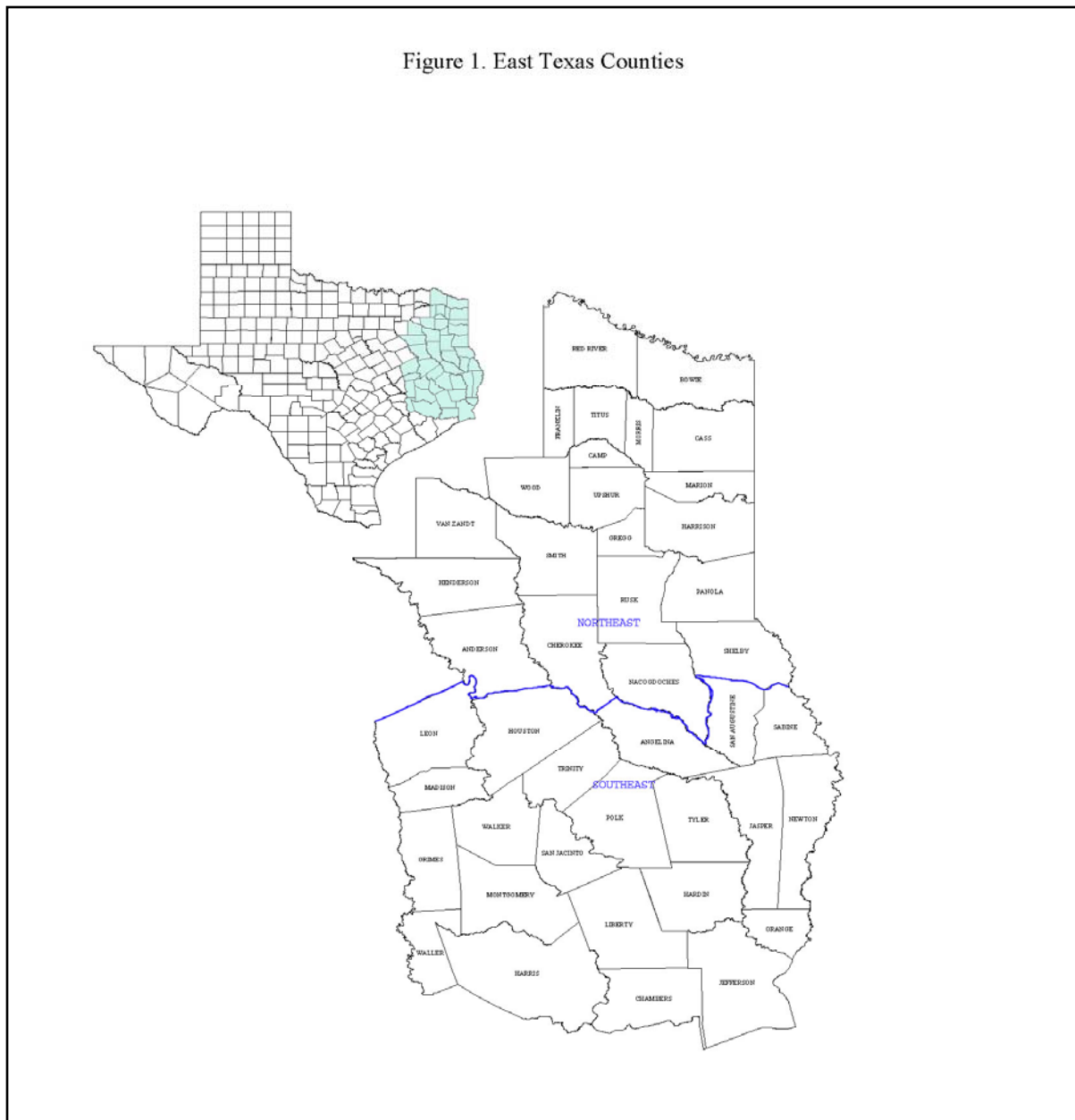
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Introduction

The abundance of woody biomass from East Texas forests offers a valuable potential for use as a renewable energy resource or for chemical extraction. This report represents the most current data on the availability of woody biomass in the form of logging and mill residue in East Texas. Residue data estimates are based on a mill survey conducted by the Texas Forest Service (Xu, 2006) and a wood utilization study published by the U.S. Department of Agriculture Forest Service (Bentley and Johnson, 2004). The 43 East Texas counties, delineated by Northeast and Southeast regions, form the scope of this study, (Figure 1).



Logging Residue

Types of logging residue include *stumps*, *tops*, *limbs* and unutilized *cull trees*. *Stump* residue, the part of the tree that is lower than the cutting point and thus left after the harvesting operation, is generally not available commercially since the cost of obtaining the stump or root biomass is likely prohibitive. *Tops* refer to the tops of the trees that are either broken during harvesting or are cut off the central stem of the tree due to a merchantability standard. *Limbs* refer to the branches of the trees. *Cull trees* are the trees that cannot be used to produce saw logs due to defects, rot, or form. Some cull trees are used as pulpwood and others are left unutilized as a part of logging residue. *Tops*, *limbs*, and unutilized cull trees are the logging residue that is potentially available as biomass for energy production or chemical extraction.

Table 1 shows the logging residue available in East Texas. A total of 3.8 million tons of logging residue was generated in 2005, 67 percent from softwood and 33 percent from hardwood. *Tops*, *limbs*, and cull trees account for 3.1 million tons, while 0.7 million tons is from stumps.

Logging residue by county in Northeast Texas is presented in Table 3. Northeast Texas produced 1.7 million tons of logging residue, 44 percent of the East Texas total. Fifty-five percent of the logging residue from Northeast Texas is from softwood and 45 percent is from hardwood. *Tops*, *limbs*, and cull trees account for 1.4 million tons, while 0.3 million tons is from stumps. *Cass*, *Nacogdoches*, *Harrison*, *Panola* and *Upshur* counties are the top five producers of logging residue in Northeast Texas.

Logging residue by county in Southeast Texas is presented in Table 4. Southeast Texas produced 2.2 million tons of logging residue, 56 percent of the East Texas total. Seventy-seven percent of the logging residue from Southeast Texas is from softwood and 23 percent is from hardwood. *Tops*, *limbs*, and cull trees account for 1.8 million tons, while 0.4 million tons is from stumps. *Polk*, *Jasper*, *Hardin*, *Angelina* and *Tyler* counties are the top five producers of logging residue in Southeast Texas.

Mill Residue

Mill residue, including *chips*, *sawdust*, *shavings* and *bark*, is generated in the process of producing primary wood products. The major primary wood products produced in East Texas include lumber, plywood, veneer, OSB, chips, and posts/poles. Figure 2 depicts the mill residue types from producing primary wood products. Chips as a primary product are produced from pulpwood roundwood while residue chips are produced from the tops of sawlogs that are used for producing lumber, veneer, or plywood. Sawdust is produced from sawing lumber from sawlogs and shavings are produced from lumber surfacing. All primary products have bark as mill residue.

There was a total of 6.3 million tons of mill residue produced in East Texas in 2005, with 85 percent from softwood and 15 percent from hardwood, (Table 2). Chips account for

52 percent of the total mill residue, followed by bark at 34 percent. Sawdust and shavings account for 8 percent and 6 percent respectively, of the total mill residue produced.

Northeast Texas mills produced 2.3 million tons of mill residue, representing 37 percent of the East Texas total, (Table 5). Seventy-three percent of the mill residue from Northeast mills was from softwood and 27 percent was from hardwood. *Bowie, Nacogdoches Rusk, Cass, and Marion* counties represent the top five mill residue producers in Northeast Texas.

Southeast Texas mills produced 4.0 million tons of residue, which represents 63 percent of the East Texas total, (Table 6). Ninety-one percent of the mill residue from Southeast Texas mills was from softwood and 9 percent was from hardwood. *Sabine, Angelina, Polk, Jasper and Liberty* counties are the top five producers of mill residue in Southeast Texas.

Conclusion

East Texas has substantial biomass in the form of logging and mill residue. Except for stumps, all other biomass from logging and mill residue is available for energy production or chemical extraction. Most of the logging residue in East Texas has not been marketed for competing uses and is left at the logging sites. However, nearly all of East Texas mill residue has already been marketed for competing uses, such as chips for pulping, sawdust, shavings and bark for fuel or landscaping. It is important to note that logging residue is generated on logging sites, while mill residue is produced in mills. Therefore, county logging residue amounts are associated with the timber harvests occurring within a county, while county mill residue totals are associated with the amount and types of primary forest products produced within a county. Additionally, part of the mill residue could be generated from wood shipped to Texas mills from other states.

References

Bentley, James W.; Johnson, Tony G. 2004. Eastern Texas harvest and utilization study, 2003. Resource Bulletin SRS-97. Asheville, N.C.: U.S. Department of Agriculture, Forest Service, Southern Research Station.

Xu, Weihuan. 2006. Harvest trends, 2005. College Station: Texas Forest Service.

Figure 2. Mill Residue from Producing Primary Wood Products in East Texas.

Primary Product	Chips	Sawdust	Shavings	Bark
Lumber	x	x	x	x
Veneer	x			x
Plywood	x			x
OSB				x
Chips				x
Posts/Poles				x

Table 1. Logging Residue in East Texas, 2005

unit: ton						
Region	Species Group	Stump	Top/Limb	Unused Cull	Total Residue	Available Residue
Northeast	Softwood	173,782	548,136	199,386	921,304	747,522
	Hardwood	130,583	421,026	202,111	753,720	623,137
	All	304,365	969,162	401,497	1,675,024	1,370,659
Southeast	Softwood	312,310	990,281	365,144	1,667,735	1,355,425
	Hardwood	89,168	283,588	128,609	501,365	412,197
	All	401,478	1,273,869	493,753	2,169,100	1,767,622
East	Softwood	486,092	1,538,417	564,530	2,589,039	2,102,947
	Hardwood	219,751	704,614	330,720	1,255,085	1,035,334
	All	705,843	2,243,031	895,250	3,844,124	3,138,281

Table 2. Mill Residue in East Texas, 2005

unit: ton						
Region	Species Group	Chips	Sawdust	Shavings	Bark	Total
Northeast	Softwood	882,419	134,408	128,564	542,913	1,688,304
	Hardwood	177,191	109,558	17,550	327,833	632,132
	All	1,059,610	243,967	146,114	870,746	2,320,436
Southeast	Softwood	2,143,474	238,829	228,445	1,034,536	3,645,285
	Hardwood	73,489	46,298	7,416	219,006	346,210
	All	2,216,964	285,127	235,862	1,253,543	3,991,495
East	Softwood	3,025,893	373,237	357,010	1,577,450	5,333,589
	Hardwood	250,681	155,857	24,966	546,839	978,342
	All	3,276,574	529,094	381,976	2,124,288	6,311,932

Table 3. Logging Residue by county in Northeast Texas, 2005

County	unit: ton												
	Softwood				Hardwood				All Species				
	Stump	Top/Limb	Unused Cull	Total	Stump	Top/Limb	Unused Cull	Total	Stump	Top/Limb	Unused Cull	Total	
Anderson	8,093	26,248	10,231	44,572	5,978	20,379	11,912	38,270	14,071	46,628	22,143	82,842	
Bowie	6,755	22,145	8,849	37,750	10,894	33,428	12,779	57,101	17,649	55,574	21,628	94,851	
Camp	1,347	4,415	1,764	7,525	988	3,183	1,520	5,691	2,335	7,597	3,284	13,216	
Cass	24,956	77,475	27,009	129,439	16,719	51,806	20,823	89,347	41,675	129,280	47,831	218,786	
Cherokee	11,061	34,590	12,301	57,951	8,468	28,856	16,844	54,168	19,529	63,446	29,145	112,120	
Franklin	222	652	193	1,067	352	1,315	979	2,646	573	1,968	1,173	3,714	
Gregg	1,724	5,394	1,921	9,039	2,863	10,270	6,931	20,064	4,587	15,664	8,852	29,103	
Harrison	18,962	59,801	21,746	100,508	10,031	31,838	14,312	56,181	28,993	91,638	36,058	156,688	
Henderson	647	2,002	693	3,342	3,832	12,649	6,637	23,118	4,479	14,651	7,331	26,460	
Marion	6,699	22,389	9,335	38,423	8,657	27,916	13,406	49,980	15,357	50,305	22,742	88,403	
Morris	2,941	9,706	3,938	16,585	3,391	10,311	3,751	17,452	6,332	20,017	7,688	34,038	
Nacogdoches	20,175	65,394	25,452	111,021	9,058	30,322	16,707	56,088	29,234	95,717	42,159	167,109	
Panola	20,434	61,605	19,715	101,754	6,372	20,522	9,811	36,706	26,805	82,128	29,526	138,459	
Red River	7,973	21,374	4,201	33,548	8,793	27,322	11,135	47,250	16,766	48,696	15,336	80,798	
Rusk	11,685	37,296	13,983	62,963	4,883	17,252	11,186	33,322	16,568	54,548	25,169	96,286	
Shelby	14,675	46,456	17,059	78,190	3,230	10,382	4,924	18,535	17,904	56,838	21,983	96,725	
Smith	4,219	14,043	5,805	24,067	5,060	17,046	9,596	31,701	9,278	31,089	15,401	55,768	
Titus	724	2,648	1,308	4,680	5,718	17,991	7,781	31,490	6,442	20,639	9,089	36,170	
Upshur	8,194	27,718	11,853	47,765	12,555	39,541	17,173	69,268	20,749	67,258	29,026	117,033	
Van Zandt	145	545	279	970	435	1,625	1,210	3,269	580	2,169	1,489	4,239	
Wood	2,152	6,240	1,750	10,142	2,306	7,072	2,695	12,073	4,458	13,312	4,445	22,215	
Northeast Total	173,782	548,136	199,386	921,304	130,583	421,026	202,111	753,720	#	304,365	969,162	401,497	1,675,024

Table 4. Logging Residue by county in Southeast Texas, 2005

County	unit: ton											
	Softwood				Hardwood				All Species			
	Stump	Top/Limb	Unused Cull	Total	Stump	Top/Limb	Unused Cull	Total	Stump	Top/Limb	Unused Cull	Total
Angelina	25,587	81,915	30,940	138,442	6,568	21,972	12,080	40,620	32,156	103,887	43,020	179,062
Chambers	6,355	17,596	4,083	28,034	4,453	13,438	4,678	22,569	10,808	31,034	8,761	50,603
Grimes	2,227	7,592	3,299	13,118	111	335	114	560	2,338	7,927	3,414	13,678
Hardin	27,360	78,097	20,644	126,101	11,499	35,980	15,163	62,642	38,859	114,077	35,807	188,744
Harris	3,682	13,289	6,420	23,391	2,073	6,533	2,847	11,453	5,755	19,823	9,267	34,844
Houston	15,003	47,803	17,844	80,649	6,209	19,642	8,704	34,555	21,212	67,445	26,548	115,204
Jasper	42,997	127,248	38,362	208,607	7,058	22,489	10,278	39,826	50,056	149,737	48,640	248,432
Jefferson	895	3,102	1,391	5,389	341	1,077	474	1,891	1,236	4,179	1,865	7,280
Leon	756	2,761	1,360	4,877	1,117	3,764	2,124	7,005	1,873	6,525	3,484	11,882
Liberty	14,376	45,327	16,471	76,175	13,389	43,553	21,648	78,590	27,765	88,880	38,119	154,765
Madison	170	641	333	1,144	133	394	121	649	303	1,036	454	1,793
Montgomery	11,168	41,630	21,205	74,003	1,864	5,995	2,849	10,708	13,032	47,625	24,054	84,711
Newton	25,561	78,966	27,155	131,682	3,429	11,696	6,849	21,974	28,990	90,662	34,005	153,656
Orange	2,211	7,839	3,672	13,722	1,981	6,358	2,999	11,338	4,191	14,198	6,671	25,061
Polk	43,269	132,760	44,772	220,802	7,374	22,625	8,643	38,643	50,644	155,385	53,415	259,444
Sabine	12,438	38,486	13,294	64,218	3,324	10,389	4,353	18,067	15,762	48,875	17,647	82,285
San Augustine	11,858	37,868	14,216	63,942	6,690	20,719	8,306	35,715	18,548	58,588	22,521	99,657
San Jacinto	13,383	48,853	24,058	86,293	1,756	5,553	2,458	9,767	15,138	54,406	26,516	96,060
Trinity	15,332	47,259	16,149	78,741	2,656	8,702	4,447	15,805	17,988	55,961	20,597	94,546
Tyler	23,267	77,753	32,416	133,436	6,748	21,186	9,067	37,001	30,015	98,939	41,483	170,437
Walker	14,231	52,868	26,784	93,883	386	1,162	395	1,943	14,618	54,029	27,179	95,826
Waller	183	627	275	1,086	8	25	10	43	191	652	285	1,129
Southeast Total	312,310	990,281	365,144	1,667,735	89,168	283,588	128,609	501,365 #	401,478	1,273,869	493,753	2,169,100

Table 5. Mill Residue by county in Northeast Texas, 2005

County	unit: ton														
	Softwood					Hardwood					All Species				
	Chips	Sawdust	Shavings	Bark	Total	Chips	Sawdust	Shavings	Bark	Total	Chips	Sawdust	Shavings	Bark	Total
Anderson	-	-	-	-	-	8,175	5,150	825	4,500	18,650	8,175	5,150	825	4,500	18,650
Bowie	242,138	36,882	35,278	124,448	438,746	1,308	824	132	179,426	181,690	243,446	37,706	35,410	303,874	620,436
Camp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cass	124,581	18,976	18,151	37,888	199,596	34,266	21,587	3,458	64,080	123,391	158,847	40,563	21,609	101,968	322,987
Cherokee	8,154	1,242	1,188	3,250	13,834	48,195	28,291	4,532	25,002	106,019	56,349	29,533	5,720	28,252	119,853
Franklin	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gregg	-	-	-	-	-	2,180	1,373	220	1,200	4,973	2,180	1,373	220	1,200	4,973
Harrison	65,500	9,977	9,543	18,218	103,238	-	-	-	-	-	65,500	9,977	9,543	18,218	103,238
Henderson	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Marion	-	-	-	71,038	71,038	33,790	21,288	3,410	18,600	77,088	33,790	21,288	3,410	89,638	148,125
Morris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nacogdoches	183,030	27,879	26,667	116,484	354,060	21,614	13,617	2,181	11,897	49,309	204,644	41,495	28,848	128,382	403,369
Panola	-	-	-	82,840	82,840	4,534	2,857	458	2,496	10,345	4,534	2,857	458	85,336	93,185
Red River	-	-	-	312	312	3,815	2,403	385	2,100	8,703	3,815	2,403	385	2,412	9,015
Rusk	215,215	32,781	31,356	59,861	339,213	3,521	2,218	355	1,938	8,032	218,736	34,999	31,711	61,799	347,245
Shelby	41,008	6,246	5,975	20,516	73,745	4,970	3,131	502	2,736	11,339	45,978	9,378	6,476	23,252	85,084
Smith	529	81	77	7,427	8,113	796	501	80	8,337	9,715	1,324	582	157	15,764	17,828
Titus	2,265	345	330	630	3,570	10,028	6,318	1,012	5,520	22,878	12,293	6,663	1,342	6,150	26,448
Upshur	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Van Zandt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wood	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northeast Total	882,419	134,408	128,564	542,913	1,688,304	177,191	109,558	17,550	327,833	632,132	1,059,610	243,967	146,114	870,746	2,320,436

Table 6. Mill Residue by county in Southeast Texas, 2005

County	unit: ton														
	Softwood					Hardwood					All Species				
	Chips	Sawdust	Shavings	Bark	Total	Chips	Sawdust	Shavings	Bark	Total	Chips	Sawdust	Shavings	Bark	Total
Angelina	395,205	60,197	57,580	180,616	693,597	5,109	3,219	516	43,351	52,195	400,314	63,416	58,095	223,967	745,792
Chambers	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grimes	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hardin	68,521	10,437	9,983	72,381	161,322	28,499	17,954	2,876	44,618	93,948	97,020	28,391	12,859	116,999	255,269
Harris	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Houston	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jasper	238,209	36,283	34,706	317,695	626,893	10,651	6,710	1,075	26,539	44,975	248,859	42,993	35,781	344,234	671,868
Jefferson	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Leon	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Liberty	217,482	9,634	9,216	30,857	267,189	7,412	4,670	748	20,800	33,629	224,894	14,304	9,964	51,657	300,818
Madison	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Montgomery	37,886	5,771	5,520	10,538	59,714	-	-	-	-	-	37,886	5,771	5,520	10,538	59,714
Newton	22,875	3,484	3,333	10,022	39,713	7,085	4,464	715	3,900	16,164	29,960	7,948	4,048	13,922	55,877
Orange	6,668	1,016	972	144,560	153,215	-	-	-	-	-	6,668	1,016	972	144,560	153,215
Polk	536,687	26,575	25,419	79,678	668,360	1,601	1,008	162	881	3,652	538,288	27,583	25,581	80,560	672,011
Sabine	501,862	67,447	64,514	128,243	762,065	924	582	93	509	2,109	502,786	68,029	64,607	128,751	764,174
San Augustine	3,169	483	462	7,381	11,495	5,668	3,571	572	27,882	37,693	8,837	4,054	1,034	35,263	49,188
San Jacinto	32,445	4,942	4,727	9,025	51,139	-	-	-	-	-	32,445	4,942	4,727	9,025	51,139
Trinity	30,200	4,600	4,400	8,400	47,600	-	-	-	-	-	30,200	4,600	4,400	8,400	47,600
Tyler	-	-	-	20,604	20,604	6,540	4,120	660	50,526	61,846	6,540	4,120	660	71,130	82,450
Walker	52,266	7,961	7,615	14,537	82,379	-	-	-	-	-	52,266	7,961	7,615	14,537	82,379
Waller	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Southeast Total	2,143,474	238,829	228,445	1,034,536	3,645,285	73,489	46,298	7,416	219,006	346,210	2,216,964	285,127	235,862	1,253,543	3,991,495