Predicting Likely Timber Purchases and Offer Levels on the Tongass National Forest. Fiscal Year 2013

April 5 2013, final

Elements	Notation	Limited Lumber	Expanded Lumber	Medium Integrated	High Integrated
Demand					
A. Installed and operable mill capacity (MMBF, log scale)	a	120	120	120	120
B. Industry rate of capacity utilization	b	33%	45%	66%	70%
C. Share of industry raw material provided by the Tongass	c	94%	94%	94%	94%
D. Percent usable wood in average NF timber sale	d	54%	65%	90%	90%
E. Annual Tongass timber consumption (MMBF, theoretical)	e=((a*b)*c)/d	69	79	82	87
F. Standard deviation of lead time (years)	f	1.08	1.08	1.08	1.08
G. Average lead time (years)	g	1.25	1.25	1.25	1.25
H. Prob. of meeting consumption (one-tailed test for 90% at infinity)	h	1.28	1.28	1.28	1.28
I. Timber inventory requirements (MMBF)	i=(e*g)+((e*h)*f)	181	207	217	230
J. Volume under contract as of September 30, 2012(MMBF)	j	130	130	130	130
K. Projected harvest (MMBF), FY 13 from PNW	k	56	98	204	291
L. Projected inventory shortfall (MMBF)	l=i-j	51	76	86	99
M. Low range of expected timber purchases (MMBF), FY 13	m=if l < 0, k+l, else k	56	98	204	291
N. High range of expected timber purchases (MMBF), FY 13	n=if l < 0, k, else k+l	107	174	290	390
O. Expected timber purchases, FY 13	o=median(m:n)	81	136	247	341
Offer					
P. Fall-down between volume offered and volume sold	p	10%	5%	2%	2%
Q. Required offered to meet VUC sell objectives (MMBF), FY 13	q=o+(p*o)	89	143	252	348

Table 1. Estimate of Mill Capacity and Utilization for FY 2013 (Model Item A - C)

MANUFACTURING FACILITY NAME	MILL LOCATION	POTENTIAL CAPACITY (1)	2011 LOCAL PROCESSING ACTUAL SAWN	PERCENT FS	VOLUME FS
		(MBF)	(MBF)	(%)	(MBF)
D&L Woodworks	Hoonah, AK	1,750	63	100%	63
Icy Straits Lumber Co., Inc.	Hoonah, AK	3,000	400	80%	320
Northern Star Cedar Products	Thorne Bay, AK	2,500	0	0%	0
Porter Lumber Co.	Thorne Bay, AK	2,500	34	100%	34
Falls Creek forest products	Petersburg, AK	3,000	25	100%	25
The Mill	Petersburg, AK	6,000	15	0%	0
Thorne Bay Wood Products	Thorne Bay, AK	5,500	400	100%	400
Western Gold Cedar Products	Thorne Bay, AK	6,500	400	70%	280
Thorne Bay Enterprises	Thorne Bay, AK	1,000	0	0%	0
Thuja Plicata Lumber Co.	Thorne Bay, AK	7,500	100	100%	100
Viking Lumber Co.	Craig, AK	80,000	9,994	95%	9,494
St Nick Forest Products	Craig, AK	1,150	115	87%	100
		120,400	**11,546**	**94%**	**10,816**

Assumed Rate of Utilization MBF (limited lumber scenario)	**33%**	**39,732**
Assumed Rate of Utilization MBF (expanded lumber scenario)	**45%**	**54,180**
Assumed Rate of Utilization MBF (medium integrated scenario)	**66%**	**79,464**
Assumed Rate of Utilization MBF (high integrated scenario)	**70%**	**84,280**

Notes:

1. Mill capacity is based on 2 shifts per day for 250 days per year.

2. Assumed rates of utilization based Alaska State Forester's 2006 survey of mill owners for limited lumber scenario, Morse (October 2000), and on discussions with Chuck Kegan, Bureau of Business and Economic Research, University of Montana.

Table 2. Timber Utilization in Southeast Alaska Sawmills (Model Item D)

a. Percent of Timber Harvest Volume

Species/Grade	Use by SE Alaska Ind.	limited lumber scenario	expanded lumber scenario	medium integrated scenario	high scenario
Alaska Yellow Cedar (1)	Exported in Round Log	4%	4%	4%	4%
Western Red Cedar (2)	Exported in Round Log	6%	6%	6%	6%
Low Grade Sawtimber (3)	Exported or Chipped	22%	11%	0%	0%
Utility (4)	Chip,Export,Wood Residue	15%	15%	15%	15%
Higher Grade Sawtimber	Processed Locally	54%	65%	76%	76%
Total		100%	100%	100%	100%

b. Volume Harvested by Species, fiscal years 2003 through 2012, MBF

Species	Current Market Expected Use	FY 03	FY 04	FY 05	FY 06	FY 07	FY08	FY09	FY10	FY11	FY12	Annual Avg	Percent
Yellow Cedar (saw timber)	(1/2 export, 1/2 sawn)	5,237	3,348	3,180	5,125	1,376	1,474	2,121	1,868	2,419	2,216	3,546	8.0%
Spruce/Hemlock (saw timber)	(1/3 chip/export, 2/3 sawn)	36,998	29,427	32,065	29,602	12,645	18,974	20,033	23,883	16,571	13,178	29,172	66.0%
Red Cedar (saw timber)	(1/2 export, 1/2 sawn)	1,869	3,922	3,333	3,788	765	3,597	3,134	4,526	11,173	4,449	5,069	11.5%
Utility	100% chip,export,left in woods	7,200	9,737	11,024	4,646	3,807	3,946	2,882	5,028	2,357	744	6,421	14.5%
Total		51,304	46,434	49,602	43,161	18,593	27,991	28,170	35,305	32,520	20,587	44,208	100%

The percentages in Table 2a are determined by the averages in table 2b, and adjusted as in the notes below describe.

Several assumptions used in the original estimate of useable wood published in *Responding to the Market Demand for Tongass Timber, April 2000* (Table 6, page 18) have changed. The following is an explanation of those changes:

1. In the original calculation, 100% of Alaska yellow cedar was assumed to be shipped out of Alaska to domestic or foreign markets. This table assumes 50% of Alaska yellow cedar to be shipped to domestic or foreign markets, based on recent trends.
2. In the original calculation, it was assumed that 100% of western red cedar would be processed locally (no domestic shipments or foreign export). This table assumes 50% of western red cedar will be shipped out of Alaska, based on recent trends.
3. In the original calculation, about 33% of the sawlog volume was estimated to be chipped or shipped to domestic markets in the current market. This table assumes 33% would be chipped or shipped to domestic markets in the limited lumber scenario and 17% would be chipped or shipped to domestic markets under expanded lumber scenarios.
4. All utility volume will be sold but with the optional removal provision in the new sale contracts, a portion of utility volume will be left in the woods as wood residue.

Table 3. Lead Time for Timber Sales Purchased Under Current Market (Model Item G)

Purchaser	Sale Name	Sale Qty. (MBF)	Bid Date (MM/YY)	Award Date (MM/YY)	1st Hvt. Record (MM/YY)	Elaspsed Months
Viking Lumber Company	Luck Lac II	9,075	08/05	09/05	10/07	25
Alcan Forest Products	Skipping Cow	18,641	11/05	07/06	10/08	27
Pacific Log and Lumber	Upper Carroll II	16,495	11/05	12/05	09/09	46
Alcan Forest Products	Red Mountain	5,955	03/06	03/06	06/07	15
R&R Conner Inc	Drumlin Reoffer II	1,106	05/06	06/06	05/08	23
H&L Salvage Inc	Setter Lake	684	12/06	02/07	04/08	14
Norsemen Wood	Backline	4,518	05/07	08/07	10/07	2
Viking Lumber Company	Tuxekan	14,161	08/07	09/07	09/07	0
Viking Lumber Company	Scratchings	11,337	09/07	09/07	05/09	20
Custom Cuts	Redtail Salvage	498	09/08	12/08	10/09	10
Sharp Lumber	POW Commercial Thinni	1,202	09/08	09/08	07/10	22
Ernie Eads	Single Pit	737	09/08	09/08	10/08	1
Michael B Allen Jr	Porcupine Salvage Reoffe	661	01/09	01/09	04/10	15
Viking Lumber Company	Diesel	23,853	12/09	12/09	02/10	2
Viking Lumber Company	Slake	18,839	09/10	09/10	10/10	1
Alcan Forest Products	Boundary II	755	09/10	09/10	03/11	6
Frantz Whale Bay Woods	Backline Helicopter	1,751	04/11	06/11	07/11	0
		286,834				

Average Lead Time:	**14.98**
Variance:	**166.85**
Standard Deviation:	**12.92**

Data based on 1) Sales over 500 MBF; 2) first harvest date = FY2007 to present; 3) Excludes settlement, defaulted, non-resource stewardship (contract type not equal to 13/13T), and study sales

Table 4. Volume Under Contract: Tongass NF Remaining Timber Sales Volumes (MBF) (Model Item J) as of Sept 30 2012

Contract ID	Bid date	termination date	purchaser	sale name	quantity est (mbf)	volume cut (mbf)	Remaining (mbf)
061526	5/15/2007	10/31/2013	Alcan Forest Products LLP	Backline	4,637.17	3,352.07	1,285.10
062425	9/21/2010	10/31/2014	Alcan Forest Products LLP	Boundary II	1,798.69	1,399.80	398.89
062649	9/13/2011	10/31/2016	Alcan Forest Products LLP	Frenchie Stewardship	25,904.00	0.00	25,904.00
062631	9/19/2011	10/31/2015	Alcan Forest Products LLP	Heceta Stewardship	7,557.00	0.00	7,557.00
061047	11/1/2005	5/10/2016	Alcan Forest Products LLP	Skipping Cow	18,640.91	6,525.32	12,115.59
062680	12/6/2011	10/31/2013	Channel Construction, Inc	Buckhorn Reoffer	19.00	0.00	19.00
062540	7/5/2011	10/31/2014	Channel Construction, Inc	Checkerboard	401.00	0.00	401.00
062581	7/13/2011	10/31/2013	Channel Construction, Inc	New Bridge Reoffer	52.00	0.00	52.00
062664	10/18/2011	11/16/2012	Charles W Bennett	Microsale #170	33.00	0.00	33.00
062730	5/8/2012	6/6/2013	Charles W Bennett	Microsale #174	12.00	0.00	12.00
062920	9/25/2012	9/30/2013	Custom Cut LLC	Fiddle Microsale Special Sal	8.00	0.00	8.00
062532	6/28/2011	7/27/2012	Custom Cut LLC	Microsale #165	12.00	0.00	12.00
061310	8/22/2006	10/31/2012	D&L Woodworks	Divide	233.00	233.00	0.00
062383	8/3/2010	10/31/2013	D&L Woodworks	Fish Ladder	137.00	0.00	137.00
062847	8/28/2012	10/31/2015	D&L Woodworks	Long Haul	28.00	0.00	28.00
062565	7/5/2011	10/31/2014	D&L Woodworks	TLC2ME	124.00	0.00	124.00
062573	7/5/2011	10/31/2014	D&L Woodworks	Two Roads Special Salvage	446.00	180.00	266.00
062045	11/26/2008	10/31/2015	DOT/PF State of Alaska	Juneau Access Settlement	3,601.00	0.00	3,601.00
061963	9/9/2008	7/1/2013	Ernie Eads	Single Pit	737.00	570.76	166.24
062409	8/10/2010	10/31/2013	Ernie Eads	Tidal	289.86	25.00	264.86
061559	6/18/2007	7/23/2013	Gordon Chew	Last Call Reoffer	71.29	17.00	54.29
062177	9/15/2009	5/23/2013	Gordon Chew	Trap Mountain	101.00	0.00	101.00
062714	5/1/2012	6/30/2013	Guy Lane	South Line ROW Reoffer	19.00	0.00	19.00
061724	11/20/2007	8/31/2013	H & L Salvage, Inc	Bogo	233.00	0.00	233.00
061013	10/18/2005	7/29/2012	H & L Salvage, Inc	Little Rock	144.73	144.73	0.00
062706	4/10/2012	10/31/2015	H & L Salvage, Inc	Rhino	625.00	0.00	625.00
061468	12/12/2006	10/31/2013	H & L Salvage, Inc	Setter Lake	684.00	216.00	468.00
062227	3/26/2010	10/31/2012	Hecla Greens Creek Mining	Sand Pit Settlement	171.00	80.00	91.00
061674	9/11/2007	9/18/2014	Icy Straits Lumber & Mill	Above Road	146.00	0.00	146.00
061666	9/11/2007	9/18/2014	Icy Straits Lumber & Mill	Boomerang	176.00	0.00	176.00
062136	6/9/2009	10/30/2012	Icy Straits Lumber & Mill	Catfal	279.00	0.00	279.00
062144	6/9/2009	10/30/2012	Icy Straits Lumber & Mill	Clear Water	76.00	76.00	0.00
060627	10/26/2004	10/31/2014	Icy Straits Lumber & Mill	Midway Reoffer II	8,222.46	347.01	7,875.45
062391	8/3/2010	10/31/2013	Icy Straits Lumber & Mill	Outback	130.00	0.00	130.00

061955	9/2/2008	6/18/2014	Icy Straits Lumber & Mill	Pit Run	104.00	0.00	104.00
061641	9/11/2007	9/18/2014	Icy Straits Lumber & Mill	Small Otter	200.00	0.00	200.00
061658	9/11/2007	9/18/2014	Icy Straits Lumber & Mill	Turbo Otter	248.00	0.00	248.00
061815	6/10/2008	6/18/2014	Icy Straits Lumber & Mill	Two Creeks	247.00	0.00	247.00
062557	7/5/2011	10/31/2014	ISL Enterprises LLC	Mt Marsh Special Salvage	52.00	31.00	21.00
061849	7/8/2008	4/19/2013	James Harrison	La Brea	290.10	0.00	290.10
061427	10/31/2006	10/31/2013	James Harrison	Power Lake	410.14	217.14	193.00
062656	10/11/2011	10/31/2013	Jerod Cook	40227 Small Sale	46.50	15.50	31.00
062771	6/12/2012	6/11/2013	John Helliwell	Microsale #176	10.00	0.00	10.00
062797	7/31/2012	8/30/2013	John Helliwell	Microsale #177	45.00	0.00	45.00
061682	9/26/2007	8/31/2013	Keith Dahl	Bound	214.00	0.00	214.00
061971	9/9/2008	6/30/2013	Keith Dahl	North Pole	312.00	0.00	312.00
062789	7/10/2012	8/13/2013	Ketchikan Ready-Mix & Quar	Elf Point Salvage	128.00	0.00	128.00
062763	5/22/2012	10/31/2013	Kevin Merry	Kake Roadside ITM	13.50	3.00	10.50
062813	9/4/2012	10/4/2013	Larry Trumble	Microsale #178	4.00	0.00	4.00
060734	5/3/2005	10/31/2012	Michael B Allen	Shady	4,449.15	3,789.73	659.42
062292	6/17/2010	10/31/2012	Michael B Allen	Wedge Resale II	203.00	174.00	29.00
061146	2/14/2006	10/31/2014	Pacific Log & Lumber Ltd	Buckdance Madder Reoffer	12,858.17	12,858.17	0.00
060619	10/12/2004	10/31/2011	Pacific Log & Lumber Ltd	Licking Creek	14,580.40	14,580.40	0.00
061070	11/17/2005	10/31/2014	Pacific Log & Lumber Ltd	Upper Carroll II	16,494.56	1,473.32	15,021.24
062805	8/1/2012	10/31/2015	Porter Lumber	EARS Stewardship	790.00	0.00	790.00
061716	11/20/2007	8/31/2013	Porter Lumber	Fishsticks	140.00	0.00	140.00
062672	11/15/2011	12/14/2012	Porter Lumber	Microsale #172	3.00	0.00	3.00
062698	4/3/2012	4/30/2013	Porter Lumber	North Line Salvage Reoffer	38.10	0.00	38.10
062748	5/8/2012	8/10/2012	Porter Lumber	Whiskey Curve Microsale	44.00	0.00	44.00
062862	8/7/2012	10/31/2015	Ralph Dean Blankenship	Tote Stewardship	383.00	0.00	383.00
062896	9/4/2012	10/31/2015	Ralph Dean Blankenship	UGA Stewardship	495.00	0.00	495.00
062870	8/21/2012	10/31/2016	Ralph Dean Blankenship	Wabbit Stewardship	1,314.00	0.00	1,314.00
062904	9/4/2012	10/31/2015	Ralph Dean Blankenship	Wing Stewardship	275.00	0.00	275.00
061906	8/5/2008	7/1/2013	Scott Hill Skyline Logging	Hook Reoffer	244.00	69.00	175.00
061914	8/5/2008	7/1/2013	Scott Hill Skyline Logging	Oxbox	249.00	62.00	187.00
062003	9/22/2008	4/30/2011	Sharp Lumber	POW Coml Thinning Study	1,202.00	1,027.00	175.00
062417	8/24/2010	10/31/2013	St. Nick Forest Products	Goose Reoffer	218.00	218.00	0.00
062219	3/9/2010	10/31/2012	St. Nick Forest Products	Salt	256.00	0.00	256.00
060965	8/25/2005	10/31/2012	Steve Little	Low Ridge	159.86	53.14	106.72
062607	7/26/2011	10/31/2014	Thorne Bay Wood Products	Lake #003	210.00	210.00	0.00
062839	8/28/2012	10/31/2015	Venita Coutlee	Pass Salvage	31.00	0.00	31.00
062193	12/15/2009	10/31/2014	Viking Lumber Company	Diesel	30,680.01	30,680.01	0.00
060510	7/20/2004	10/31/2013	Viking Lumber Company	Finger Point	12,228.52	10,591.28	1,637.24

061062	11/8/2005	10/31/2014	Viking Lumber Company	Lindenberg	23,265.38	17,215.46	6,049.92
061617	9/11/2007	10/31/2012	Viking Lumber Company	Scratchings	14,256.33	14,256.33	0.00
062433	9/27/2010	10/31/2015	Viking Lumber Company	Slake	29,145.34	29,057.92	87.42
062912	9/18/2012	10/31/2016	Viking Lumber Company	Tonka Stewardship	36,399.00	0.00	36,399.00
062821	8/28/2012	10/31/2015	Vincent S. Schafer	The Pit	175.00	0.00	175.00
061591	7/24/2007	10/31/2013	Vincent S. Schafer	Three Moose	90.00	16.00	74.00
062615	7/26/2011	10/31/2014	Western Gold Cedar Product	Copper	322.00	87.00	235.00
062623	8/23/2011	10/31/2014	Western Gold Cedar Product	Lead	258.00	0.00	258.00
062508	4/26/2011	10/31/2013	Whale Bay Woods LLC	Backline Helicopter	1,751.00	1,065.14	685.86
062888	9/4/2012	10/4/2013	William C Musser	Microsale #181	1.00	0.00	1.00
062524	6/14/2011	7/13/2012	William Kaufman	Microsale #169	47.00	47.00	0.00
062722	5/8/2012	6/7/2013	William Kaufman	Microsale #171	30.00	0.00	30.00
062755	5/22/2012	6/21/2013	William Kaufman	Microsale #175	29.00	0.00	29.00
062276	6/1/2010	10/31/2012	William L.Cheney	6367 Small Sale #2 Reoffer	48.00	13.75	34.25
061336	8/29/2006	5/6/2013	William Thomason	Dogleg Special Salvage	242.00	242.00	0.00
061021	10/18/2005	10/31/2012	William Thomason	Mink Tail Special Salvage	152.89	152.89	0.00
061344	8/29/2006	7/6/2012	William Thomason	Moxie Special Salvage	217.00	217.00	0.00

Sales/Permits with Remaining Volume: 0

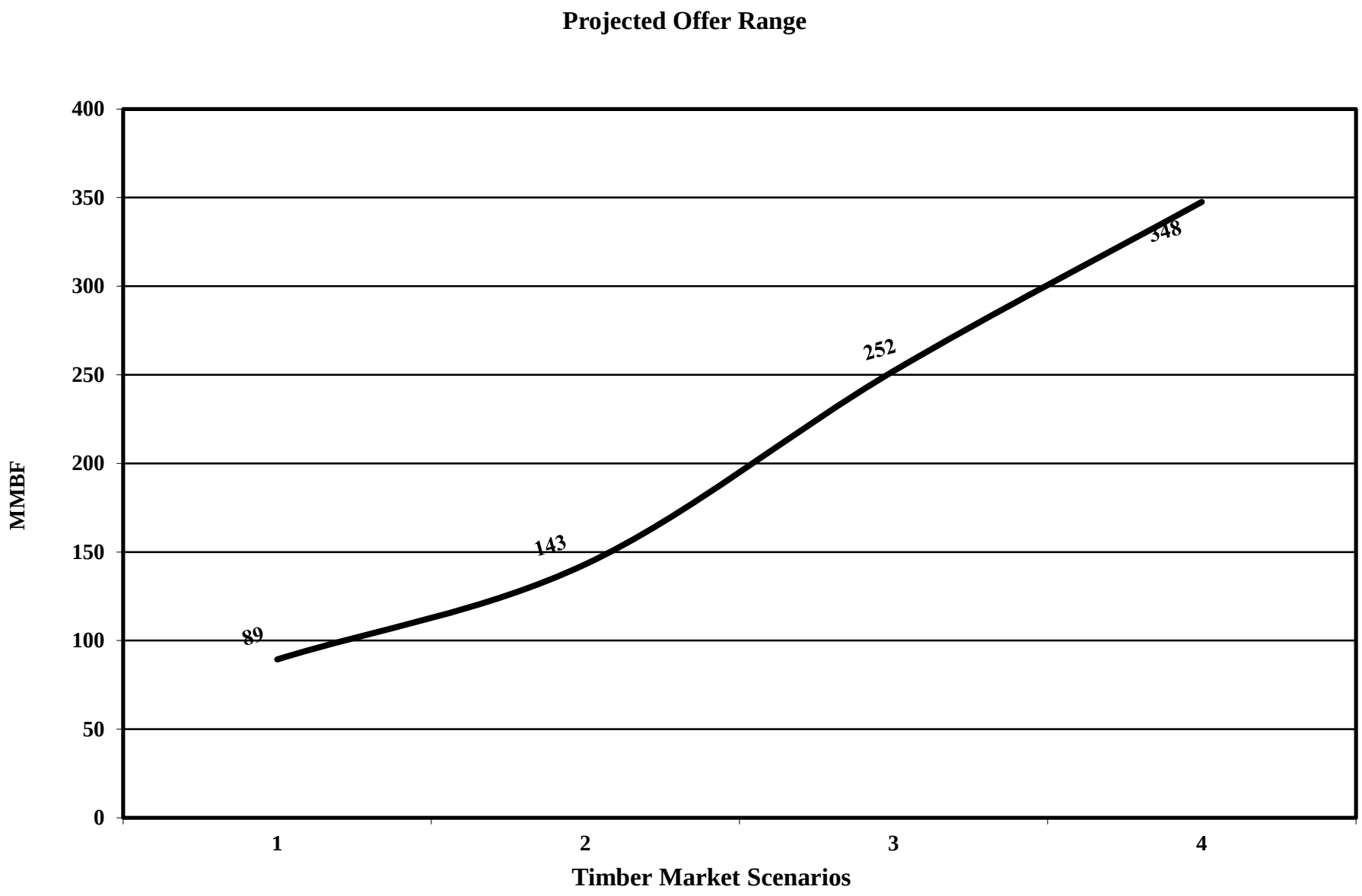
282,048	151,590	130,458
Current Qty Est mbf	Volume Cut mbf	Volume Remaining mbf

Table 5. Projected Tongass National Forest Timber Harvest (Model Item K)
Actual Harvest (million board feet, sawlog + utility volume) [1]

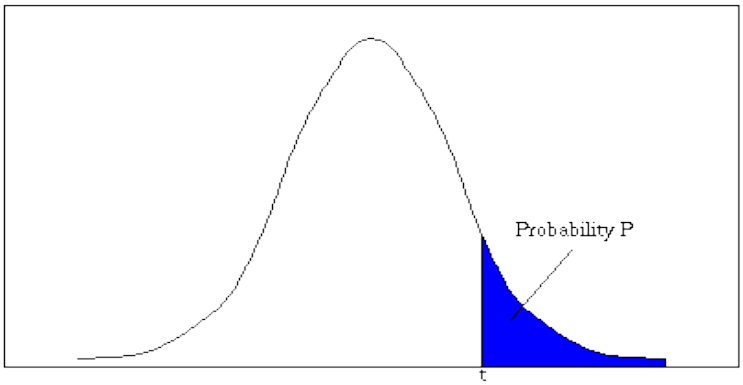
Fiscal Year	1. Limited lumber scenario [2]	2. Expanded lumber scenario	3. Medium integrated scenario [3]	4. High integrated scenario
2005	46.8	52.8	45	45
2006	48.3	57.3	55	55
2007	49.8	61.9	67	67
2008	49.8	66.4	139	139
2009	51.3	72.4	151	151
2010	52.8	78.5	166	166
2011	52.8	84.5	184	184
2012	54.3	90.5	204	286
2013	55.8	98.1	204	291
2014	57.3	105.6	204	295
2015	58.9	113.2	204	299
2016	58.9	122.2	204	303
2017	60.4	131.3	204	308
2018	61.9	140.3	204	312
2019	63.4	150.9	204	317
2020	64.9	162.3	204	325
2021	66.4	175	204	333
2022	67.9	187.1	204	342
2023	69.4	200.7	204	351
2024	70.9	215.8	204	360
2025	72.4	230.9	204	370

Adapted from:
Brackley, A.M.; Rojas, T.D.; and Haynes, R.W. 2006. Timber products output and timber harvests in Alaska: projections for 2005-25. Gen. Tech. Rep. PNW-GTR-677. Portland, OR, USDA Forest Service, PNW Research Station.

1. Scenarios 1 and 2 are adjusted from Brackley et al. (2006) by about 34% to include utility volume (14.6%) and grade 3 volume (19.2%). Scenarios 3 and 4 are not adjusted from Brackley et al.
2. The limited and expanded lumber scenarios include saw logs, cedar exports, and chip volumes available from sawmill production in Brackley et al. but no low-grade and utility volume, so these figures are adjusted to include utility and grade 3 volume.
3. The medium and high integrated scenarios include saw logs, cedar exports, chip volumes, low-grade material, and utility in Brackley et al. These scenarios are not adjusted.


Projected Offer Range
400
350
300
250
200
150
100
50
0
MMBF
89
143
252
348
1
2
3
4
Timber Market Scenarios

Model Item H - t Distribution for One-tailed Test



t distribution critical values												
	p for one-tailed test											
df	**0.250**	**0.200**	**0.150**	**0.100**	**0.050**	**0.025**	**0.020**	**0.010**	**0.005**	**0.003**	**0.001**	**0.001**
1	1.000	1.376	1.963	3.078	6.314	12.710	15.890	31.820	63.660	127.300	318.300	636.600
2	0.816	1.061	1.386	1.886	2.920	4.303	4.849	6.965	9.925	14.090	22.330	31.600
3	0.765	0.978	1.250	1.638	2.353	3.182	3.482	4.541	5.841	7.453	10.210	12.920
4	0.741	0.941	1.190	1.533	2.132	2.776	2.999	3.747	4.604	5.598	7.173	8.610
5	0.727	0.920	1.156	1.476	2.015	2.571	2.757	3.365	4.032	4.773	5.893	6.869
6	0.718	0.906	1.134	1.440	1.943	2.447	2.612	3.143	3.707	4.317	5.208	5.959
7	0.711	0.896	1.119	1.415	1.895	2.365	2.517	2.998	3.499	4.029	4.785	5.408
8	0.706	0.889	1.108	1.397	1.860	2.306	2.449	2.896	3.355	3.833	4.501	5.041
9	0.703	0.883	1.100	1.383	1.833	2.262	2.398	2.821	3.250	3.690	4.297	4.781
10	0.700	0.879	1.093	1.372	1.812	2.228	2.359	2.764	3.169	3.581	4.144	4.587
11	0.697	0.876	1.088	1.363	1.796	2.201	2.328	2.718	3.106	3.497	4.025	4.437
12	0.695	0.873	1.083	1.356	1.782	2.179	2.303	2.681	3.055	3.428	3.930	4.318
13	0.694	0.870	1.079	1.350	1.771	2.160	2.282	2.650	3.012	3.372	3.852	4.221
14	0.692	0.868	1.076	1.345	1.761	2.145	2.264	2.624	2.977	3.326	3.787	4.140
15	0.691	0.866	1.074	1.341	1.753	2.131	2.249	2.602	2.947	3.286	3.733	4.073
16	0.690	0.865	1.071	1.337	1.746	2.120	2.235	2.583	2.921	3.252	3.686	4.015
17	0.689	0.863	1.069	1.333	1.740	2.110	2.224	2.567	2.898	3.222	3.646	3.965
18	0.688	0.862	1.067	1.330	1.734	2.101	2.214	2.552	2.878	3.197	3.611	3.922
19	0.688	0.861	1.066	1.328	1.729	2.093	2.205	2.539	2.861	3.174	3.579	3.883
20	0.687	0.860	1.064	1.325	1.725	2.086	2.197	2.528	2.845	3.153	3.552	3.850
21	.663.	0.859	1.063	1.323	1.721	2.080	2.189	2.518	2.831	3.135	3.527	3.819
22	0.686	0.858	1.061	1.321	1.717	2.074	2.183	2.508	2.819	3.119	3.505	3.792
23	0.685	0.858	1.060	1.319	1.714	2.069	2.177	2.500	2.807	3.104	3.485	3.768
24	0.685	0.857	1.059	1.318	1.711	2.064	2.172	2.492	2.797	3.091	3.467	3.745
25	0.684	0.856	1.058	1.316	1.708	2.060	2.167	2.485	2.787	3.078	3.450	3.725
26	0.684	0.856	1.058	1.315	1.706	2.056	2.162	2.479	2.779	3.067	3.435	3.707
27	0.684	0.855	1.057	1.314	1.703	2.052	2.150	2.473	2.771	3.057	3.421	3.690
28	0.683	0.855	1.056	1.313	1.701	2.048	2.154	2.467	2.763	3.047	3.408	3.674
29	0.683	0.854	1.055	1.311	1.699	2.045	2.150	2.462	2.756	3.038	3.396	3.659
30	0.683	0.854	1.055	1.310	1.697	2.042	2.147	2.457	2.750	3.030	3.385	3.646
40	0.681	0.851	1.050	1.303	1.684	2.021	2.123	2.423	2.704	2.971	3.307	3.551
50	0.679	0.849	1.047	1.295	1.676	2.009	2.109	2.403	2.678	2.937	3.261	3.496
60	0.679	0.848	1.045	1.296	1.671	2.000	2.099	2.390	2.660	2.915	3.232	3.460
80	0.678	0.846	1.043	1.292	1.664	1.990	2.088	2.374	2.639	2.887	3.195	3.416
100	0.677	0.845	1.042	1.290	1.660	1.984	2.081	2.364	2.626	2.871	3.174	3.390
1000	0.675	0.842	1.037	1.282	1.646	1.962	2.056	2.330	2.581	2.813	3.098	3.300
inf.	0.674	0.841	1.036	1.282	1.640	1.960	2.054	2.326	2.576	2.807	3.091	3.291

Notes: For 2009 to 2011, changed probability of meeting consumption to from 99% to 90% given poor market conditions.