



BRIEFING TO TONGASS NATIONAL FOREST, SUPERVISOR'S OFFICE
USDA FOREST SERVICE, ALASKA REGION

**DRAFT TONGASS NATIONAL FOREST:
PROJECTING TIMBER DEMAND, ESTIMATING TIMBER
SALE TARGET, AND MONITORING CONDITIONS**

CONTEXT

Debate regarding market demand for Tongass National Forest timber, and how the Forest Service's timber sale program relates to timber market demand, has been ongoing for decades. Pacific Northwest Research Station economists completed their first comprehensive timber demand study during 1990. Later that year, US Congress enacted the Tongass Timber Reform Act (TTRA), which in Section 101 amended Section 705(a) of the Alaska National Interest Lands Conservation Act (ANILCA 1980):

Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act of 1976 (Public Law 94-558), except as provided in subsection (d) of this section, the Secretary shall, to the extent consistent with providing for the multiple use and sustained yield of all renewable forest resources, seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand for timber from such forest and (2) meets the market demand from such forest for each planning cycle (16 US Code 539(d)(a)).

Prolonged discussion regarding how to interpret and apply direction provided by the Tongass Timber Reform Act slowed the development of procedures to comply. However, the 1997 Record of Decision (ROD) for the *Tongass Land and Resource Management Plan* revision committed the Forest Service to develop procedures to ensure annual timber sale offerings are consistent with implementing the Tongass Timber Reform Act's 'seek to meet market demand' language. Annual timber demand procedures were subsequently completed during 2000 and became known as the 'Morse Methodology' in acknowledgement of the original designer and author – Kathleen Morse, former Forest Service Alaska Region regional economist.

In a nutshell, the Tongass Timber Reform Act directed the Forest Service to seek to provide a supply of timber to meet estimated market demand over the longer-term planning cycle and on an annual basis. At current time, Daniels et al. (2016) establishes longer-term planning cycle timber demand (2015 – 2030) with projections published in a Pacific Northwest Research Station general technical report (PNW-GTR-934). Daniels et al. (2016) timber demand projection is one of 15 inputs used by the Forest Service's Alaska Regional Office to calculate annual timber demand, which guides Tongass National Forest annual timber sale targets. Annual timber demand procedures, as developed by Kathleen Morse (2000a), ensure full compliance



with Tongass Timber Reform Act and were originally published in *Responding to Market Demand for Tongass Timber* (Morse, K.S.; USDA Forest Service R10-MB-413). Since 2000, the Morse Methodology has substantively remained the same with only minor modifications to accommodate updated planning-cycle timber demand projections (Grewe, N: USDA Forest Service R10-MB-823).

ESTIMATING ANNUAL TIMBER SALE TARGET

The procedures developed by Morse (2000a) to estimate Tongass National Forest annual timber sale offer targets address uncertainty associated with forecasting market conditions, considering the continuing evolution of the timber industry and the inability of the Forest Service to respond quickly to market fluctuations due to the time it takes to prepare timber for sale. The basic approach developed by Morse (2000a) is to allow the industry to accumulate an adequate timber volume under contract (i.e., a measure of inventory), then monitor industry behavior and adjust timber sale program levels to keep pace with actual harvest activity. The procedures rely on systematic monitoring of key economic indicators and stumpage market conditions to test assumptions regarding the relationships between timber industry performance, current economic conditions, and the Tongass National Forest timber sale program.

Since the Morse Methodology (Morse 2000a) was initially developed, inputs to the model have been adjusted to reflect new understandings and information, such as the overall share of raw material provided by the Tongass National Forest to local processors, total time between timber sale purchase and harvest, and overall sawmill capacity and utilization. The basic approach used in the procedures (Morse 2000a) adapts to current conditions in the timber industry and the Tongass National Forest timber sale program. Industry activities are monitored, including annual timber harvest levels, and timber sale program targets are developed by estimating the amount of timber needed to replace harvested volume on an annual basis.

The Morse Methodology is an example of adaptive management because it addresses uncertainty in a flexible, objective, and science-based manner. If timber harvest levels drop below expectations while other factors remain constant, future timber sales are also reduced to levels needed to maintain target level of timber under contract. Conversely, if timber harvest levels rise unexpectedly, future timber sale targets also increase to ensure inventory of volume under contract is not exhausted. The Morse Methodology is implemented, on an annual basis, to estimate current timber supply needed to meet market demand – as required by the Tongass Timber Reform Act's 'seek to meet market demand' provision. Of noteworthy importance, the Morse Methodology was peer-reviewed and publicly-reviewed at the time of development (2000a). It has since withstood multiple objections as memorialized in Tongass National Forest plan revisions and amendments.

Tongass National Forest timber sale offer targets are calculated on an annual basis with findings presented in an Alaska Region briefing paper (Harris 2018) and used to guide the timber management program. Estimated Tongass National Forest timber demand for fiscal year 2018 ranged from 58 to 62 million board feet (MMBF) depending upon projected long-term scenario including the transition to young growth harvest, growing wood energy markets, and domestic housing market rebound (Table 1), as originally projected by Daniels et al. (2016).



Table 1. Tongass National Forest Estimated Timber Purchase and Sale Offer – Fiscal Year 2018

Model Item	Description	Notation	Baseline	Scenario 1 Young Growth Transition	Scenario 2 Wood Energy Growth	Scenario 3 Housing Market Rebound
Demand						
A	Installed and Operable Sawmill Capacity [MMBF, Log Scale]	a	114	114	114	114
B	Industry Rate of Capacity Utilization ¹	b	24%	24%	24%	24%
C	Share of Industry Raw Material Provided by Tongass National Forest	c	99%	99%	99%	99%
D	Percent of Useable Wood in Average Tongass National Forest Timber Sale	d	82%	82%	82%	82%
E	Annual Tongass National Forest Timber Consumption [MMBF, Theoretical]	$e = ((a*b)*c)/d$	33	33	33	33
F	Standard Deviation of Lead Time [Years]	f	.99	.99	.99	.99
G	Average Lead Time [Years]	g	1.28	1.28	1.28	1.28
H	Probability of Meeting Consumption [One-Tailed Test for 90% at Infinity]	h	1.28	1.28	1.28	1.28
I	Timber Inventory Requirements [MMBF]	$i = (e*g)+(e*h)*f$	84	84	84	84
J	Volume Under Contract [MMBF]	j	83	83	83	83
K	Projected Harvest [MMBF], 2018 [per PNW]	k	43	43	46	43
L	Projected Inventory Shortfall [MMBF]	$l = i-j$	1	1	1	1
M	Low Range of Expected Timber Purchases [MMBF], FY18	$m = \text{if } 1 < 0, k + 1, \text{ else } k$	43	43	46	43
N	High Range of Expected Timber Purchases [MMBF], FY18	$n = \text{if } 1 < 0, \text{ else } k + 1$	44	44	48	45
O	Expected Timber Purchases, FY18 [MMBF]	$o = \text{median } (m:n)$	44	44	47	44
Offer						
P	Fall-Down Between Volume Offered and Sold	p	33%	33%	33%	33%
Q	Offer Needed to Meet Volume Under Contract (VUC) Objectives [MMBF]	$q = o+(p*o)$	58	58	62	58

Note: Information represents fiscal year 2018 data and may not represent current fiscal year data.
¹Based on standard 250-day per year, two shifts per day annual operating schedule.

PROJECTING PLANNING-CYCLE TIMBER DEMAND

Morse (2000a) outlined a monitoring strategy with specific criteria for action that guides Tongass National Forest annual timber demand determinations. The overall approach, however, is informed by longer-term planning-cycle market demand for Tongass National Forest timber. The Pacific Northwest Research Station has a 25-year history and tradition of conducting longer-term timber demand and price forecasting to support Tongass National Forest planning including Brooks and Haynes (1990, 1994, 1997), Brackley et al. (2006a), and Daniels et al. (2016). Procedures developed by Morse (2000a) to estimate timber sale offer target (i.e., timber supply) incorporates Pacific Northwest Research Station timber demand estimates as one of 15 inputs



in the annual timber demand calculation. The Morse Methodology relates Pacific Northwest Research Station’s planning-cycle timber demand projections into an annual calculation of timber sale offer targets.

Pacific Northwest Research Station derived demand analyses estimate the quantity of Tongass National Forest timber required to satisfy projected demand for forest products given harvest by other regional landowners and assumptions about future market conditions and prices. Analyses and timber demand projections, completed by Pacific Northwest Research Station, ensure compliance with meeting Tongass Timber Reform Act requirements directing the national forest to “...seek to provide a supply of timber from the Tongass National Forest which (1) meets the annual market demand from timber from such forest and (2) meets the market demand for timber from such forest *for each planning cycle*” (emphasis added).

Substantive findings from the five-year review of the 2008 *Tongass Land and Resource Management Plan*, changes in forest policy regarding Tongass National Forest timber harvest, and changes in land ownership prompted an amendment to the 2008 *Tongass Land and Resource Management Plan*. Amending the Tongass National Forest’s plan necessitated an update of planning-cycle timber demand estimates. During 2016, Pacific Northwest Research Station published *Tongass National Forest Timber Demand: Projections for 2015 to 2030* (Daniels et al., 2016). Daniels et al. (2016) identifies a baseline deterministic model and three alternative future scenarios representing the transition to young growth, growing wood energy markets, and domestic housing market rebound (Table 2). Tongass National Forest planning-cycle timber demand is projected to range from 45 to 58 million board feet (MMBF) during the next fifteen years.

Table 2. Tongass National Forest, Timber Demand Projections [MMBF]

Year	Baseline	Scenario 1 Young Growth Transition	Scenario 2 Wood Energy Growth	Scenario 3 Housing Market Rebound
2015	40.9	40.9	40.9	40.8
2016	41.6	41.6	41.6	41.6
2017	42.3	42.3	43.4	42.5
2018	43.1	43.1	46.3	43.3
2019	43.8	43.8	49.2	44.1
2020	44.5	44.5	52.1	45.0
2021	45.3	45.3	55.1	45.8
2022	46.0	46.0	58.0	46.7
2023	46.7	46.7	60.9	47.5
2024	47.5	47.5	63.8	48.4
2025	48.2	44.0	63.0	45.0
2026	48.9	44.5	65.7	45.6
2027	49.7	45.0	68.4	46.2
2028	50.4	45.5	71.0	46.8
2029	51.1	45.9	73.7	47.4
2030	51.9	46.4	76.4	47.9
Average	46.4	44.6	58.1	45.3

Source: *Tongass National Forest Timber Demand: Projections for 2015 to 2030* (PNW GTR-934; Daniels et al., 2016)

Of noteworthy importance, new planning-cycle timber demand projections (Daniels et al., 2016) do not require changing the underlying methodology for annual timber offer calculations in the procedure outlined by Morse (2000a). Morse 2000b, the spreadsheet model that implements the procedures (Morse 2000a), outlines how information regarding timber market demand is used to schedule timber sale offerings. New Pacific Northwest Research Station timber demand projections requires the Morse (2000b) timber offer spreadsheet model be slightly modified to reflect new scenarios developed by Daniels et al. (2016). Minor modification of the timber offer calculation spreadsheet model allows the procedure outlined in Morse (2000a) to continue to be followed in developing short-term timber sale offer targets, as summarized in the *Tongass Land and Resource Management Plan*, Record of Decision (2016:27-28).



2016 TONGASS NATIONAL FOREST PLAN AMENDMENT

Public debate concerning market demand for Tongass National Forest timber, and how the timber sale program relates to market demand, has been ongoing for decades. The debate was renewed during the *Tongass National Forest Land and Resource Management Plan's* 2016 amendment (hereafter 2016 forest plan amendment) to transition the timber program from predominantly old-growth to young-growth timber harvest during the next 10 to 15 years. The forest plan amendment was premised on achieving certain objectives including transitioning the timber program, maintaining a viable timber industry, operating within an identified suitable land base that maintains the forest plan's conservation strategy while producing an appropriate volume of timber, and complying with Tongass Timber Reform Act's 'seek to meet market demand' provision.

New longer-term planning-cycle timber demand projections were needed to accommodate changes in forest policy regarding Tongass National Forest timber harvest, land ownership adjustments, the export policy, and profile of foreign log demand. Pacific Northwest Research Station published new planning-cycle demand projections (Daniels et al., 2016) that identified a baseline deterministic model and three future scenarios representing alternative futures for Southeast Alaska's forest products industry – the transition to young-growth timber harvest, growing wood energy markets, and rebound in domestic housing market. The forest plan amendment utilized a projected timber demand of an annual average of 46 MMBF of Tongass National Forest timber. Of noteworthy importance, Daniels et al.'s (2016) baseline model and a range of potential demand scenarios informed the construction of plan components resulting in the integration of the projected 46 MMBF average annual demand for Tongass National Forest timber to ensure the goal of transitioning the timber program within 10 to 15 years.

The forest plan amendment's *Record of Decision* (Stewart 2016) acknowledged projecting long-term timber market demand is inherently uncertain and differences of opinion exist, however, utilizing 46 MMBF as the projected timber sale quantity was considered reasonable, conservative, and based on an evaluation of the best available information. Furthermore, while 46 MMBF is the annual average of demand for Tongass National Forest timber in the baseline model, it is also reflected in all three future scenarios at varying points in time.

2016 forest plan amendment objectives were designed to provide a measurable rate of progress towards the acceleration of the transition to primarily young-growth harvest while providing sufficient old-growth timber to meet projected market demand while also supporting the industry's retooling to process young growth timber. The projected timber sale quantity (PTSQ) consists of old-growth and young-growth timber harvest with old-growth decreasing as a share of total volume (46 MMBF) as young growth becomes more economic to harvest. Old-growth volume offered continues to decrease until it reaches 5 MMBF per year, at which point it stabilizes as 5 MMBF to support small and micro sale industry – and remains at this level throughout the planning period.



MONITORING

Both the forest plan amendment’s *Reviewing Officer Response to Objections* (Pendleton 2016) and *Record of Decision* (Stewart 2016) upheld Daniels et al. (2016) long-term planning-cycle timber demand projections as based on best available information, peer-reviewed methodology, and adequate to support forest planning and decision-making. Both documents, however, also recognize the controversial nature and ongoing debate regarding Tongass National Forest long-term timber demand projections – as evidenced in objections received on both sides of issue. Through the 2016 forest plan amendment process, it became evident there is no common ground with regard to Tongass National Forest timber demand.

Due to ongoing external interest in projecting Tongass National Forest market demand and changing conditions that could impact market demand, the reviewing officer directed the responsible official to implement an aggressive monitoring program to compare actual timber harvest with Daniels et al. (2016) projected timber harvest and make any needed changes via the Morse Methodology. Further guidance directed the Tongass National Forest to: 1) monitor harvest over the next five years (2016 – 2021) including a consideration of any constraints on that harvest; 2) monitor data related to other assumptions utilized by Daniels et al. (2016); and 3) report on any different or unexpected information that warrants further review in another plan amendment. The following sections provide information integral to monitoring Tongass National Forest conditions.

Table 3. Southeast Alaska Timber Harvest, Calendar Years 2002 – 2017 [MMBF]

Year	Tongass National Forest	State of Alaska	Native Corporation	Total	Tongass National Forest Proportion
2002	31.9	57.3	101.7	190.9	17%
2003	48.1	34.8	105.7	188.6	26%
2004	49.2	24.2	98.9	172.3	29%
2005	46.6	42.9	103.9	193.4	24%
2006	40.0	44.6	71.2	155.8	26%
2007	22.5	44.6	50.0	117.1	19%
2008	30.0	11.9	52.3	94.2	32%
2009	28.3	13.5	51.8	93.6	30%
2010	35.7	10.5	66.4	112.6	32%
2011	31.6	16.3	63.1	111.0	28%
2012	17.5	10.8	56.1	84.4	21%
2013	41.2	11.2	47.4	99.8	41%
2014	36.7	12.0	29.3	78.0	47%
2015	59.5	3.40	32.4	95.3	62%
2016	43.5	6.2	34.6	84.3	52%
2017	16.0	27.5	46.4	89.9	18%
2015 – 2017 Average	39.7	12.4	37.8	89.8	44%



Source: USDA Forest Service 2018
 Notes: State of Alaska includes Division of Forestry, Mental Health Trust, and University of Alaska lands.
 Harvest volume reported by calendar year, in million board feet (MMBF), and includes sawlog and utility.

Timber Harvest

From 2002 to 2017, Southeast Alaska total annual timber harvest significantly varied, ranging from approximately 84 (2016) MMBF to 193 (2005) MMBF. During the same timeframe, Tongass National Forest annual harvest also varied from approximately 16 MMBF (2017) to 60 MMBF (2016). Tongass National Forest timber harvest, as a percent of total Southeast Alaska timber harvest, has ranged from 17 percent (2002) to 62 percent (2015). During 2017, 16 MMBF was harvested off the Tongass National Forest, representing 18 percent of total Southeast Alaska timber harvest. Notably, 16 MMBF is significantly lower than the fiscal year 2017 estimated annual timber demand of 58 to 62 MMBF depending upon the projected scenario (Harris 2018).

During more recent years (2015 – 2017), Daniels et al. (2016) projected timber harvest off the Tongass National Forest to range from 41 MMBF (2015) to 42 MMBF (2017) with a three-year total harvest of nearly 125 MMBF (Table 4). Actual Tongass National Forest timber harvest exceeded projections during 2015 and 2016, but fell significantly short during 2017 (-26 MMBF). Considered in aggregation, Tongass National Forest timber harvest (119 MMBF) fell slightly short of projected timber harvest (125 MMBF) by approximately 6 MMBF during recent years (2015 – 2017).

Table 4. Projected versus Actual Timber Harvest, Calendar Years 2002 – 2017 [MMBF]

Year	Tongass National Forest	State of Alaska	Native Corporation	Total	Tongass National Forest
2015					
Projected	40.9	18.2	61.5	120.6	34%
Actual	59.5	3.40	32.4	95.3	62%
Difference	+18.6	-14.8	-29.1	-25.3	Not Applicable
2016					
Projected	41.6	18.6	62.8	123.0	34%
Actual	43.5	6.2	34.6	84.3	52%
Difference	+1.9	-12.4	-28.2	-38.7	Not Applicable
2017					
Projected	42.3	18.9	64.0	125.2	34%
Actual	16.0	27.5	46.4	89.9	18%
Difference	-26.3	+8.61	-17.6	-35.29	Not Applicable
2015 – 2017					
Projected	124.8	55.7	188.3	368.8	34%
Actual	119.0	37.1	113.4	269.5	44%
Difference	-5.8	-18.6	-74.9	-99.3	Not Applicable

Source: USDA Forest Service 2018
 Notes: State of Alaska includes Division of Forestry, Mental Health Trust, and University of Alaska public lands. Harvest volume reported by calendar year, in million board feet (MMBF), and includes sawlog and utility.

From 2015 to 2017, both State of Alaska and Alaska Native corporation timber harvest fell short of Daniels et al. (2016) projections (Table 4). State of Alaska actual timber harvest fell short of projections during 2015 (-15 MMBF) and 2016 (-12 MMBF), but exceeded projections during 2017 (9 MMBF); three-year shortfall totaled -19 MMBF. Alaska Native corporation timber harvest fell short of projections during all three years; 2015 (-29 MMBF), 2016 (-28 MMBF), and 2017 (-18 MMBF). Three-year Alaska Native corporation shortfall totaled -75 MMBF. Total timber harvest, across all three land ownerships, fell short of Daniels et al. (2016) projections by nearly 100 MMBF during recent years (2015 – 2017).

Sawmill Utilization

Since 2000, the Forest Service has conducted an annual key-informant survey of moderately-sized and regularly-operating sawmills across the Tongass National Forest, spanning from Haines to Metlakatla. The purpose of the annual survey is to gather information regarding current sawmill operations including total estimated capacity, actual production, harvested lands, forest products, market destinations, and general



business expansion and retention challenges. The annual *Tongass National Forest: Sawmill Capacity and Production Report* summarizes key survey findings, provides brief supplemental discussion, and presents a longitudinal perspective of sawmill performance during the past seventeen years (Parrent and Grewe 2018).

During 2000, 22 medium- to large-scale sawmills operated across the Tongass National Forest with the greatest concentration located in southern Southeast Alaska. Since 2000, half (50%) of these sawmills have closed and been uninstalled; no new sawmills of equal size classification have been established during the same timeframe. During 2017, eight sawmills (36%) remained active and eleven sawmills (50%) were no longer in production

(i.e., decommissioned, uninstalled). Three sawmills (14%) remain installed with equipment onsite, but were idle during 2017 (Parrent and Grewe 2018).

Of noteworthy importance, numerous family-owned and operated small sawmills that operate on a seasonal, part-time, or contingent basis have operated across the region since 2000, each with varying degrees of success producing forest products for local markets. During 2018, nearly two dozen small sawmills (22) were operating across the region as evidenced by State of Alaska active business licenses (ADCCED 2018). While the medium to large sawmills continue to decline in numbers and operations, small sawmills are increasing in numbers and operations.

Table 5. Sawmill Utilization, Calendar Years 2000 – 2017 [MBF]

Year	Active Sawmills	Installed Sawmill Capacity	Estimated Sawmill Consumption	Sawmill Utilization
2000	19	501,850	87,117	17%
2001	11	Not Available	Not Available	Not Available
2002	13	453,850	39,702	9%
2003	13	369,850	32,005	9%
2004	12	370,350	31,027	8%
2005	11	359,850	34,695	10%
2006	14	354,350	32,141	9%
2007	11	292,350	31,717	11%
2008	11	282,350	23,666	8%
2009	10	249,350	13,422	5%
2010	10	155,850	15,807	10%
2011	10	160,000	11,546	7%
2012	10	120,400	13,842	12%
2013	10	120,400	17,593	15%
2014	10	119,400	18,830	16%
2015	9	113,650	18,540	16%
2016	9	113,650	17,912	16%
2017	8	113,650	15,544	14%
Average	11	279,300	28,794	10%

Source: Parrent and Grewe, 2018

Table 6. Southeast Timber Industry Employment, Calendar Years 2002 to 2017

Year	Tongass Logging	Tongass Sawmill	Total Tongass Employment	Other Logging	Other Sawmill	Total Other Employment	Total Industry Employment
2002	63	110	173	299	40	339	512
2003	108	91	199	298	64	362	561
2004	82	95	177	220	53	273	450
2005	88	96	184	263	52	315	499
2006	81	77	158	217	46	263	421
2007	44	70	114	225	54	279	393
2008	52	70	122	118	24	142	264
2009	48	39	87	110	19	129	216



Southeast sawmill installed capacity and estimated sawmill consumption have consistently declined since 2000 – largely a consequence sawmills ceasing operations and challenges with timber supply from multiple land ownerships. For nearly two decades, Southeast sawmills have been significantly underutilized with total utilization ranging from five percent (2009) to 17 percent (2000). During the past 17 years, Southeast sawmills have operated at approximately 10 percent of total capacity.

2010	61	43	104	133	7	140	244
2011	62	47	109	150	3	153	262
2012	42	47	89	144	11	155	244
2013	75	48	123	106	14	120	243
2014	86	60	146	96	7	104	249
2015	104	58	162	63	12	75	237
2016	81	70	151	76	1	77	228
2017	24	37	61	109	32	141	202
Average	70	55	125	83	15	98	222

Note: Tongass employment estimates based on ratio of Tongass National Forest timber harvest to total Southeast Alaska harvest
 Source: USDA Forest Service 2019

Employment

Since 2002, Southeast Alaska timber industry employment has consistently declined on a year-to-year basis. From 2002 – 2017, Southeast total timber industry employment ranged from 202 to 561 jobs with an annual average of 222 jobs, including both logging and sawmill jobs. Notably, 2017 marked an all-time timber industry employment low with only 202 total jobs including both sawmill and logging jobs supported by federal government, state government, and Alaska Native corporation land ownerships.

During the same timeframe, timber industry employment supported by the Tongass National Forest timber program has ranged from 61 to 199 sawmill and logging jobs with an annual average of 125 jobs. Notably, 2017 marked an all-time low of Tongass National Forest supported timber industry employment with only 61 jobs. Employment supported by timber harvest activity on other land ownerships, including State of Alaska and Alaska Native corporations, ranged from 75 jobs (2015) to 362 jobs (2003) with an annual average of 98 jobs.

Assumptions

Daniels et al. (2016) approach to developing long-term planning-cycle timber demand utilized four analytical steps: 1) historical estimates of forest products output (by product and destination) are gathered and projected to year 2030; 2) raw material requirements necessary to support this output are calculated by using explicit product recovery and conversion factors; 3) timber harvest equivalent is calculated and allocated by timber owner (i.e., Tongass National Forest, State of Alaska, Alaska Native corporation); and 4) analysis is repeated to model the impact on harvest of varying management scenarios. The result is an estimate of timber harvest volume necessary to meet projected demand from the Tongass National Forest, State of Alaska, and Alaska Native corporations.

This basic approach to developing derived timber demand projections is informed by historical data and also guided by an explicit set of assumptions. Daniels et al. (2016) assumed future Southeast Alaska timber harvest would follow past trends of timber harvest across land ownerships, Southeast Alaska forest products would



continue to be sold domestically and internationally, and the United States would continue to consume imported forest products from international trade partners.

Daniels et al. (2016) made additional assumptions regarding Southeast forest product markets including: 1) timber harvested across Southeast Alaska would continue to be exported to the Pacific Rim as unprocessed sawlogs; 2) low to no market demand for utility logs would continue due to overall low economic value; 3) softwood lumber products would continue to be produced and sold to local, regional, and Lower 48 markets – and exported to the Pacific Rim; 4) markets for Southeast Alaska sawmill residue would remain limited and largely focused on local markets.

Daniels et al. (2016) assumptions remain valid and continue to characterize current conditions across the Southeast Alaska timber industry. Southeast Alaska unprocessed sawlogs continue to be exported to the Pacific Rim, there continues to be low market demand for utility logs, softwood lumber products are sold domestically and internationally, and markets for mill residue continue to be limited.

New Information

During the past three years, there has not been new information of magnitude to warrant another plan amendment. Daniels et al. (2016) assumptions have generally held true. Tongass National Forest actual timber harvest, considered in aggregate, has closely aligned with projected timber harvest. The substantive difference between Daniels et al. (2016) projections and current conditions is timber harvest off both State of Alaska and Alaska Native corporation lands, which have lagged behind projections. However, only three years have passed since the 2016 forest plan amendment, and year-to-year timber harvest can significantly vary as evidenced by long-term historical data.

During recent years, however, new information has been introduced that might impact the short- and long-term future of the Southeast timber industry. Ongoing and escalating trade tension, and political retaliatory crossfire, between the United States and China continues to introduce instability to the timber industry due to lingering threats and impacts of trade tariffs. China has become a major importer of Southeast Alaska timber and now imposes a ten percent tariff on imported US forest products – immediately threatening the viability of Southeast Alaska log exporters. However, some believe aggressive China tariffs on US forest products may create opportunity for US sawmills and manufacturing facilities due to increased domestic log supply and lower pricing due to restricted export markets.

To the surprise of many, Sealaska announced a multimillion-dollar deal to keep trees in the ground during 2018. The Alaska Native corporation placed nearly half of their total land base into carbon sequestration through California's cap-and-trade carbon sequestration program. Thousands of acres of young- and old-growth trees will remain intact over the next 100 years as California greenhouse gas emitters are now able to buy carbon offset credits from Sealaska. In application, trees from 165,000 acres of Sealaska's 360,000 total land base (46%) will be set aside and protected from large-scale timber harvest, to store carbon from the atmosphere. Resultant "carbon credits" are sold to greenhouse gas emitters through California's cap-and-trade program.



CONCLUSION

At the close of the 2016 forest plan amendment, the Tongass National Forest was instructed to implement a monitoring program to compare actual timber harvest with Daniels et al. (2016) projected timber harvest and make any needed changes via the Morse Methodology including: 1) monitoring harvest over the next five years (2016 – 2021) including a consideration of any constraints on that harvest; 2) monitoring data related to other assumptions utilized by Daniels et al. (2016); and 3) reporting on any different or unexpected information that warrants further review in another plan amendment. This report presents a review of Tongass National Forest timber harvest, long-term planning cycle timber demand assumptions, and unexpected information of magnitude to warrant another forest plan amendment. Notably, this review was completed during the third year of plan implementation and prior to the five-year monitoring plan – as originally instructed by the reviewing officer (Pendleton 2016).

During the past three years, the Tongass National Forest's total timber harvest is nearly on-target with Daniels et al. (2016) projections, but State of Alaska and Alaska Native corporation total timber harvest has lagged behind projections. Southeast Alaska sawmills continued to be underutilized and total timber industry employment is at an all-time low. Of noteworthy importance, as the total number of moderate- to large-scale sawmills continues to decline, the total number of small-scale family-owned and operated sawmills continues to grow and produce forest products for local markets.

In developing longer-term planning-cycle timber demand projections, Daniels et al. (2016) generally assumed the majority of Southeast Alaska timber harvest would be exported to the Pacific Rim, market demand for utility logs would remain low, softwood lumber products would continue to be sold in domestic and international markets, and sawmill resident demand would remain low and focused on local markets. These assumptions have generally held true during the past three years.

Changing timber industry conditions, forest product markets, and timber harvest data are incorporated into the Morse Methodology on an annual basis. As timber industry evolves, and market conditions change, the Morse Methodology adapts to allow the industry to accumulate adequate timber volume under contract to keep pace with actual harvest activity. Industry activities are monitored, including annual timber harvest levels, and timber sale program targets are developed by estimating the amount of timber needed to replace volume harvested on an annual basis. Since the 2016 forest plan amendment was implemented, data regarding timber industry conditions has been updated on an annual basis and used as inputs to the Morse Methodology. In this manner, the Morse Methodology adapts to current timber harvest activities and overall market conditions – and eliminates the need to amend the forest plan to accommodate year-to-year changes in timber harvest, timber industry conditions, or market conditions.



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