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Draft Timber Resources Assessment

Tongass National Forest Plan Revision

Forest Service
Alaska Region
Tongass National Forest
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Cover Photo: Young-growth forest on Kosciusko Island by Sheila Spores.

Draft Forest Management and Timber Assessment

Tongass National Forest Plan Revision

Forest Service, Alaska Region

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Resource Importance

Forest management, including timber harvest, is an important tool for establishing and maintaining sustainable and diverse communities, economies, and ecological conditions. In Southeast Alaska, timber production is a valuable ecosystem service provided by the Tongass NF and other forest lands. Timber harvest helps meet the demands of the public for products such as sawlogs, carving logs, firewood, and specialty products such as musical instrument wood, shakes and shingles, boat wood, posts and pilings, and high-quality construction materials. Timber harvest also contributes to social and economic sustainability by supporting employment opportunities and economic diversification in rural communities; providing markets for byproducts of forest restoration activities; supporting traditional and cultural use of the forest; and maintaining infrastructure that supports access for subsistence and other resource uses that contribute to community well-being (see also the Subsistence and Socioeconomic sections).

Resource History and Current Management Direction

Resource Context and History

Since establishment of the Tongass NF in 1907, forest management and timber harvest across the region have adapted to meet changing societal demands (Figure 1), from supplying primarily the needs of local residents and those of the fishing and mining industries in the early 1900s, to supporting airplane manufacturing with Sitka spruce during the first and second world wars, and supporting a regional pulp industry from the 1950s to the 1990s (for a succinct history of timber harvest and uses on the Tongass NF, see Morse 2000). Timber production on the Tongass has decreased substantially since the 1990s, corresponding with pulp mill and sawmill closures and changes in political, social, economic, and regulatory demands (Resource Development Council 2024, see also Figure 1 and Table 3).

Since completion of the 1997 Tongass NF Land and Resource Management Plan (Forest Plan) region-wide timber harvest including on State of Alaska lands (managed by the Division of Forestry, Alaska Mental Health Trust, and University of Alaska) and Native Corporation lands (managed by Sealaska, the Alaska Native Regional Corporation, as well as 13 Alaska Native Village Corporations) has declined from just over 500 MMBF to about 50 MMBF in 2021 (Figure 2).

Since establishment, approximately 400,000 acres of timber land on the Tongass NF have been harvested and have regenerated to young-growth forest. This equates to about 4% of the forested acres and 8% of the productive forest acres on the Tongass.

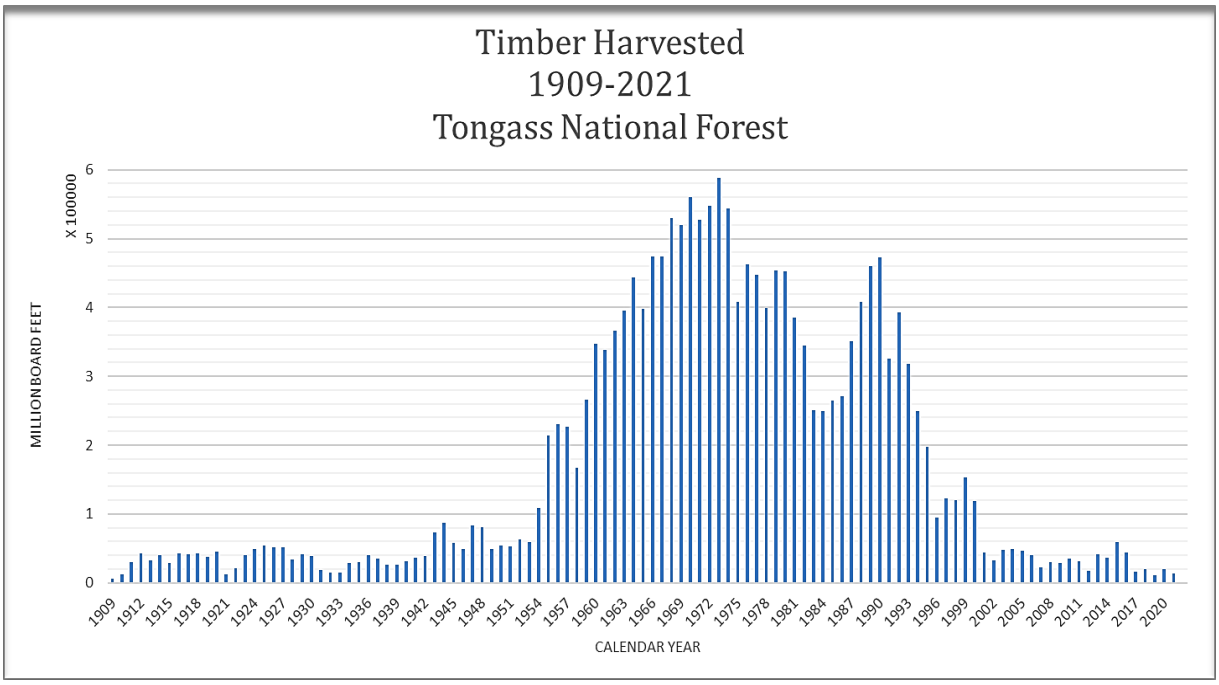

Figure 1. Tongass NF timber harvest history 1909-2021 (Forest Management Reports and Accomplishments 2024.)

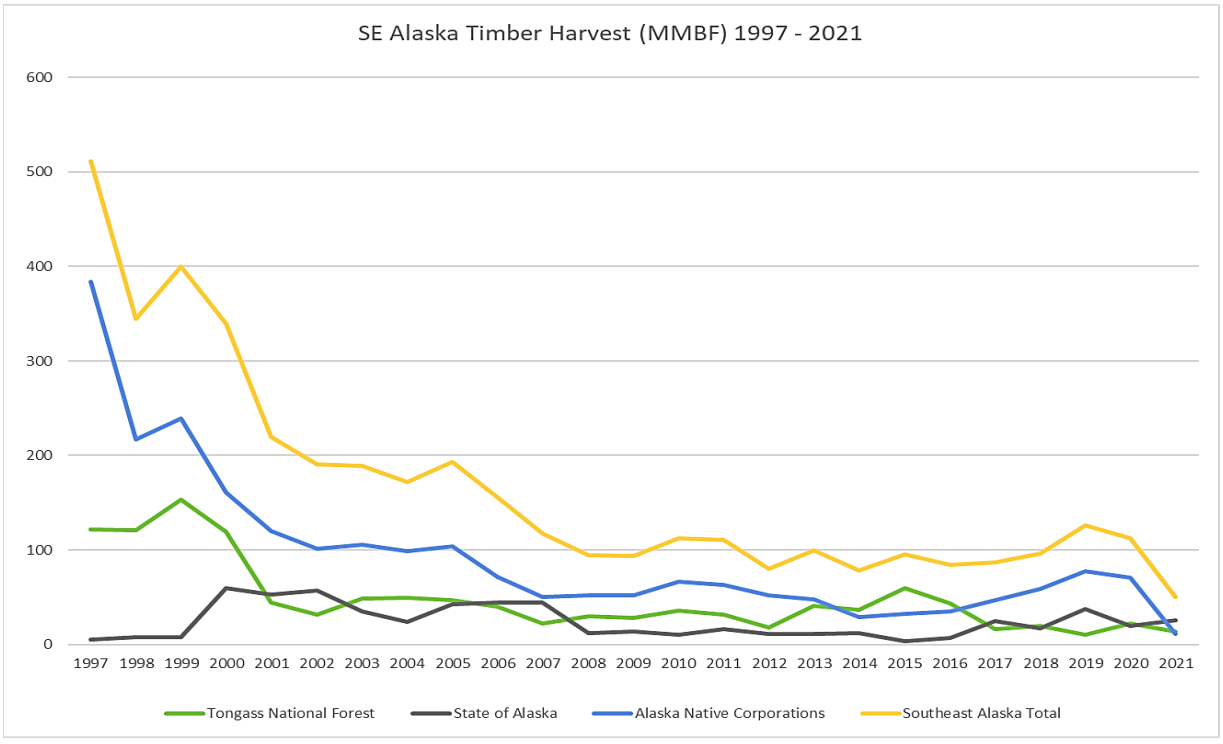

Figure 2. Southeast Alaska timber harvest volume (MMBF), 1997–2021

Current Management Direction

Legal and Regulatory Compliance

The 1997 Tongass Land and Resource Management Plan, as amended in 2016 (generally referred to as the 2016 Forest Plan) provides the current land and resource management direction for the Tongass NF. The Forest Plan was amended in 2016 in response to a July 2013 memo issued by the Secretary of Agriculture (Memorandum 1044-009), "*Addressing Sustainable Forestry in Southeast Alaska*," which directed the Forest Service to transition timber harvest on the Tongass National Forest from old growth to young growth over the next 10 to 15 years (USDA 2013, Tongass FEIS 2016). The timeframe was intended to conserve old growth forests while allowing the forestry industry time to adapt. The memo emphasized that the transition was necessary to conserve the Tongass NF under the principles of the Multiple-Use Sustained-Yield Act of 1960 and the Tongass Timber Reform Act while maintaining a viable timber industry to provide jobs and opportunities for residents of Southeast Alaska.

Direction in the 2016 Forest Plan includes timber production calculations required by the 2012 Planning Rule: Sustained Yield Limit (SYL), Lands Suitable and Not Suitable for Timber Production, Projected Wood Sale Quantity (PWSQ), and Projected Timber Sale Quantity (PTSQ) (Table 1, Table 2). In addition, the Tongass Old Growth Habitat Conservation Strategy and the Adaptive Management Plan for Timber remain key elements of the Forest Plan that pertain to timber production.

For the current Forest Plan Revision, Lands Suitable for Timber Production, SYL, PTSQ, and PWSQ values from the 2016 Forest Plan will be presented as the no action alternative in the EIS and values will be calculated for the proposed action and alternatives identified during the forest plan revision process. There is a need to update the Lands Suitable for Timber production inventory during the Forest Plan revision due to several changes in the National Forest land base and other factors including land exchanges, land selections, and land transfers that have occurred since 2016, as well as updated vegetation mapping and new available data.

The 2016 Forest Plan included several goals associated with forest management and timber harvest on the Tongass during the first 5 years of implementation and throughout the 15-year transition period. In 2022, Tongass NF staff completed a review of progress on the five 5-year commitments described in the 2016 Forest Plan and Record of Decision (Meridian Institute 2023). Tongass NF has been unable to achieve planned work at the intended pace outlined in the 2016 Forest Plan due to a variety of factors including budgets, staffing, shifting management priorities, and litigation.

Sustained Yield Limit (SYL)

The sustained yield limit (SYL) is the amount of timber that could be produced on all lands that may be suitable for timber production, assuming all these lands were managed to produce timber without considering other multiple uses or fiscal or organizational capability. The SYL is the amount of timber that can be removed annually in perpetuity on a sustained-yield basis from the applicable national forest.

The SYL for the Tongass NF under the current management direction of the 2016 Forest Plan is estimated to be 248 million board feet (MMBF) per year (USDA FS 2016, Appendix A; Table 1).

Lands Suitable for Timber Production

Lands suitable for timber production constitute the land base for vegetation management practices associated with timber production. The status of land as suitable for timber production does not necessarily mean that timber production is the primary purpose of management on those lands. Timber production may be a secondary use of the land and needs to be compatible with the achievement of

desired conditions and objectives established by the plan for those lands (36 CFR 219.11(a)(1)(iii)), and some regular flow of timber products may be expected.

Suitability of lands is a determination made regarding the appropriateness of various lands within a plan area for various uses or activities, based on the desired conditions applicable to those lands. Identifying lands not suited for timber production is accomplished by following the process outlined in 36 CFR 219.11 and in Forest Service Handbook 1909.12, Chapter 60, Sections 61.11 to 61.14. In accordance with the 2012 planning rule, an analysis of lands suitable for timber production on the Tongass NF was completed as part of the 2016 Forest Plan Amendment. The inventory of lands suitable for timber production in the existing 2016 Forest Plan was about 568,000 acres (Line F of Table 2) (USDA FS Appendix A 2016). Model implementation reduction factors (MIRFs) were then applied to compensate for incomplete knowledge of on-the ground conditions. Due to the expanse and terrain of the forested lands on the Tongass, a complete and current ground survey is not possible.

Table 1. 2016 Forest Plan Sustained Yield Limit (SYL), Projected timber sale quantity (PTSQ), and Projected wood sale quantity (PWSQ) (USDA FS 2016, Appendix A).

Planned Timber Sale Program, Tongass National Forest, including Annual Average Volume Outputs for 1st and 2nd Decade				
Sustained Yield Limit (SYL):	**248 MMBF or 55 MMCF[1] per year**			
	First Decade		**Second Decade**	
Timber Products				
	MMCF	**MMBF**	**MMCF**	**MMBF**
Lands suitable for timber production				
Sawtimber	10.3	46.0	16.0	71.8
Other products				
Lands not suitable for timber production				
Sawtimber				
Other products				
Projected Timber Sale Quantity (PTSQ)	10.3	46.0	16.0	71.8
Other Estimated Wood Products[2]				
	MMCF	**Tons**	**MMCF**	**Tons**
Fuelwood	0.5	10,000	1.0	20,000
Projected Wood Sale Quantity (PWSQ)	10.8		17.0	

[1] MMCF: Millions of cubic feet
MMBF: Millions of board feet
[2] Does not include wood provided through the Tongass personal use firewood or free use timber programs.

Table 2. Lands suitable for timber production (USDA FS 2016, Appendix A)

	Land Classification Category	Acres
A	Total National Forest System lands within the plan area	16,755,685
B	Lands not suited for timber production due to legal or technical reasons	15,794,004
C	Lands that *may* be suited for timber production (A-B)	961,681
D	Lands not suited for timber production because timber production is not compatible with the desired conditions and objectives established by the plan	393,648
E	Total lands not suited for timber production (B+D)	16,187,652
F	Total lands suited for timber production (mapped suitable) because timber production is compatible with the desired conditions and objectives established by the plan (C-D)	568,033
G	Model Implementation Reduction Factor (MIRF) Acreage	90,138
H	Estimated actual suitable acreage for timber production (F-G)	477,895
I	Scheduled suitable acreage (based on modeling)	326,623

Land acres suitable for timber production on the Tongass NF have declined with each revised or amended plan since 1979 due to transfer of lands to other owners and shifts in land management goals and objectives for the Tongass NF. Lands suitable for timber production have declined from over 2.4 million acres in 1979 to about 568,000 acres in 2016 (Figure 3). This represents a decrease in the percentage of the Tongass NF land suitable for timber production from 15 percent in 1979 to 10 percent in 1991 and 3 percent in 2016.

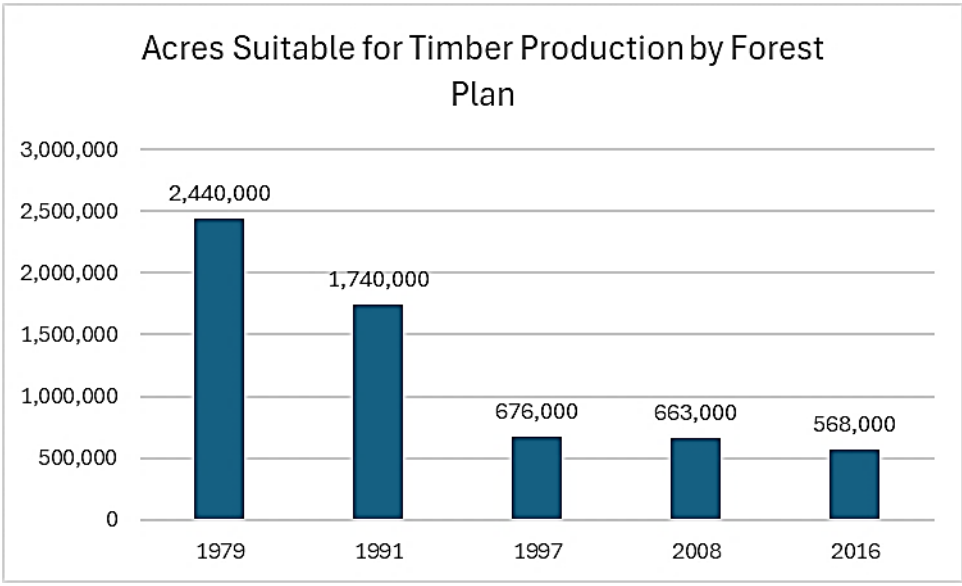

Figure 3. Acres suitable for timber production (rounded) for each Forest Plan and major amendment, by date

Projected Wood Sale Quantity (PWSQ)

The projected wood sale quantity (PWSQ) is an estimate of the volume of all timber and other wood products that is expected to be sold during the plan period from expected harvests for any purpose (except salvage harvest or sanitation harvest) on all lands in the plan area. The PWSQ includes all woody material likely to be sold from these harvests, whether the woody material meets the utilization

standards[1]. The estimation of both the PWSQ and the projected timber sale quantity (PTSQ) must consider the fiscal capability of the planning unit and be consistent with all plan components.

The PWSQ for the Tongass National Forest under the current management direction of the 2016 Forest Plan is estimated at 10.8 MMCF per year for the first decade and 17.0 MMCF per year for the second decade (USDA FS Appendix A 2016; Table 1).

Projected Timber Sale Quantity (PTSQ)

The projected timber sale quantity (PTSQ) is a subset of the PWSQ and is an estimate of the quantity of timber expected to be sold during the plan period. The volume in the PTSQ is the volume that meets utilization standards.[1] The estimation of both the PWSQ and the PTSQ must consider the fiscal capability of the planning unit and be consistent with all plan components.

The PTSQ for the Tongass National Forest under the current management direction of the 2016 Forest Plan is estimated to be 46.0 MMBF per year for the first decade, increasing to 71.8 MMBF per year for the second decade, due to more young growth reaching harvestable age (USDA FS Appendix A 2016, Table 1). As young-growth volume increases, the volume of old growth decreases to be capped at 5 MMBF per year, for the life of the plan starting in the year 2031.

Old Growth Conservation Strategy

The 1997 Tongass Forest Plan included a comprehensive science-based strategy intended to provide for long-term viability of old growth associated wildlife, well-distributed across Southeast Alaska. This strategy, referred to as the Tongass Old-Growth Conservation Strategy, was retained with minor modifications through 2008 and 2016 amendments of the Forest Plan. The Strategy includes a network of habitat reserves linked by corridors of old growth forest and a collection of Standards and Guidelines that provide additional protection for vulnerable wildlife species. Elements of the Strategy are dispersed throughout the Forest Plan, with standards and guidelines intended to protect certain habitats such as beach and estuary fringe and old growth dependent species. Forest Plan components that comprise the Old Growth Conservation Strategy were compiled in a report to support the current revision effort (Brockman 2023).

Adaptive Management Plan for Timber

The 2008 Forest Plan introduced the Timber Sale Program Adaptive Management Strategy. This strategy divided the development LUDs, which allow timber harvest, in three phases. The strategy was aimed at reducing impacts to high-value, roadless areas of the Tongass. Under the 2008 Forest Plan, timber sales were allowed only in Phase 1 land base until the timber harvest rose to 100 mmbf for 2 consecutive years (Tongass FEIS ROD 2008), then could expand to Phase 2 lands. However, personal use of timber, microsales (timber sales of down or dead trees totaling no more than 50 thousand board feet, to supply small niche-market timber processors), salvage sales, small commercial timber sales generally less than 1 MMBF, young-growth management projects, and the roads associated with these activities, would be allowed in development LUDs outside of the Phase 1 portion of the land base (Tongass FEIS ROD 2008). The 2016 Plan Amendment changed implementation of the 2008 Adaptive Management Strategy to allow

[1] Utilization Standards for commercial removal at time of the 2016 FP Amendment were minimum 9" diameter at breast height (DBH), net 12' piece length, net 6" top diameter of inside bark (DIB), and 33.33 percent sound. Since November 2018, the Regional Forester has issued interim direction to change utilization standards to better correspond with current utilization trends, market conditions, and appraisal pricing, to minimum 9" DBH, net 16' piece length, net 7" top DIB, and 33.33 percent sound.

old growth timber harvest only in the Phase 1 portion of the land base (approximately 537,000 acres, of which 223,000 acres is old growth).

Tongass Timber Demand

In 1990, Congress passed the Tongass Timber Reform Act (TTRA). Among other provisions, the TTRA established the requirement to better understand demand for Tongass NF timber. It states:

Subject to appropriations, other applicable law, and the requirements of the National Forest Management Act of 1976 (P.L. 94-588), 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.

Under TTRA, the Forest Service must seek to provide a supply of timber to meet annual and planning cycle demand, subject to limitations such as available appropriations and multiple use and sustained yield of all renewable forest resources. Planning-cycle market demand studies have been conducted by the US Forest Service Pacific Northwest Research Station since 1990 (Brooks and Haynes 1990, 1994, 1997; Brackley et al. 2006, Daniels et al. 2016). Annual market demand is calculated and used to estimate timber sale offer target (i.e., timber supply) by translating long term timber demand projections into an annual estimate for timber sale offer targets (Grewe 2017).

Long-term timber demand analysis estimates 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. In the most recent long term timber demand study (Daniels et al. 2016), a baseline model based on projections and market shares for each market served by SE Alaska producers was developed for the period 2015-2030. The baseline model was used to construct three management scenarios representing alternative futures for timber harvest and markets in southeast Alaska: the Tongass NF young-growth transition, the Tongass NF young growth transition with expansion of bioenergy markets, and the Tongass NF young-growth transition with an increase in demand for wood products for construction. Estimates for demand from these three scenarios for the years 2015 to 2030 ranged from 40.8 MMBF to 76.4 MMBF per year (Daniels et al. 2016). Annual demand estimates for the Tongass NF for the years 2017 through 2023 range from 45 to 58 MMBF per year.

Several events have occurred since 2016 that have changed the circumstances for the planning cycle demand study. In 2021, the US Forest Service and Alaska Mental Health Trust finalized a land exchange. The exchange was required by the Alaska Mental Health Trust Land Exchange Act of 2017 and provided productive timber lands to the State of Alaska and valued recreational lands to the Tongass NF, enabling the State to provide a limited supply of old growth timber for local mills during the Tongass NF transition to young growth. Also in 2021, Sealaska Corporation announced plans to transition out of logging operations beginning in 2022, making lands available for selective harvesting, hunting, fishing and other recreation and tourism activities but decreasing the amount of timber volume harvested annually. These changes affect market and market share assumptions in the demand study. Finally, in July 2021, The US Department of Agriculture announced the Southeast Alaska Sustainability Strategy in order to help support a diverse economy, enhance community resilience, and conserve natural resources in Southeast Alaska (https://go.usa.gov/xMNzF). One of the components of the strategy called for ending large-scale, old growth timber harvest on the Tongass NF and focusing resources to support forest restoration, recreation, climate resilience, and sustainable young-growth forest management. The Southeast Alaska Sustainability Strategy does not represent law, regulation, directive, or a final agency action representing long-term management decisions on the forest; however, recent years have seen a reduction in old growth

harvest on the Tongass NF to less than 5 MMBF per year. A new long term timber demand analysis is underway at the Pacific Northwest Research Station to support the current Tongass Forest Plan revision, with results expected in March 2025.

Scope and Scale of Assessment

This assessment identifies and evaluates available information about how timber management on the Tongass NF, including harvest and production, contribute to social, economic, and ecological sustainability. The scope for assessing the timber resource on the Tongass NF includes timber harvest and timber sold, harvest and treatment types, timber and forest product demand, and logging infrastructure and employment. Forest management on the Tongass NF has the potential to impact and influence communities and economies across various land ownerships more broadly, including the geographic region known as Southeast Alaska, the entire state of Alaska, the lower 48, and international markets. Information contained within this report is presented at a scale most appropriate for the topic being discussed

Status and Trends

The following section will briefly discuss the status and trends of timber volume sold, commercial harvest, forest management, logging infrastructure, and economic considerations on the Tongass NF.

Tongass Timber Volume Offered, Sold, and Harvested

Table 3 shows the amount of timber volume offered, sold, and harvested by fiscal year (October 1 to September 30) for years 1994-2023. Volumes include sawtimber, fuelwood, pulpwood, non-sawtimber, and small roundwood products. National economic trends, National Forest funding levels, litigation, and local market conditions are some of drivers that affect the amount of timber harvest from the Tongass each year. Timber harvest on the Tongass was lowest in 2022 with 3 MMBF harvested (USDA Forest Service 2024a). The most recent 10-year sold average is 22 MMBF and the most recent 10-year harvest average is 26 MMBF. This is below the 2016 Forest Plan PTSQ of 46 MMBF and the SYL of 248 MMBF, with a 15-year schedule to reduce the old growth portion to 5 MMBF.

Table 3. Tongass NF Timber volume offered, sold, and harvested, 1994-2023 (MMBF)

Fiscal Year	Offered[1]	Sold[2]	Harvest[3]
1994	277	269	276
1995	290	261	221
1996	266	227	120
1997	162	202	107
1998	187	24	120
1999	115	61	146
2000	85	170	147
2001	68	50	48
2002	57	24	34
2003	89	36	51
2004	73	87	46
2005	110	65	50
2006	24	85	43

Fiscal Year	Offered[1]	Sold[2]	Harvest[3]
2007	32	30	19
2008	42	5	28
2009	36	10	28
2010	46	46	36
2011	44	44	33
2012	53	53	21
2013	115	16	37
2014	105	105	39
2015	43	48	57
2016	44	14	45
2017	31	31	20
2018	34	9	20
2019	28	5	11
2020	2	5	15
2021	2	2	18
2022	5	4	3
2023	4	2	18

[1]Offer- Volume advertised during the fiscal year. Does not include volume re-offered from sales receiving no bids in prior years. Source: Periodic Timber Sale Accomplishment Report (PTSAR). Trace volumes round to zero.
[2]Sold- Volume awarded during the fiscal year. Includes commercial permits (and free use beginning FY23) and volume added to sales awarded in prior fiscal years. Does not include volume resold from defaulted sales awarded in prior fiscal years. Source: Timber Cut and Sold Report (ATSA). Trace volumes round to zero.
[3] Harvest- Volume reported as cut (harvested) and paid for by timber sale purchasers during the fiscal year. Source: (USDA Forest Service 2024a- Timber Cut and Sold Report (ATSA)). Trace volumes round to zero.

Table 4 shows the amount of timber volume harvested by species on the Tongass NF by fiscal year (October 1 to September 30) for years 2013-2023. Volume includes sawtimber, fuelwood, pulpwood, non-sawtimber, and small roundwood products.

Table 4. Tongass National Forest timber harvest by species (MBF)

Fiscal Year	Alder	Sitka spruce	Softwood Other	Western Hemlock	Alaska Yellow-Cedar	Western Redcedar	Total
2013	6.0	9,854.2	0.0	22,566.1	2,379.6	2,474.6	37,280.5
2014	14.2	14,648.8	0.0	20,217.9	3,297.4	940.8	39,119.2
2015	5.0	14,783.6	0.0	34,909.0	2,266.3	4,918.7	56,882.6
2016	0.0	12,515.7	0.0	22,414.5	3,147.1	7,293.7	45,370.9
2017	0.1	3,899.1	0.0	9,817.1	2,162.0	4,132.1	20,010.3
2018	0.0	5,052.6	0.0	10,186.6	2,099.5	2,566.8	19,905.5
2019	0.0	1,999.7	0.0	5,278.5	1,802.7	2,625.0	11,705.9
2020	0.0	6,221.7	0.0	5,892.0	955.3	2,126.2	15,195.2
2021	1.5	10,844.9	59.3	4,718.7	768.1	1,446.8	17,839.3
2022	2.5	1,393.6	0.2	773.7	324.7	752.7	3,247.2
2023	0.2	14,394.5	22.6	2,831.4	115.4	688.5	18,052.6

Source: (Forest Management Reports and Accomplishments 2024- Forest Products Cut and Sold from the National Forests and Grasslands, Tongass National Forest)

Timber Sales

Young Growth and Old Growth

Timber sales on the Tongass NF can include a combination of young and old growth. Young growth exists in diverse stages, influenced by the harvest method used historically. Age of stand, past intermediate treatments such as thinning prior to harvest, and stand site quality and site productivity also influence the diversity present within young-growth stands. Beach logging was the most common practice many decades back, where some of the oldest stands of young growth can be found now.

The existing inventory of young growth on the Tongass NF is about 410,000 acres.[2] Of this, 8,750 acres is considered commercially viable in 2026 for a total of approximately 198 MMBF. One unique aspect of the 2016 Forest Plan is that to support the transition to young growth, it allows for the harvesting of trees prior to the culmination of mean annual increment (CMAI) of growth under the authority granted by Public Law (P.L.) 113–291, Sec. 3002, subsection (e)(4). This provision is valid until a total of 50,000 acres have been harvested prior to CMAI. As of this time, four projects have included young-growth forests that have or may include the CMAI exemption for a cumulative 4476 acres.

As of 2023, the Tongass NF has awarded 19 young-growth sales. In the most recent 5 years of data, 66 old growth and 14 young-growth sales were awarded, averaging 2,312 MBF and 777 MBF, respectively. (Table 5). Although a few local sawmills have begun retooling and purchasing young-growth sales, preference for old growth timber remains (Daniels et al. 2023).

Table 5. Number of timber sales and timber sold volume for old growth and young growth on the Tongass:2010 to 2023.
Source: Tongass NF timber volume under contact reports, 2010-2023, Tongass sales gates worksheets module PRP101. Includes commercial fuelwood permits, does not include scaled timber sale overrun volume reported in the year

Tongass timber sale awarded	Old growth timber sold volume (MBF)	Old growth number of sales	Young-growth timber sold volume (MBF)	Young growth number of sales
2010	59,252	26	0	0
2011	29,637	22	7,557	1
2012	41,815	27	0	0
2013	12,943	26	0	0
2014	89,569	31	0	0
2015	14,619	26	4,409	2
2016	12,655	32	0	0
2017	800	13	35,592	1
2018	9,962	15	44	1
2019	2,661	17	2,730	1
2020	2,236	11	43	2
2021	1,440	11	172	2

[2] In response to the TAC recommendations in the 2016 Forest Plan, the Tongass National Forest entered into an agreement with ADOF in 2016 to jointly conduct a forest-wide inventory of young-growth stands. The inventory data collected information covering over 42,000 acres of young growth. This information was incorporated into the Forest Planning and Projection System (FPS) that allows the inventory information to be tracked spatially and grown over time, allowing the data to not become stagnant. In addition to the actual data, the ADOF hired Terra Verde to conduct an extensive mapping exercise that subdivided all the Forest's young growth into ecological units and applied consistent vegetation labels on all polygons across the Forest. In 2021, the 2nd phase of this effort began, to include mapping of all young growth on non-National Forest System (NFS) land across SE Alaska. This effort will lead to one, unified young-growth map that can be modeled, allowing for cooperation across landowners in the region to plan for a sustainable and predictable flow of young-growth forest.

Tongass timber sale awarded	Old growth timber sold volume (MBF)	Old growth number of sales	Young-growth timber sold volume (MBF)	Young growth number of sales
2022	3,475	12	269	5
2023	1,759	15	671	4

Microsales

A microsale is a timber sale consisting of dead or down timber of approximately 50 thousand board feet (MBF) or less that a District Ranger agrees to offer for bidding (Tongass FP 2016). Microsales have traditionally been dead and down old growth timber. Assuming they have the quality needed to meet the purchaser's desired product specifications, young-growth microsales could increase as younger trees blow down, likely along road corridors, and as the trees increase in size. These sales can be lucrative for local operators since they can produce value-added products such as music wood, shakes and shingles, molding, and high-value sawn building products. Some of these products require special characteristics. For example, music wood needs tight tree rings mainly found in old growth trees to achieve tonal quality.

Microsales are a primary sale type for many small operators, and the Tongass updates the Standard (advertised) Rates used for microsales annually based on recent bids, with a roll-back factor to encourage competition and ensure advertised rates are not too high for local bidders to afford.

Non-deficit Timber Sale Requirement

A Forest Service timber sale is comprised of different species and grades of timber, each of which is appraised according to the expected product yield. Per most of the annual appropriations laws since 2000, the Tongass NF may not offer a deficit timber sale. A deficit timber sale is defined as one where the value of the timber is not sufficient to cover all logging and stumpage costs and provide a normal profit and risk allowance under the Forest Service's appraisal process. Timber sale design and location greatly impact harvesting costs and subsequent ability to appraise positive.

Commercial Timber Harvest and Management Methods

Three main types of silvicultural systems are used for commercial timber harvest on the Tongass NF: even-aged regeneration harvest (such as clearcutting, clearcutting with reserves, and seed-tree cuts); two-aged regeneration harvest (clearcutting with reserves); uneven-aged regeneration harvest (such as group selection and single-tree selection); and intermediate harvest (such as commercial thinning).

Salvage or sanitation harvest is used to harvest dead, down, or dying trees that have been negatively affected by wind-events or insect and/or disease. The Tongass microsale program is based on the harvest of these trees but larger salvage harvest has also occurred over the years.

Table 6. Acres of timber harvest, 1915 to 2023

Year of Harvest	Acres of even-aged harvest	Acres of uneven-aged harvest	Acres of 2-aged harvest	Acres Total Harvest
1915 and prior	1,001	1,275	NA	2,276
1916-1920	320	734	NA	1,054
1921-1925	1,775	600	NA	2,375
1926-1930	782	500	NA	1,282
1931-1935	822	148	NA	970
1936-1940	858	NA	NA	858
1941-1945	1,210	242	NA	1,452
1946-1950	2,231	817	NA	3,048
1951-1955	5,439	1,885	NA	7,324
1956-1960	20,928	182	NA	21,110
1961-1965	44,986	NA	227	45,213
1966-1970	60,981	31	NA	61,012
1971-1975	56,159	5	NA	56,164
1976-1980	47,370	24	NA	47,394
1981-1985	32,163	239	144	32,546
1986-1990	52,000	144	NA	52,144
1991-1995	46,721	NA	980	47,701
1996-2000	*41,468	1,517	1,063	44,048
2001-2005	5,668	1,544	1,158	8,370
2006-2010	2,889	1,672	1,205	5,766
2011-2015	4,462	3,635	539	8,636
2016-2020	3,141	1,473	51	4,665
2021-2023	1,153	56	169	1,378
Totals	434,527	16,723	5,536	456,786

Source: USDA Forest Service - Forest Service Activities Tracking System (FACTS) database.

*Approximately 22,000 acres of even-aged harvest in the 1995-2000 time period was done on non-Forest Service lands that were then transferred to the Forest Service (Cube Cove)

Even-Aged Management

The dominant silvicultural system used on the Tongass has been even-aged regeneration harvest, predominantly using clearcutting since the 1950s (USDA FS 2014). Clearcutting is used as the predominant harvest method as it is relatively economical, it is effective at removing diseased trees, reduces the risk of within stand windthrow, reduces the wounding of thin barked species, as well as encourages regeneration of spruce and cedars. Rotational harvest using even-aged management has been the predominant method considered for the future of the timber industry. For effective continued use of even-aged harvest on the Tongass NF, the Tongass Young Growth Management Strategy identified that the following should be considered (USDA FS 2014):

- The initial harvest consisted of primarily downhill cable yarding. Partial harvests using downhill cable is very complex, difficult, costly, and dangerous.
- It is expected that even maximizing timber with even-aged harvests would still produce a mosaic of openings across the landscape given plan direction for resource protection.

- In order to harvest commercial-sized trees via thinning, the stand must be older to allow for the co-dominant trees to be the ones targeted. Studies conducted on the Forest demonstrate that taking the largest trees out during a thin can lead to unraveling of a stand through windthrow.

Uneven-Aged Management

The use of uneven-aged management of timber on the Tongass NF presents various operational and economic challenges that influence the availability of timber on the Tongass NF (USDA FS 2014 (Tongass Young Growth Management Strategy)). For instance, net present values are the lowest in stands that are managed using uneven-aged silvicultural systems such as group selection or single tree selection (McClellan 2004). There is also an unknown cost to be incurred in future stands made up of varying sized trees which will require different types of logging equipment than typically modeled. Logging feasibility in stands that have been partial cut may be a challenge in situations where specialized harvesting equipment is needed, as opposed to the common downhill yarding practices. Lastly, damage to thin barked trees is common with uneven-aged management and must be considered in selecting a management method.

Salvage Harvest

Existing forest plan direction is unclear, impacting the ability for salvage operations to address windthrow and emergent forest health issues from insect and disease outbreaks and the amount of timber that could be harvested. The ability to salvage threatened, infected, dying, and recently dead trees can recoup the value of the wood.

Precommercial Thinning

Precommercial thinning (PCT) is the cutting of trees not for financial return but to accomplish stand improvement goals such as improving residual stand health, stand stability, or increasing the production and yield of usable wood. PCT facilitates earlier economical timber sale opportunities by allowing the residual stand to grow larger, faster, and with preferred species. PCT operations can also generate valuable resource benefits such as aquatic and wildlife habitat improvements that provide important subsistence resources for Southeast Alaskans (Meridian Institute 2020). PCT is also critical in even-aged stands in areas managed for old growth objectives by creating growing conditions that accelerate development of structural and plant species heterogeneity, allowing for the growth of large trees and eventual recruitment of large snags and logs, features important to wildlife species on the Tongass NF.

An analysis of how to transition forest management on the Tongass NF to young growth more quickly shows that viable commercial thinning opportunities will generally be found in stands that are at least age 60 or greater if they have been precommercially thinned or at least age 70 or greater if unthinned (USDA FS 2014 (Tongass Young Growth Management Strategy)). Precommercially thinned stands tend to be more stable with sturdier boles and healthy crowns, increasing their resilience to disturbance such as windthrow, giving land managers more options for treatment (USDA FS 2014 (Tongass Young Growth Management Strategy)).

Current 2016 Forest Plan objective for precommercial thinning is:

- O-YG-03: Annually, pre-commercially thin 4,000 to 7,000 acres of young-growth stands and refers to (USDA FS 2014 (Tongass Young Growth Management Strategy)) for precommercial treatment prioritization and scheduling.

Even-aged timber harvest during the pulp mill era (1960s-1990s) in Southeast Alaska grew back to stands of thick young growth that are overstocked and in need of density management for stand health via

thinning. These areas in need of thinning are estimated at 85,000 acres across the Tongass NF (Meridian Institute 2020).

On the Tongass NF, programmatic thinning did not start until the late 1970s. From 1979 until 1997, an average of 5,600 acres were precommercially thinned per year (USDA FS 2014). From 1998 through 2007, an average of 4,650 acres were precommercially thinned per year (USDA FS 2014). To address the thinning backlog and ongoing need, about 6,000-8,000 acres per year of PCT is needed.

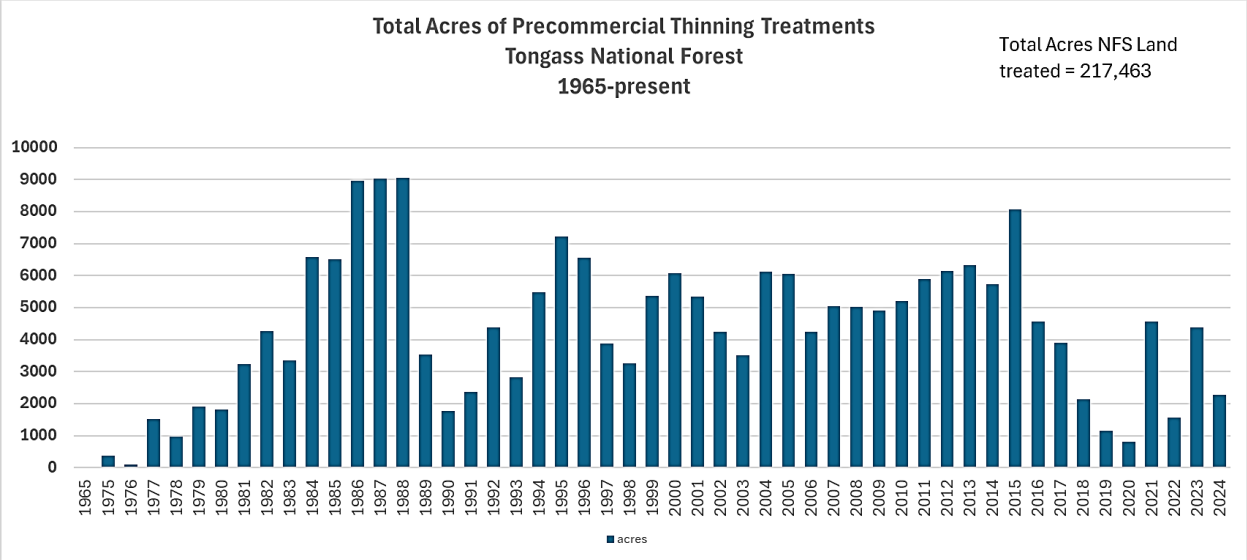

Figure 4. Acres of precommercial thinning treatments, Tongass National Forest, 1965 to 2024

Regeneration and Desired Species Composition

The National Forest Management Act (NFMA) of 1976 requires all forested lands in the National Forest System be maintained in appropriate forest cover with species of trees, degree of stocking, rate of growth, and conditions of stands designed to secure maximum benefits of multiple-use sustained yield management in accordance with land management plans (NFMA 1976). These regulations do not specify that harvested units be regenerated with the identical species composition that existed before harvest. The current 2016 Tongass Forest Plan defers to site-specific silvicultural prescriptions to determine the appropriate species mix based on the potential of the site as indicated by plant associations and adjacent stand conditions, emphasizing the need to regenerate and maintain particular species such as Alaska yellow-cedar and western redcedar where appropriate for the site. The National Reforestation Strategy also provides guidance on reforestation regimes that foster broader adaptations to create more efficient implementation plans that will result in the greatest benefit to forest stands and trees species in the future (National Reforestation Strategy 2024).

Natural regeneration is abundant on the Tongass, accounting for nearly 99 percent of the reforestation that occurs on forest. Interplanting for species diversity accounts for the remaining 1 percent of reforestation, not for the purposes of meeting restocking requirements but to promote a particular species composition on the landscape (National Reforestation Strategy 2024). To the extent practical, land managers prescribe regeneration harvests designed to create microclimates that favor the establishment of less shade-tolerant western redcedar, Alaska yellow-cedar, and Sitka spruce. Yet western hemlock regenerates far more than

other species following harvest because of differences in soil and light requirements, seed production, seed dispersal distance, seed dormancy requirements, and other factors. Western hemlock can thrive on organic or mineral soil and in a variety of light conditions. Alaska yellow-cedar can grow in a variety of mineral and organic soils, in fully open or partially shaded environments.

Natural regeneration and recruitment of Alaska yellow cedar can be difficult and sporadic. Germination of Alaska yellow-cedar seed requires an extensive and complex stratification that consists of warm and cold periods (Hennon et al. 2016). If stratification requirements are not met, then seeds will not germinate the first year after seed dispersal. Remaining seed may germinate the next year if stratification requirements are met and if the seeds are not consumed by birds or rodents or decayed by fungi. Future climate projections for Southeast Alaska indicate a warmer and wetter environment, influencing the establishment, survival, and appropriateness of sites for desirable tree species to naturally regenerate, influencing the species composition found across the landscape.

Commercial Wood Permits

Permits that offer wood for commercial use are primarily firewood permits. Many homes in Southeast Alaska use wood as a secondary source of heat in the winter, through fewer and fewer homes use wood as a primary heat source as time progresses. Since 1997, commercial use of wood via permit has averaged 115 MBF per year and varied from a minimum of about 20 MBF to a maximum of 387 MBF per year (https://www.fs.usda.gov/forestmanagement/products/ptsar/index.shtml).

Alaska Free Use Program

On the Tongass NF, various products are available for harvest for personal use (but not for sale), providing residents of Southeast Alaska economic, cultural, and spiritual benefits. Under the Alaska Free Use Timber Program (36 CFR § 223.10), all Alaska residents are entitled to 10,000 board feet of sawtimber and 25 cords of firewood annually. In FY2023, 218 permits were issued for free use timber on the Tongass, amounting to 1,609 CCF of sawtimber and firewood.

Table 7. Tongass NF free-use sawtimber and fuelwood from free use reports (Source: Region 10 - Resource Management (usda.gov))

Fiscal Year	Number of Permits	Volume (CCF)
2009	303	1,841.8
2010	289	1,609.28
2011	249	1,445.71
2012	318	1,133.4
2013	427	1,423.27
2014	266	1,025.09
2015	285	1,393.26
2016	204	968.09
2017	142	757.68
2018	150	867.87
2019	140	1,007.61
2020	125	710.08
2021	167	1,172.34
2022	168	1,289.61
2023	218	1,609.14

Cultural Use

Alaska Natives have used western redcedar and Alaska yellow-cedar species for cultural products for centuries. Today, Southeast Alaska tribes continue to use trees from their traditional territories within the Tongass NF for cultural and traditional purposes. Cedars provide logs for totem and mortuary poles, longhouses, housing, dugout canoes and cedar canoe paddles, and bark for traditional woven baskets, hats and weaving (Johnson and Cerveny 2022). Other items made from Alaska yellow-cedar trees include masks, boxes, bowls, halibut hooks, tools, mats, and hats (Johnson et al 2021). Specific trees needed for totems and canoes are known as monument trees. These trees are usually 450 - 600 years old, have tight grain and small growth rings, stand tall and straight, and be relatively free of defects or too many branches (Riley and Anderson 2021, see also the Tongass as an Indigenous Place assessment section). Trees with these characteristics are increasingly rare across the Tongass (Riley and Anderson 2021). Alaska Native people need a permit to harvest trees for their cultural traditions, which many say is a challenging process to navigate (Johnson and Cerveny 2022).

Cultural use of non-timber forest products, including gathering and foraging of wild fungi, berries, and plants, harvesting of spruce roots for weaving (Johnson et al 2021), as well as hunting, trapping, and fishing (Wilmer et al 2024) are discussed in other sections of the Assessment (See, e.g., Subsistence and other Non-Commercial Harvest). Not only do these objects have cultural meaning for the tribes, the act of harvesting, preparing, processing, and producing cultural products is a part of heritage and cultural identity and belonging (Johnson and Cerveny 2022). Cultural market demand for wood products on the Tongass NF includes recognition of community significance, associated jobs and income associated with wood used for cultural artforms in Southeast Alaska, and community requirements for maintaining and promoting culture and heritage activities (Johnson et al 2021). The production and sale of wood products increases tourism-related opportunities for community residents and provides a sense of sharing something meaningful with visitors (Johnson and Cerveny 2022). Carving and weaving also provide an important source of income (Johnson and Cerveny 2022).

Figure 5. Totem tree being cut on the Ketchikan-Misty Fjords Ranger District

Special Forest Products

Special forest products are products or natural resources derived from non-timber biological resources that are used for subsistence, personal, spiritual, educational, commercial, and scientific use. Examples of special forest products include resins, oils, leaves, bark, fungi, boughs, Christmas trees, ferns, moss, burls, berries, cones, conks, herbs, roots, and wildflowers. Resources excluded from special forest products include saw-timber, pulpwood, cull logs, small round-wood, house logs, utility poles, minerals, animals, animal parts, rocks, water and soil. Special forest products can provide an opportunity to diversify the wood products industry and create or expand markets for niche products.

Table 8 shows the quantity of special forest products by type cut on the Tongass NF from 2016-2023. Cut amounts and demand for these products are variable year to year.

Table 8. Special forest products cut by type by fiscal year on the Tongass NF

Special forest product	FY2016	FY2017	FY2018	FY2019	FY2020	FY2021	FY2022	FY2023
Foliage, limbs. boughs, pounds	0	100	1,000	0	0	0	0	263
Christmas trees, each	100	0	0	0	0	0	30	30
Mushrooms, pounds	50	120	30	0	0	820	100	0
Miscellaneous, pounds	0	0	402	268	400	0	0	0

Source: Cut and Sold Reports- Tongass NF, cut quantity of non-convertible products

(https://www.fs.usda.gov/forestmanagement/products/cut-sold/index.shtml)

Logging Infrastructure

Critical infrastructure to support all aspects of logging operations includes log transfer facilities, operators, roads and bridges, sawmills, and biomass facilities.

Log Transfer Facilities

A log transfer facility (LTF) is a type of marine access facility that is constructed in marine waters and is utilized for the purpose of transferring commercially harvested logs to or from a vessel or log raft, including the formation of a log raft. Also included are constructed facilities such as sort yards, equipment loading ramps, docks, floats, buoys, booms, log rafts, pilings, and anchors. Many LTFs constructed as logging infrastructure have since been converted to recreational facilities and therefore are no longer available to support logging. This creates inefficiencies in the timber industry transportation network by requiring longer hauling and marine towing distances to more distant LTFs still available for industrial use.

Logging infrastructure also includes the service providers such as third-party log scalers, dock workers, fuel providers, and barging and towing services. Established facilities to load export ships have declined, such as the KIDCO dock on Klawock Island which was recently converted to tourism use. These trends can be traced back to the closure of the region's pulp mills in the 1990s. The primary helicopter logging contractor has recently sold their Alaska equipment and demobilized from the region.

In some parts of Southeast Alaska, larger operators shutting down could have ripple effects on the overall viability of smaller operators and contractors (i.e., loggers, small mills, longshoremen) because many of the smaller operators benefit from the larger operators that maintain the foundations of the remaining existing infrastructure (Huber-Stearns et al 2020).

Roads and Bridges

Most of the roads on the Tongass National Forest were built and maintained to access and remove timber. As the number of timber sales have decreased so has the miles of roads being maintained. Many roads have been in storage status for so long that it is nearly cost-prohibitive to reopen them for logging access. Roads were often built in valley bottom locations that provide access challenges for modern logging equipment or in locations that increase maintenance needs and the risk for sediment from the road surface to enter adjacent streams. As described in the Infrastructure assessment, many of the bridges across the Tongass NF were constructed to support the timber program and are over 40 years old, with the oldest bridges no longer in compliance with best management practices.

Sawmill Capacity and Production

The number and distribution of sawmills that process timber has social and economic impacts on many Southeast Alaska communities. Since 2000, the USFS Alaska Regional Office has conducted annual surveys of sawmills across the Tongass NF to gather information regarding sawmill operations including total estimated production capacity, actual production, wood supply source, forest products, market destinations, and general business challenges (Daniels et al. 2023)[3]. When the survey was initiated in 2000, 20 medium- (producing 1.0-5.0 MMBF annually) to large-scale sawmills (producing > 5.0 MMBF annually) operated across the Tongass National Forest with the greatest concentration located in southern Southeast Alaska (Daniels et al. 2023). Between 2000 and 2019, more than half (59 percent) of these sawmills were closed and uninstalled and sawmill capacity had contracted to produce a fraction of their 2000 output (Daniels et al. 2023). No new sawmills of equal size classification have been established to date. The mill survey conducted for 2019 found that of the original pool of sawmills, four were operating and five were idle; thus, the entire Southeast Alaska wood products industry was being represented by four active mills. To improve the representation of small mills in the region, the sawmill survey pool was expanded in 2021 to include seven additional mills selected based on criteria discussed in Daniels et al. 2022. Sawmill capacity remained significantly underutilized in 2022; regional capacity utilization rate, based on an installed capacity of 135,500 MBF, is 13 percent (Daniels et al. 2023). Sawmill employment fell from 80 full time equivalents (FTEs) in 2021 to 77 FTEs in 2022, including owners, operators, and other employees (Daniels et al. 2023).

The high cost of fuel is also a limiting factor for sawmills to expand their operations; many sawmills depend on diesel-generated power to run their milling equipment and diesel fuel is expensive in the rural areas of Southeast Alaska.

Biomass Facilities

Biomass facility is a broad term used to describe facilities that utilize biomass in different ways. Biomass in terms of this report is wood for heat. Currently the biomass facilities installed to produce heat operate on cordwood or chips or pellets. Biomass utilization facilities provide a viable market and heating source for businesses, schools, and other centers while also providing employment and a use for byproducts of sawmill processing and logging residue. Industrial and nonindustrial biomass facilities impact the social

[3] Note that the largest producer in the region has not provided data since 2021. Production data for that mill has been held constant since. See Daniels et al. 2023.

and economic well-being of communities by creating paying, low-skill jobs which offers economic opportunity and job training opportunities. Cordwood facilities also create a local market for cordwood, wood that has been cut into uniform lengths, typically used as firewood, allowing individuals to supplement their income by selling firewood, and importantly, keeping money within the local community. The largest cordwood burning system in Southeast Alaska burns on average of 200 cords of wood a year, the largest chip system burns about 2,000 tons of wood chips a year.

Biomass utilization facilities can create a market and use for the byproducts of sawmilling, efficiently utilizing the entirety of the harvested timber. At least 16 biomass facilities have been installed across 13 communities in Southeast Alaska (Alaska Wood Energy 2024). These facilities are primarily located in schools, but also heat other private and public facilities such as an airport, a senior center, two office buildings, a pool, and housing units. Another 18 projects have undergone a pre-feasibility study by the State of Alaska's Alaska Wood Energy Development Task Group and are in various stages of consideration or development (Alaska Energy Authority 2024). These facilities are impacted when local mills close.

Economic Contributions and Considerations

Timber harvest contributes to local economies and rural community well-being by supplying raw materials, generating local jobs and income, and stimulating economic activity in supporting sectors. The Tongass NF is an economic contributor to Southeast Alaska communities directly as an employer by supporting jobs through stewardship and service contracts and permits, timber sales, grants and agreements and through federal payments to the states. Timber harvesting for wood production supports traditional forest industries such as logging and milling. In addition, tree cutting and timber harvest are often activities included in contracts, grants, and agreements to accomplish restoration to achieve forest health and restoration goals. These direct economic contributions expand more widely as the ripple effect of job creation and money spent circulates throughout the related industries and economic sectors. These contributions are especially important to rural economies where there may be few opportunities.

Commercial Use of Wood and Local Use Lumber

Commercial harvest of products from the Tongass NF provides a source of employment and labor income across Southeast Alaska. Special forest products and timber resources that are sold, processed for sale, or used in business operations are considered commercial use. Examples include mushrooms, boughs and greenery, and Christmas trees. Wood harvested from the Tongass NF is used to manufacture a variety of primary products. Primary products are wood products directly manufactured from timber and include dimensional lumber, firewood, timbers, house logs, log furniture, molding stock, cedar products (mostly shingles), and tonewood blanks used to make musical instruments.

Western hemlock is used for pilings, poles, railway ties, windowsills, doors, and construction lumber, and has been an important fiber source for pulp (Tongass FEIS 2016). Sitka spruce is used for lumber and commodity products, as well as specialty products, such as piano sounding boards, guitar faces, oars, planking, masts, and spars for custom-made or traditional boats (Tongass FEIS 2016). Today, redcedar is primarily used as a roofing, siding, and decking material and Alaska yellow-cedar has many uses including boats, utility poles, heavy flooring, framing, and marine decking and piling (Tongass FEIS 2016).

To expand domestic marketing opportunities for Alaska-produced wood products, the Local Use Lumber Program was enacted in 2023 (AK DNR 2023). The intent of the program is to provide small mills an opportunity to enter home construction markets, address housing shortages, and increase management opportunities of Alaskan forest resources (Douse 2023).

Local Jobs and Industry

Although many communities have diversified or completely shifted their economic bases from timber to other industries such as tourism, or recreation, timber is still a culturally, socially, and economically important industry for communities in Southeast Alaska.

Overall, timber sector employment has declined by 65 percent from 2005 to 2021, with losses in forestry and logging (72 percent), and wood product manufacturing (49 percent) (Table 9).

The expanding use of Forest Service authorities to engage in "goods for services" stewardship contracting and Good Neighbor Authority agreements to achieve ecological restoration goals is reflected in the support services employment trends. By providing opportunities for living wage jobs through local contracting and workforce development, management activities on the Tongass NF contribute to economic opportunities in the communities in Southeast Alaska.

Table 9 shows employment in logging and sawmill operations in Southeast Alaska from 2005-2021. Data for total logging and sawmill jobs in Southeast Alaska was acquired from the Alaska Department of Labor and Workforce Development. The number of logging jobs attributable to timber projects on the Tongass National Forest was calculated by adjusting total Southeast Alaska logging jobs by the ratio of Tongass timber harvest to total Southeast Alaska timber harvest. Tongass National Forest sawmill employment was calculated by adjusting total Southeast Alaska sawmill employment by the ratio of sources of wood (Federal versus total) from annual regional mill study reports.

Table 9. Employment in the wood products industry in Southeast Alaska, 2005-2021 (number of fulltime employees)

Year	Tongass Logging	Other Logging	Logging Total	Tongass Sawmill	Other Sawmill	Sawmill Total	Total Industry Employment
2005	88	263	351	96	52	148	499
2006	81	217	298	77	46	123	421
2007	44	225	269	70	63	133	402
2008	52	118	170	70	24	94	265
2009	48	110	158	39	17	56	216
2010	61	133	194	46	4	50	241
2011	60	152	212	47	3	50	264
2012	39	147	186	47	11	58	244
2013	75	106	181	48	14	62	243
2014	86	96	182	60	7	67	249
2015	104	63	167	58	12	70	237
2016	81	76	157	70	1	71	228
2017	25	108	133	37	32	69	202
2018	25	94	119	37	37	74	193
2019	14	148	162	37	31	68	230
2020	19	92	111	36	32	68	179
2021	26	71	97	19	57	76	173
5 year average	22	103	124	33	38	71	195

On the Tongass NF, labor income from the Forest Products program area was $8,844,000 with 90 direct and 190 total jobs supported by forest management activities in 2019 (USDA FS 2019). Across Southeast Alaska, total employment-related earnings in the timber industry by year were $17,050,899 (2013), $18,764,683 (2018), $19,352,720 (2022), and $19,241,564 (2023), contributing 295 total jobs in the timber sector in 2022 (Southeast Conference 2023).

Timber Industry Workforce Availability

Timber industry employment has been in decline for decades, with an estimated 3,500 jobs lost in the 1990s (Alexander and Gorte 2014). Broadly, the timber industry workforce demographic is aging, and a lack of skilled workforce (e.g., equipment operators, logging engineers) is ongoing (Meridian Institute 2023). Larger operators rely on a seasonal workforce that come from out of state and need housing which can be costly and challenging to find. As larger operators age towards retirement, there has not been a younger demographic willing to come in to replace them. Most small sawmills are family owned and operated, relying on family members to run operations, and not really interested in growing their labor force.

To meet future opportunities and fill employment demand in the industry, the maintenance of a trained timber and restoration workforce is critical. Several workforce development and training programs have been implemented to help recruit, train, and retain local employees (Meridian Institute 2023). Examples of these include agreements with the State of Alaska Division of Forestry, Prince of Wales Vocational & Technical Education Center, Alaska Youth Stewards, the 2016 Forest Academy, hiring initiatives through the ANILCA, and various community native forest partnerships such as Hoonah Native Forest Partnership, Klawock Indigenous Stewards Forest Partnership, and Keex' Kwaan Community Forest Partnership.

Authorities with Emphasis on Restoration and Collaboration

To address challenges with providing an adequate supply of timber from the Tongass NF, emphasis has been placed on collaboration using an all-lands approach with the region's timber land managers.

Good Neighbor Authority

The Good Neighbor Authority (GNA) is a multi-faceted approach with the State of Alaska Division of Forestry to manage forests for multiple benefits. In 2016, the U.S. Forest Service and Alaska Department of Natural Resources entered into a Master Good Neighbor Agreement, under which two Supplemental Project Agreements have been executed. These GNA agreements between the State of Alaska and the Tongass NF, both of which included young-growth harvest, include working across land ownership boundaries and combining timber sales with restoration work (Huber-Stearns et al 2020). Under GNA, revenue generated from the sale of Federal timber remains with the forest to be used to complete additional authorized restoration work that otherwise may not have been funded through annual appropriations.

Stewardship Contracting Authority

Stewardship Contracting includes natural resource management practices that contribute to the development of sustainable rural communities, restore and maintain healthy forest ecosystems, and provide a continuing source of local income and employment. From 2011-2015, the Tongass NF had an active Stewardship Contracting program, which required an emphasis on restoration and informal collaboration with partners. Stewardship authority continues to evolve and remains a viable tool that is still in use today at a smaller scale.

Emphasis on restoration and collaboration is expected to continue, as extensive restoration needs exist on the Tongass NF, based around young-growth management and stand restoration through thinning activities. Restoration treatments can help support a more efficient and effective transition to young-growth management of timber on the Tongass NF.

Limited Export Policy

The forest products industry is a global industry, where it is common for both unprocessed and processed products to be bought and sold to competitive international markets, supply chains, and customers.

The Tongass National Forest is unique because its Limited Export Policy makes it the only national forest west of the 100th meridian of the United States authorized to export unprocessed timber to international destinations (Daniels et al. 2023). Sale of unprocessed timber from Alaska to destinations in the Lower 48 is considered interstate shipment but is often termed export because primary manufacture occurs outside of Alaska. Export of unprocessed timber to locations outside of Alaska is an important component of the Tongass timber economy as it allows for more complete utilization of timber harvested in areas logged primarily for local manufacture (36 CFR 223.201). Timber harvested from state and private lands has no export restrictions, while timber harvested from the Tongass is bound by 36 CFR 223.201 and associated Forest Service Alaska Regional Office Limited Export Policy (stelprdb5252655.pdf). Log exports represent another market available to purchasers of timber throughout the region (Daniels et al. 2023). Tongass timber purchasers can choose to process timber into forest products, buy and sell logs among each other, or apply for a permit from the Regional Forester to divert wood into log export markets to respond to economic conditions and fluctuating product prices. Log exports support jobs in logging, transportation, and shipping (Daniels et al. 2023).

Figure 6 shows the volume of Tongass National Forest log exports to international and Lower 48 destinations by calendar year. Sitka spruce and western hemlock of very high quality have been exported in the form of logs, lumber and timbers into the Pacific Rim for the past 5 decades (Resource Development Council 2024). Log export and timber harvest data from lands managed by the Tongass NF indicate that export percentages have fluctuated year to year, likely due to declining harvest of old growth coupled with an increased harvest of young-growth trees of which the primary market is export. Year-to-year export percentages depend on global markets, transport logistics, and other factors (Huber-Stearns et al 2020).

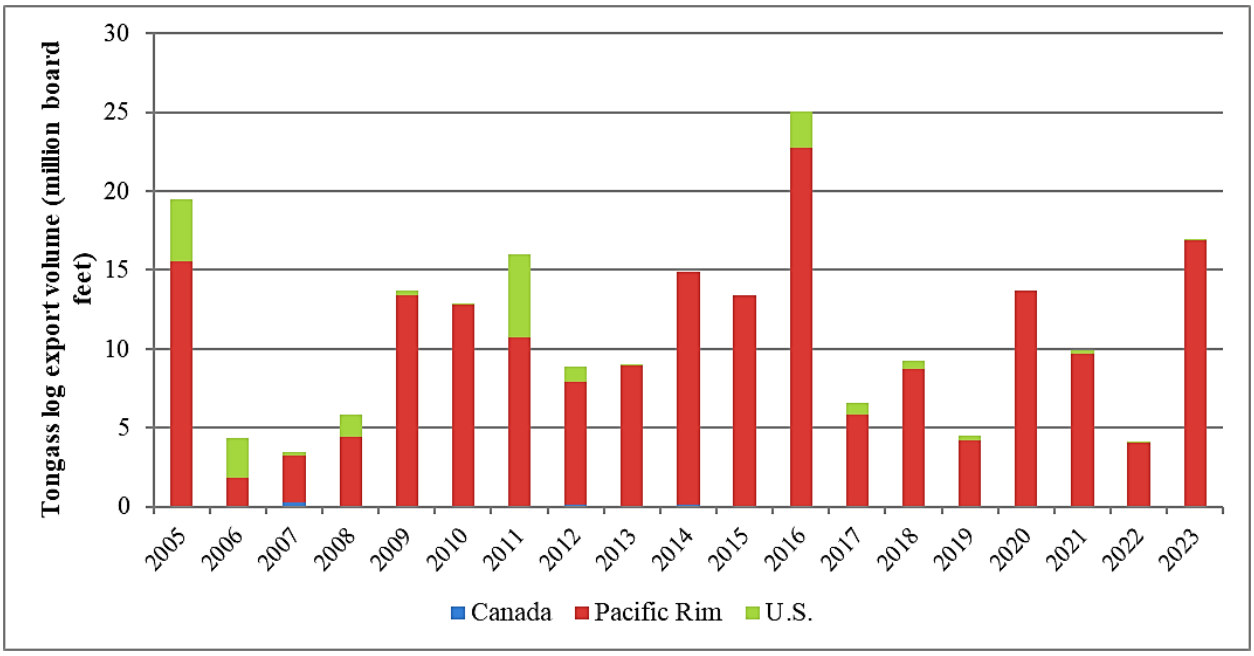

Figure 6. Volume of log export permits by destination, 2005-2023

The Tongass NF is not the only source of timber available to Southeast Alaska timber operators. Volume has come from Alaska Native Corporations and State of Alaska lands including the Division of Forestry lands, the Alaska Mental Health Land Trust, and the University of Alaska. A 100 mmbf contract was harvested from Alaska Mental Health Trust lands on Prince of Wales Island in 2019 and 2020. Another 100 mmbf is in a contract near Ketchikan on Revillagigedo Island near Shelter Cove in 2022. Both of these parcels of lands were part of the Alaska Mental Health Trust Land Exchange for Forest Service lands which occurred in two phases and completed in 2020 (AK DNR MHTLO 2020).

At this time, the only established large-scale market for young-growth Tongass timber is export destinations; export percentages are expected to remain high unless processors establish new domestic markets for young-growth products in Southeast Alaska.

Young-growth Transition and Milling Equipment

Timber harvest trends have been influenced by the direction to transition timber harvest on the Tongass NF to primarily young growth. The desired condition for suitable young-growth acres scheduled for timber production is that timber products from young-growth stands are available on an even-flow, long-term sustained yield. Due to the extent of past harvest since the 1950s, large acreages of young growth will become ready for rotational harvest over a relatively short period of time starting around 2030. Various studies have been used to develop management schemes that produce the highest potential future returns on stand treatments (USDA FS 2014).

Markets for young growth processed or sawn in Southeast Alaska are still developing. There is notable mixed interest in investing in infrastructure for young-growth processing due to uncertain timber supply, limited economically viable options for young-growth utilization, and modest success with selling young-growth products to date (Huber-Stearns et al 2020). There are equipment challenges in producing finished lumber from young growth (planed and kiln-dried) and sawmills may not have those facilities installed or in an operating. A 2021 survey of mill operators indicate milling of young growth is occurring in their overall production, with young-growth utilization increasing by two percent (Daniels et al. 2023). The

small mills added to the survey in 2021 averaged 22 percent, up from 1.3 percent in 2021 and the original sawmills in the survey fell from an average of 10 to 1.8 percent of total production (Daniels et al. 2023).

The Tongass Transition Collaborative (TTC), a third-party collaborative group focused on forest management work on the Tongass NF, conducted work sessions in 2022 and 2023 and results indicate there is a perception that young-growth wood quality is inferior to, and not a replacement for, the quality of old growth wood (Meridian Institute 2023). However, young-growth wood from the Tongass NF is of higher quality than most second growth in the Lower 48 due to its strong, small knots that holds up well in construction (Meridian Institute 2023). Higher grade products such as shop lumber, cants and timbers, and niche products are typically sourced from old growth and generally command a price premium. Conversely, dimension lumber, generally sourced from young growth, is a commodity product for structural use that is highly price competitive and Alaska's distance to established markets puts local producers at a competitive disadvantage (Daniels et al. 2023).

Discussions with operators about young-growth timber revealed that several had no desire to ever purchase young growth, but several others would purchase more if offered, primarily because logs were more uniform in size, had less defect than old growth, and met local customer needs for rough cut dimension lumber (Daniels et al. 2023). Some small mills are retooling to more efficiently process young growth. Three grants awarded by the Forest Service in 2022 brought $1.1 million into Southeast Alaska to fund a containerized pellet mill near Ketchikan as well as purchase equipment to support value added and young-growth milling in Hoonah and Tenakee Springs (Daniels et al. 2023). Market competition for finished products can be challenging due to high costs of transportation as bulk shipments of construction lumber are barged into rural communities from large suppliers in the Lower 48 (Huber-Stearns et al 2020).

Factors Affecting Timber Sale Economics and Project Design

Alaska is inherently a high cost operating environment, making prudent project design of timber projects imperative to their overall implementation success. In some cases, aspects of the project design (such as high-cost yarding systems, limited treatment area sizes, or necessary road construction for access) can make most of the acres economically infeasible. Project location and whether it is connected to a community by road or at a remote location and requiring a logging camp also affects timber sale economics, as well as transportation logistics (such as marine towing, which is discussed in the Logging Infrastructure section below).

Project design is affected by laws and national direction, primarily National Forest Management Act which limits the size of openings and Tongass Timber Reform Act which applied a buffer on fish-bearing streams.

Resource protections impact the intensity and acres available for timber harvest. Since the 1997 Forest Plan, standards and guidelines to achieve these protections have played a large part in affecting project design. Notably the Scenery Integrity Objectives often limit the size of openings for even-aged management, making equipment set-up costly and inefficient. Other standards and guidelines that affect project design are buffers for raptor, murrelet and heron nests and rookeries, timing protections for goshawks, avoidance of high-value karst, riparian management areas especially for alluvial fans, steep slope analysis requirements, buffers for sensitive plant locations, and beach buffers.

The above project design restrictions will become more apparent as the transition to young-growth management occurs. The majority of these were not in place during the initial harvest of the timber stands and, as such, adjustments will need to be made relative to the original harvest footprint. The 2016 Forest

Plan imposed additional restrictions and limitations to address various resource concerns that made traditional even-age harvest more challenging.

Specific Young-Growth Direction from 2016 Forest Plan that influences project design includes the following:

- S-YG-BEACH-01: …"the maximum size of any created opening for commercial timber harvest in the beach fringe must not exceed 10 acres and a maximum removal of up to 35 percent of the acres of the original harvested stand is allowed. Commercial thinning is limited to 33 percent of the stand's basal area. A combination of the two treatments may be used, with no more than 35 percent of the total stand removed in either basal area and/or acres"…
- S-YG-BEACH-03: Commercial harvest within the beach and estuary fringe is not allowed within a minimum 200-foot forested buffer beginning at the mean high tide
- S-YG-KC-02: On lands identified as moderate vulnerability karst, the maximum opening size of any created opening for commercial timber harvest must not exceed 10 acres with a maximum removal of 35 percent of the acres of the original harvested stand
- S-YG-RIP-O1…"the maximum size of any created opening for commercial timber harvest in the Old-growth habitat LUD must not exceed 10 acres and a maximum removal of up to 35 percent of the aces of the original harvested stand is allowed. Commercial thinning is limited to 33 percent of the stand's basal area. A combination of the two treatments may be used, with no more than 35 percent of the total stand removed in either basal area and/or acres"…
- S-YG-WILD-01: …"the maximum the maximum size of any created opening for commercial timber harvest in the beach fringe must not exceed 10 acres and a maximum removal of up to 35 percent of the aces of the original harvested stand is allowed. Commercial thinning is limited to 33 percent of the stand's basal area. A combination of the two treatments may be used, with no more than 35 percent of the total stand removed in either basal area and/or acres

These restrictions and avoidance measures present operational challenges to reaching harvestable timber based on existing access and road locations.

Service Contracting Difficulties

Service contracts are awarded to businesses to achieve specific tasks on behalf of the agency, with the amount and type of work and local business capacity determining the extent to which local communities benefit from these contracts. Challenges associated with contracting include existing contracts and acquisitions processes that are difficult to change and hard to navigate. In some cases, certain types of work may be more suited to local business capacity than others. For example, small sized contracts or contracts for mechanical work (e.g., road brushing) requiring just a few operators may be more feasible for small local contractors than manual work for large crews (e.g., tree thinning) or specialized or expensive equipment (e.g., helicopter logging). As such, matching the size of operations is limited by available contractor pool and type of work needed. The Tongass has also experienced recent challenges with the increasing cost of service work and finding contractors to complete pre-commercial thinning work.

Career Development and Educational Opportunities

Timber management and employment in the forestry and natural resources sector help support trade and degree programs and entry into the natural resources sector broadly. Forest Service professionals working in the field of forestry engage with prospective students or applicants through career fairs, environmental education, and outreach events in the community. The Tongass NF also partners with local universities to

conduct research and host learning opportunities. These efforts generate research that further promote effective management strategies on the Forest.

Within the communities of Southeast Alaska, local high schools are using young growth in woodworking and shop classes, providing an opportunity to integrate the shift towards young-growth forest management into training and education at multiple scales (Meridian Institute 2023).

The Tongass timber management program has offered several recent workforce development and skills enhancement opportunities in the local communities. One notable example is the Forest Academy, held periodically on Prince of Wales Island. The first two Forestry Academies in 2016 and 2017 were the result of a Challenge Cost Share Agreement between the Tongass National Forest and State of Alaska. These initial academies were designed to train locally recruited residents a variety of technical skills in natural resource management such as timber stand inventories and collection of aquatic, wildlife, and cultural resource information. Twenty residents participated in the 2016 and 2017 academies with the majority applying their learned skills in seasonal or permanent jobs with the State of Alaska, USFS, Sealaska, or local forestry contractors. Following the successes of the 2016 and 2017 academies, the Tongass hosted a follow up multi-week Forest Academy in 2019 that included a week of forestry skills, a week of aquatic organism passage survey methods, and a week of learning aquatic habitat mapping techniques. The 2019 academy had sixteen participants and was partially led by four previous academy participants now serving as teachers and field assistants to USFS staff. These Forest Academies have led to additional trainings and workshops with an increasing range of partners, including local community forest partnerships and conservation based non-profit organizations, to continue providing forestry and natural resource management training and workforce development opportunities for residents.

The Alaska Youth Stewards (AYS) is an employment program for rural and Indigenous youth of Southeast Alaska. AYS offers place-based on-the-job experiential education and training to care for our lands, waters and communities, with varied projects focused on stream restoration, community harvest efforts, forest inventorying, and a suite of other forestry projects.

Risks, Areas of Uncertainty, Assumptions

Climate Change

Climate change is anticipated to affect the composition, distribution, and performance of vegetation communities throughout the Tongass National Forest, although it is difficult to predict the extent and direction of these effects. A climate change vulnerability assessment (CCVA) for the Tongass NF (Halofsky et al. DRAFT) is in development and is drawn on and summarized in the Drivers, Stressors, and Climate Change assessment section. Elements of climate change that may affect the timber resource include changes in temperature, precipitation, wind, landslides, drought, fire, insects, and disease.

Forest Health

Insect and disease outbreaks have the potential to impact the diverse ecoregions and ecological integrity of forested land in Southeast Alaska. Tree mortality and decline can impact tree growth, stand health, commercial availability of timber, species distribution and occurrence across the landscape, and wildlife habitat. Concern for tree damage and tree mortality, and management interventions to address tree disease impacts to forest ecosystems, reflects the values and cultures forest users hold. In addition to the ecological and economic impact, tree diseases, like other disturbances, can alter practical and psychological attachments humans hold to healthy trees and forests, degrading the social values that forested ecosystems support (Roy et al 2024).

Alaska Yellow-Cedar Decline

Alaska yellow-cedar (AYC) has cultural, economic, and ecological values. The chemistry of the heartwood of AYC allows the tree to live for longer than 1,000 years and persist long after death as sequestered carbon and durable wood products (Hennon et al 2016). The wood has many favorable characteristics that make it highly valued including durability, structural integrity, and resistance to rot. The chemical composition of the wood makes the trees highly resistant to fungal decay and attack by marine borers, termites, and other insects (Hennon et al 2016). Alaska yellow-cedar wood is used for a variety of products such as carpentry and decorative paneling, wood furniture, molding, cabinetwork, shingles, posts, poles, marine pilings, small boat hulls, oars and paddles, exterior door and window boxes. It is also used in exterior applications such as bridges, decking and stairs as well as specialty construction projects such as temples and shrines.

Climate exerts long-term influence over vegetation patterns, hydrology, and soil development, and relatively shorter-term influence over seasonal precipitation, temperature, and acute weather events (Hennon et al 2016). The widespread AYC decline is associated with freezing injury to fine roots that occurs where snowpack in early spring is insufficient to protect roots from late-season cold events (Hennon et al 2016). Yellow-cedar trees appear to be protected from spring freezing injury where snow is present in spring and able to insulate tree roots and prevent premature dehardening and freezing (Hennon et al 2016).

Alaska yellow-cedar has experienced extensive mortality and forest decline in Southeast Alaska during the past century (Hennon et al 2016) and causes patches of dead trees across the landscape. Mapping of AYC decline began around 1990 during annual U.S. Forest Service aerial surveys of forest health; more than 710,000 acres of AYC decline have been mapped across Southeast Alaska to date (Mulvey 2024).

Among stands with a component of healthy Alaska yellow-cedar in Southeast Alaska, there are also isolated patches of dying AYC associated with climate change (Johnson et al 2021). Affected stands are usually composed of long-dead, recently dead, dying, and surviving trees, which suggests that mortality has occurred for a long time and continuing. Yellow-cedar decline has elevational limits that vary by latitude in a manner that suggests that climate plays a key role in the mortality; in Alaska, elevational patterns of AYC decline have been documented over the 3° of latitude where it occurs (Hennon et al 2016).

In 2023, more than 20,000 acres of active yellow-cedar decline were mapped in Southeast Alaska during aerial detection survey, a two-fold increase from last year. Yellow-cedar decline has continued to impact young-growth stands managed for timber (Mulvey 2024) and has the potential to impact small sawmills and free use permitees that utilize the wood for niche commercial and non-commercial uses. Yellow-cedar decline, as perceived by Tlingit and Haida Alaska Natives, creates concerns when tree diseases damage cultural uses, provoking a loss of connection to nature, spiritual well-being, and cultural identity (Roy et al 2024). Under climate change, decline impacts are anticipated in continue based on models that incorporate the risk factors of yellow-cedar decline (hydrology and snowpack) (Mulvey 2024).

Recent Defoliator Outbreaks

The Tongass NF has experienced recent defoliator outbreaks across the landscape, including Western black headed budworm (*Acleris gloverana*) and hemlock sawfly (*Neodiprion tsugae*) causing mortality and decline of forested stands.

Western blackheaded budworm populations began to rise in 2020, resulting in a largescale outbreak in 2021 and 2022 primarily impacting western hemlocks and Sitka spruce to a lesser degree, dominated by top-killed trees with some trees showing needle regeneration that cast a subtle green shade to gray trees

(FS-R10-FHP 2023). Outbreaks typically last two to three years and then crash due to parasitism, predation, disease and ultimately starvation; in 2023 the western blackheaded budworm outbreak subsided throughout Southeast Alaska with minimal damage and light defoliation found (FS-R10-FHP 2023).

An outbreak of hemlock sawfly started in 2018, peaked in 2019, and crashed in 2020 (FS-R10-FHP 2023). No hemlock sawfly damage was recorded in 2023 (FS-R10-FHP 2023). Hemlock mortality from past defoliation was minimal in most areas, but dense in some pockets on Admiralty and Chichagof Islands and along Excursion Inlet, totaling 28,700 acres (FS-R10-FHP 2023). Areas previously impacted were dominated by top-killed trees with some trees showing needle regeneration that cast a subtle green shade to gray trees. Hemlock sawfly larvae preferentially feed on the older foliage of western hemlock, often leaving part of the needle uneaten, resulting in thin inner tree crowns. Typically, outbreaks last a couple years and may result in growth loss and topkill (FS-R10-FHP 2023). Tree mortality is limited unless hemlock sawfly outbreaks co-occur with outbreaks of the western blackheaded budworm, which has been observed.

Priority Work and Policy Development

The Tongass NF has a long history of debate between timber industry, state and local governments, and environmental and conservation groups. Decisions regarding work priorities and policy making that impact timber management on the Tongass NF are often made at the executive and departmental level. Litigation and court orders have also impacted the ability of the Tongass NF to offer a level of timber for sale that is analyzed and permitted under the Forest Plan.

Key Takeaways

The following list represents a summary of key findings contained within this report, with each item discussed in more detail within its corresponding section of the report.

- The timber industry is part of the diversity of industries for many of the communities of Southeast Alaska.
- Timber harvest has declined substantially on the Tongass NF and across Southeast Alaska since 1997, the date of the last Forest Plan revision.
- Free use and special forest product use has been ongoing and remains an important aspect of Southeast Alaska way of life.
- The Forest Plan includes calculations for a sustained yield limit, lands suitable for timber production, projected wood sale quantity, and projected timber sale quantity, which will be recalculated as part of the revision effort. Timber offered, sold, and harvested on the Tongass NF has been well below these limits and projected amounts.
- Even-aged regeneration harvest, using clearcutting, has been the primary silvicultural system used for commercial timber harvest. Even-aged harvest is effective for meeting several management objectives, including regeneration of Western redcedar, Alaska yellow-cedar, and Sitka spruce; minimizing windthrow impacts; removing disease pathogens like dwarf hemlock mistletoe; minimizing the need for roadbuilding across the landscape; and providing harvest efficiency and economically viable timber sales.
- The Tongass NF is transitioning from primarily old growth timber harvest to primarily young-growth timber harvest. The 2016 Forest Plan outlines a 15-year transition, with old growth

harvest amounts at an average of 5 MMBF in 2031. Five MMBF or less of old growth has been offered and sold on the Tongass NF since 2020.

- As more young growth stands become available for commercial harvest to support investment and development of a young growth industry, continued availability of old growth as a component of the timber program during this time, will allow operators who rely on old growth timber to continue production of high value specialized products.
- At this time, the only established large-scale market for young-growth Tongass timber is export destinations; export percentages are expected to remain high unless processors establish new domestic markets for young-growth products in Southeast Alaska.
- Flexibility in management is needed for management options to address emergent forest health issues such as insect and disease outbreaks and to address changing conditions due to climate.

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Glossary

Ecological sustainability
The capability to meet the needs of the present generation without compromising the ability of future generations to meet their needs. For the purposes of this Handbook ‘‘ecological sustainability’’ refers to the capability of ecosystems to maintain ecological integrity; ‘‘economic sustainability’’ refers to the capability of society to produce and consume or otherwise benefit from goods and services including contributions to jobs and market and nonmarket benefits; and ‘‘social sustainability’’ refers to the capability of society to support the network of relationships, traditions, culture, and activities that connect people to the land and to one another, and support vibrant communities (36 CFR 219.19).

Restoration
The process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. Ecological restoration focuses on reestablishing the composition, structure, pattern, and ecological processes necessary to facilitate terrestrial and aquatic ecosystems sustainability, resilience, and health under current and future conditions. (36 CFR 219.19).

Timber harvest.
The removal of trees for wood fiber use and other multiple use purposes. (36 CFR 219.19).