ALASKA ROADLESS RULEMAKING
REGULATORY IMPACT ASSESSMENT
AND
COST-BENEFIT ASSESSMENT

SUMMARY

The United States Department of Agriculture (USDA) is exempting the Tongass National Forest from the 2001 Roadless Area Conservation Rule, which prohibits tree harvest and road construction/reconstruction within inventoried roadless areas with certain limited exceptions. In January 2018, the State of Alaska submitted a petition requesting that the Secretary of USDA consider exempting the Tongass National Forest from the 2001 Roadless Rule, in accordance with the Administrative Procedure Act (APA), section 553(e) and the USDA's rulemaking procedures in 7 Code of Federal Regulations (CFR) 1.28. In June 2018, the USDA secretary directed the Forest Service to begin working to develop an Alaska state-specific roadless rule under the APA. The Secretary of Agriculture has broad authority to protect and administer the National Forest System through regulation as provided by the Organic Administration Act of 1897 (the Organic Act), the Multiple-Use Sustained Yield Act of 1960, and the National Forest Management Act of 1976. These statutes provide the Secretary with discretion to determine the proper uses within any area, including the appropriate resource emphasis and mix of uses. Since the 2001 Roadless Area Conservation Rule was promulgated it has been the subject of uncertainty, due to litigation, on the Tongass National Forest. In August 2018, the Forest Service granted cooperating agency status to the State of Alaska. Originally six Alaska Native Tribes became cooperating agencies. However, after the publication of the proposed rule, one Alaska Native Tribe withdrew as cooperating agency, and after the publication of the Final Environmental Impact Statement the remaining five tribal cooperating agencies withdrew. The USDA and the State of Alaska believe that an Alaska-specific roadless rule provides a unique opportunity to collaboratively resolve and offer certainty to roadless area management within the State of Alaska.

The Forest Service published a Notice of Intent (NOI) to prepare an environmental impact statement and initiate a public rulemaking process to address the management of inventoried roadless areas on the Tongass National Forest on August 30, 2018 (83 Federal Register [FR] 44252). As stated in that NOI, the USDA proposed to develop a durable and long-lasting regulation for the conservation and management of roadless areas on the Tongass National Forest (NF). The State-specific roadless rule would discontinue the existing regulation's prohibitions and instead rely upon existing statutory and management plan direction to manage roadless area characteristics for the Tongass NF.

Executive Orders 13563 and 12866 direct agencies to assess costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). These executive orders require that agencies conduct a

regulatory analysis for economically significant regulatory actions. Economically significant regulatory actions are those that have an annual effect on the economy of $100 million or more or adversely affect the economy or economic sectors. This rule has been designated a significant regulatory action and the economic effects are estimated to be less than $100 million per year.

This document also examines cost to address the Executive Order 13771 requirement to provide the Agency's best estimates of the total costs or savings associated with each new regulation or repealed regulation. Executive Order 13771, Reducing Regulation and Controlling Regulatory Costs, issued January 30, 2017, requires significant new regulations shall, to the extent permitted by law, be offset by the elimination of existing costs associated with at least two prior regulations.

For the proposed rulemaking, USDA elected to circulate the full text of the proposed rule as well as the full text of the alternative rule language for public comment. The final rule corresponds to the roadless management regime represented in Alternative 6 of the Final Environmental Impact Statement for the Alaska Roadless Rule.

None of the regulatory alternatives propose changes to the projected timber sale quantity or timber demand projections set out in the Tongass Land and Resource Management Plan. The Tongass National Forest, in compliance with the Tongass Timber Reform Act (1990), seeks to provide an annual supply of timber to meet market demand to the extent consistent with providing for multiple use and sustained use of all renewable forest resources, and other requirements, including the National Forest Management Act of 1976 (NFMA). While projected harvest levels are not expected to be materially different under any of the alternatives under consideration, the roadless rule can influence the potential location or likelihood of future timber harvesting between the various alternatives. In other words, the alternatives examine different mixes of land areas and timber restrictions that would incrementally increase management flexibility for how the forest plan’s timber harvest goals can be better achieved but does not alter the plan’s underlying goals or projected outcomes. In addition to timber related impacts, this report includes discussion of recreation and tourism, commercial fisheries, mining related industries, and impacts to non-market or non-use benefit categories.

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INTRODUCTION

The Roadless Area Conservation Rule (2001 Roadless Rule) was adopted into regulations at Title 36 of the CFR Part 294 (36 CFR 294), Subpart B (66 FR 3244) in January 2001. Currently, about 9.4 million acres (56 percent) of the Tongass are managed as "inventoried roadless areas" (IRAs). IRAs contain generally undeveloped areas that are typically 5,000 acres or greater in size. The 2001 Roadless Rule applies nationwide (except Idaho and Colorado), and currently provides management direction for IRAs on 44.7 million acres of National Forests (approximately 24 percent of total National Forest System [NFS] lands) by prohibiting road construction and reconstruction and timber cutting, sale, or removal in those IRAs, with certain exceptions.

Since its promulgation, the 2001 Roadless Rule has been the subject of litigation. In 2001, the State of Alaska filed a complaint, challenging the USDA promulgation of the 2001 Roadless Rule and its application in Alaska. The USDA and the State of Alaska reached a settlement in 2003, and the USDA subsequently issued a rule temporarily exempting the Tongass NF from the 2001 Roadless Rule. In 2011, a federal court (District of Alaska) set aside the Tongass NF's exemption and reinstated the 2001 Roadless Rule on the Tongass NF (with special instructions). The Alaska District Court's ruling was initially reversed by a three-judge panel of the Ninth Circuit, but the District Court's ruling was ultimately upheld in a 6–5 en banc ruling of the Ninth Circuit in 2015. Consequently, the 2001 Roadless Rule remains in effect in Alaska and the Forest Service continues to apply the 2001 National Rule to the Tongass and Chugach NFs.

In January 2018, the State of Alaska submitted a petition requesting that the Secretary of Agriculture consider exempting the Tongass NF from the 2001 Roadless Rule, pursuant to the APA and the USDA's petition procedures in 7 CFR 1.28. In June 2018, the Secretary of Agriculture directed the Forest Service to begin working to develop an Alaska state-specific roadless rule. In August 2018, the Forest Service granted cooperating agency status to the State of Alaska. Originally six Alaska Native Tribes became cooperating agencies. However, after the publication of the proposed rule, one Alaska Native Tribe withdrew as cooperating agency, and after the publication of the Final Environmental Impact Statement the remaining five tribal cooperating agencies withdrew. The Forest Service published a NOI to prepare an environmental impact statement (EIS) and initiate a public rulemaking process to address the management of IRAs on the Tongass NF on August 30, 2018 (83 FR 44252). As stated in that NOI, the USDA proposes to develop a durable and long-lasting regulation for the conservation and management of roadless areas on the Tongass NF. The state-specific roadless rule would discontinue the existing regulation's prohibitions and instead rely upon existing statutory and management plan direction to manage roadless area characteristics for the Tongass National Forest.

This report meets the requirements of Executive Order 12866 for a significant rule. Executive Orders 13563 and 12866 direct agencies to assess costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. These executive orders require that agencies conduct a regulatory analysis for

economically significant regulatory actions. Economically significant regulatory actions are those that have an annual effect on the economy of $100 million or more or adversely affect the economy or economic sectors. Under the final rule (Alternatives 6), additional timber harvest opportunities would be provided with removal of all 9.4 million inventoried roadless acres on the Tongass from roadless protection (Table 1). These are more acres removed than any other regulatory alternative providing the greatest flexibility to offer timber sales that appraise positive. None of the regulatory alternatives propose changes to the projected timber sale quantity or timber demand projections from the Tongass Land and Resource Management Plan. The Tongass National Forest, in compliance with the Tongass Timber Reform Act (1990), seeks to provide an annual supply of timber to meet market demand to the extent consistent with providing for multiple use and sustained use of all renewable forest resources, and other requirements, including NFMA.

Changes in the availability of suitable timber lands provide general context for economic effects. Suitable timber lands represent those lands on the Forest that are suitable for timber production based on all multiple-use objectives of the Forest (see the Suitable Timberland Assumptions section of the Final Environmental Impact Statement for this rule (USDA Forest Service 2020)). Suitable acres vary under the regulatory alternatives depending on the level of roadless area protections. Estimated gains, under the final rule, of suitable old growth (168,000 acres) are equivalent to about 74 percent of the acres available under the baseline 2001 Roadless Rule and seven times the old-growth acres expected to be harvested over the next 25 years (24,000 acres); thus the final rule would not decrease timber related jobs, income or output. The final rule is not anticipated to alter output or employment in local economies associated with recreation and tourism, commercial fisheries and mining related industries (see the discussion below for more detail) assuming forest plan protections remain in place, including those in the Tongass NF Forest Plan (USDA Forest Service 2016). NFMA directs that forest plans assure that timber will be harvested from National Forest System lands only where soil, slope, or other watershed conditions will not be irreversibly damaged. 16 U.S.C. 1604(g)(3)(E) for example, in the case of fisheries stream buffers and soils standards and guides provide protection to fisheries. In addition, the harvest of timber is subject to the legal context (e.g., Clean Water Act, Clean Air Act, Endangered Species Act, National Historic Preservation Act, etc.) within which forest plans and site specific environmental analysis (NEPA) is performed.

This rule has been designated a significant regulatory action and the economic effects are estimated to be less than $100 million per year. This analysis has examined a wide breadth of potential effects that include ‘a worst-case scenario’. This includes an upper estimate of recreation visitation displacement that assumes all recreation visitation is displaced under the highest level of timber suitability designation under the final rule; and application of forgone conservation value to not just a portion of suitable acres harvested, but all suitable old-growth acres designated as suitable timberlands and harvested.

This document also examines cost to address the Executive Order 13771 requirement to provide the Agency's best estimates of the total costs or savings associated with each new regulation or repealed regulation. Recreationists and related industry (including outfitters and guides) could experience lost revenue from potential displacement due to timber harvest. Relative to the

baseline estimate under the 2001 Roadless Rule, approximately $65,000 to $213,000 in outfitter and guide related revenue may be lost annually in Southeast Alaska from IRA visitors who may be subject to displacement from changes to young- and old-growth areas available for harvest.[1] For some recreation uses, additional development for timber harvest and other infrastructure could provide increased access to the Forest and more opportunities. Nearly all new roads constructed under the regulatory alternatives would be closed following harvest. These roads would, therefore, not be available for use by highway vehicles or high-clearance vehicles. They may, however, be available for access by other methods and would, as a result, have the potential to affect existing recreation patterns. Some roads would be left open and available for access on maintained roads for administrative use, recreation and other uses such as infrastructure.

Costs from potential displacement of recreationists would accrue alongside benefits from a more efficiently managed timber sales program. Potential change in stumpage value provides a frame of reference for benefits from the Tongass NF timber program. Timber harvest levels on the Tongass NF are guided by the Forest Plan (USDA Forest Service 2016) and continual timber demand monitoring, currently 46 million board feet (MMBF) per year. Analysis of stumpage value under the final rule (and Alternatives 2 through 5) indicate stumpage value could potentially increase by approximately $460,000 to $922,000 dollars per year as a result of improved flexibility to the timber sales program depending on the level of harvest (one standard deviation less than the average annual harvest on the Tongass NF over the last 17 years, in Table 4, to the harvest estimate under the Forest Plan of 46 MMBF).[2] This range of value accounts for uncertainty in timber demand; accounting for past influences of the 2016 and 2008 Forest Plans by using the annual average depicted in Table 4. In addition, the upper estimate of 46 MMBF, from the Forest Plan, is a projection of future demand. This includes the agency's responsibilities under the Tongass Timber Reform Act, which directs the Forest Service to seek to provide a supply of timber from the Tongass National Forest that meets annual market demand and the market demand for each planning cycle to the extent consistent with providing for the multiple-use and sustained-yield of all renewable resources and other applicable requirements, including NFMA. The USDA recognizes the projected timber sale quantity is not a cap, like the allowable sale quantity from the 1982 Planning Rule. It is only an estimate and at this time it is the agency's best estimate. The final rule (Alternatives 6) provides the most flexibility amongst the regulatory alternatives for timber managers for designing timber sales that appraise positive[3].

[1] These estimates provide an upper estimate for consideration of potential lost revenue, alongside a more efficiently managed timber sales program, and should not be used as precise estimates of roadless area visitor expenditures or losses. Expenses incurred by visitors are not necessarily lost but subject to displacement related changes. While some businesses may lose revenues, if visitors choose not to travel to Southeast Alaska, others may see increases in revenues if visitors choose to stay longer or travel to substitute sites within Southeast Alaska. Detailed explanation and sources for this analysis is provided below in the Cost Benefit sub-section Potential Impacts by Resource Area.
[2] Detailed explanation of the source (USDA Forest Service 2019b) and calculations used in this analysis are provided below in the Cost Benefit sub-section Potential Impacts by Resource Area.
[3] Under the Further Consolidated Appropriations Act, 2020 P.L. 116-94, 133 Stat. 2751 (Sec. 436), timber sales that do not appraise positive using the current Region 10 Residual Value (RV) appraisal cannot be offered. The Region 10 RV appraisal and other timber valuation programs are based on the best available information (collected from timber companies, price reports, and cost indices) to appraise timber sales on the Tongass National Forest.

Cost savings from improved flexibility could, in turn, potentially improve the Forest Service's ability to offer economically feasible sales that meet the needs of industry. Areas closer to markets, either a mill or export facility, are also more likely to offer more economic timber sale options. More distant areas would be relatively expensive to harvest and less likely to be accessed. While many factors can influence the cost of timber harvest, areas along existing roads or those using marine access facilities are typically more economically efficient, followed by areas where existing roads can be extended rather than building many more miles of new roads.

Analysis of potential increase in stumpage value (see detailed description of this analysis in the section below Potential Impacts by Resource Area) under the final rule (and Alternatives 2 through 5) indicates the final rule and Alternatives 2 through 5 could potentially increase stumpage value by approximately $922,000 dollars annually under the Tongass Forest Plan harvest estimate of 46 MMBF (USDA Forest Service 2019b). These increases in stumpage value reflect efficiency gains from just a portion of overall cost covering just "stump to truck" from felling, yarding, and loading and assume transportation and towing costs remain constant. Harvest near existing roads and closer to markets may provide 'stump to truck' costs saving as readily available acres in areas formerly designated as IRAs are harvested first. As these acres are exhausted efficiency gains from lower "stump to truck" costs are likely to be absorbed by increased transportation and towing costs. Information on transportation and towing costs are not available and highly speculative given the influence of external market forces and lack of site specific knowledge on where and when harvest will occur. The potential increase in roads would likely increase maintenance costs to the Forest Service and these are considered in the analysis below. Detailed explanation and sources for this analysis are provided below in the Cost Benefit sub-section Potential Impacts by Resource Area.

Because the final rule and other regulatory alternatives do not prescribe site-specific activities, it is difficult to predict changes in benefits under the different regulatory alternatives. It should also be emphasized that the types of benefits derived from uses of roadless areas in Alaska are far ranging and include a number of non-market and non-use benefit categories. As a consequence, benefits are discussed qualitatively in many sections of this report.

RELATIONSHIP OF FINAL RULE TO THE FOREST PLAN AND OTHER BINDING CONSTRAINTS

The National Forest Management Act of 1976 (NFMA) requires the Forest Service to develop, maintain and as appropriate, revise land and resource management plans (forest plans) for units of the National Forest System. Land management plans provide a framework for integrated resource management and for guiding project and activity decision making, but plans do not authorize projects or activities or commit the Forest Service to take action. A revised Tongass Land Management Plan was issued in 1997, and amended in 2008 and 2016. Forest planning is a distinct and separate process from USDA's various roadless rulemakings. See Kootenai Tribe of Idaho v. Veneman, 313 F.2d 1094 (9th Cir. 2002); and State of Wyoming v. USDA, 661 F.3d 1209 (10th Cir. 2011).

The relationship between regulations, land and resource management plans (forest plan), and national forest projects is of particular importance to roadless rulemaking. Hierarchically, the Alaska Roadless Rule is two steps removed from any Tongass project-specific decision. A regulation is hierarchically above a forest plan, which must comply with all applicable laws and regulations. A forest plan provides broad guidance for future project activities within a specific national forest.

All forest plans must conform to existing laws and regulations as well as new laws and regulations. See 36 CFR 219.1(f) and 219.13(c). All of USDA's previous roadless rules, national and state-specific, have directed that: (1) no amendment or revision of any forest plan was compelled by promulgation of such rules, (2) subsequent forest planning decisions could not revise the Secretary's regulatory instructions, and (3) line officers were to conform project decisions to the prohibitions and exceptions set forth in the applicable rules. The final rule would continue this approach with one minor exception.

The final rule would direct the Tongass Forest Supervisor to provide notice of an administrative change (36 CFR 219.13(c)) concerning lands that were deemed unsuitable in the Tongass Forest Plan (See Tongass Forest Plan, Appendix A: Identification of Lands Suitable for Timber Production and Limitations on Timber Harvest) solely due to the application of the 2001 Roadless Rule. Similarly, an administrative change addressing timber suitability would occur for other alternatives that alter the underlying assumptions of the plan's identification of suitable lands. Any such lands would be appropriately returned to the suitable timber base via the administrative change provision of the planning regulations. All other aspects of the Tongass Forest Plan would be consistent with the final roadless rule including the goals, objectives, management prescriptions, standards, guidelines, projected timber sale quantity, projected wood sale quantity, and young-growth transition strategy. This includes standards and guidelines for non-timber resources, for example riparian management standards and guidelines which provide protection for fisheries with subsistence and commercial importance. All timber harvest, including harvest in areas formerly designated as inventoried roadless areas, would be compelled to adhere to these resource standards and guidelines (fisheries, water quality, air, recreation, etc.), thus providing continuation of Forest Plan direction under all the regulatory alternatives. A forest plan amendment or revision is neither required nor expected to occur due to this rulemaking, and the public involvement opportunities associated with this rulemaking are equivalent to any notice or public involvement requirements under the National Forest Management Act.

Although the Forest Service has broad discretion during forest plan revision to modify management direction, any change would need to be consistent with applicable law, regulation, and policies, including the final Alaska Roadless Rule. Similarly, the Tongass Timber Reform Act directs the Forest Service to seek to provide a supply of timber from the Tongass National Forest that meets annual market demand and the market demand for each planning cycle to the extent consistent with providing for the multiple-use and sustained-yield of all renewable resources and other applicable requirements, including the NFMA. The current Forest Plan anticipates sufficient timber availability to meet projected demand as described in the 2016 Tongass Forest Plan Amendment Final EIS and Record of Decision. In addition, the Tongass

Forest Plan provides guidance to conduct annual monitoring and review of current timber demand. Similarly, the Tongass Timber Reform Act provides for protection of riparian habitats and the multiple use and sustained yield of all renewable surface resources. In addition, watershed protection measures, such as riparian buffers and application of watershed conservation measures will be provided for future revisions or amendments in conformance with all applicable laws, including the Clean Water Act, Magnuson–Stevens Fishery Conservation and Management Act, and Alaska's Department of Environmental Conservation Water Quality Standards.

In addition, Forest Service is only authorized to offer specific lots of timber for sale if that sale is determined to be economic or appraises positively. An economic sale is one where the sale of the harvested timber generates sufficient revenue to cover all costs of harvesting and a reasonable profit to the purchaser. Certainly not all of the available acres in the Tongass will be able to meet this test.

A unique aspect of the Tongass Forest Plan is the land use designation (LUD) called LUD II, a statutorily established land classification that applies on lands as described in the Tongass National Forest Land Management Plan, completed March 1979 and amended winter 1985-1986, for areas allocated to be managed in a roadless state to retain their wildland character. Wildlife and fish habitat improvement and primitive recreation facility development are permitted in these areas. LUD II areas are defined in the Tongass Timber Reform Act (TTRA; Title II, Section 201) and the National Defense Authorization Act for Fiscal Year 2015 (Public Law 113-291, 128 Stat. 3729, Section 3720(f)). The statutory direction for LUD II areas would remain in place regardless of whether the 2001 Rule or any other rule is promulgated.

As a result of these legal and regulatory constraints, reducing the number of acres designated as roadless, or even removing roadless status from all acres is not expected to lead to large scale development or harvest of timber. The USDA recognizes the projected timber sale quantity is not a cap, like the allowable sale quantity from the 1982 Planning Rule. It is only an estimate and at this time it is the agency's best estimate. The agency has no reason to believe harvest levels will increase from the Tongass Forest Plan annual projected timber sale quantity based on implementation of the final rule.

DESCRIPTION OF THE FINAL RULE AND ALTERNATIVES

The terms central to understanding the final rule and regulatory alternatives described here are defined below, and are not terms used previously in managing the Tongass National Forest. These terms and others used in the analysis are also defined in the glossary of the Final Environmental Impact Statement (FEIS) (USDA Forest Service 2020):

- Alaska Roadless Areas (ARA). Lands within the Tongass National Forest designated pursuant to this subpart and identified in a set of maps maintained by the national headquarters office of the Forest Service.
- ARA Designations. Areas identified with varying degrees of exceptions and prohibitions, designed based on land management priority.

- Land Use Designation (LUD) II. Statutory land use designations managed in a roadless state to retain their wildland character as defined in the TTRA (Pub. L. 101-626, Title II, Section 201) and the National Defense Authorization Act for Fiscal Year 2015 (Pub. L. 113-291, 128 Stat. 3729, Section 3720(f)).
- Tongass 77 (T77) Watersheds and The Nature Conservancy (TNC)/Audubon Conservation Priority Areas. Through involvement of private and public groups and agencies, a number of watersheds and Value Comparison Units (VCUs) in the Tongass were previously evaluated for relative importance for several metrics relating to fish and wildlife. Included among these are conservation priority areas identified by TNC and Audubon Alaska (Audubon Alaska and The Nature Conservancy 2007), and the T77 watersheds identified by Trout Unlimited. The T77 refers to value comparison units (VCUs), which approximate major watersheds located on the Tongass National Forest that Trout Unlimited, Alaska Program identified as priority salmon watersheds within the 2016 Tongass National Forest Land and Resource Management Plan (USDA Forest Service 2016a).

Alternative 6 is the final rule and provides maximum additional timber harvest opportunity and is the full exemption alternative. Under the final rule, roadless protection would be removed from all roadless areas on the Tongass, resulting in a reduction of 9.4 million acres of roadless areas (Table 1). Former roadless areas would be managed in accordance with the Forest Plan (USDA Forest Service 2016) with an estimated net gain of about 168,000 acres of suitable old growth, including 59,000 acres of high-volume suitable old growth (Table 1). This estimated gain (168,000 acres) is equivalent to about 74 percent of the acres available under the baseline 2001 Roadless Rule and seven times the old-growth acres expected to be harvested over the next 25 years (24,000 acres).

Aspects of the Tongass Forest Plan are consistent with the final rule including the goals, objectives, management prescriptions, standards, guidelines, projected timber sale quantity, projected wood sale quantity, and young-growth transition strategy. Analysis relies on baseline conditions under the Forest Plan that includes standards and guidelines for other non-timber resources, for example Riparian Management standards and guidelines providing protection for fisheries with subsistence and commercial importance. All timber harvest, including harvest in areas formerly designated as IRAs, would be compelled to adhere to these resource standards and guidelines (fisheries, water quality, air, recreation, etc.), thus providing continuation of Forest Plan direction under all the regulatory alternatives.

The final rule is programmatic and does not directly authorize any ground-disturbing activities. Before authorizing a land-use activity, the Forest Service must complete a site-specific environmental analysis, pursuant to the National Environmental Policy Act (NEPA) and its implementing regulations. When a specific project or activity is proposed on NFS land, the Forest Service conducts site-specific analyses of the effects associated with that project or activity and makes a decision that authorizes implementation of that project or activity (this requirement exists under all regulatory alternatives including the baseline 2001 Roadless Rule).

This report provides effects of the final rule in comparison to baseline conditions represented as a continuation of current land management pursuant to the 2001 Roadless Rule, presented as "baseline 2001 Roadless Rule" in the discussion below, and current Forest Plan direction.

Alternative 1 applies to the provisions of the 2001 Roadless Rule to inventoried roadless areas under the No Action Alternative and is referred to as the baseline 2001 Roadless Rule throughout this document. Alternative 1 takes no action and leaves all of Alaska under the 2001 Roadless Rule, including the Tongass NF. Under Alternative 1, roadless areas consist of 110 IRAs identified in the 2001 Roadless Rule. As a result of ownership changes and boundary alignment corrections, these IRAs currently encompass 9.4 million acres of NFS land. Provisions of the 2001 Roadless Rule would remain intact across the 110 IRAs, encompassing approximately 56 percent of the Tongass NF. Under Alternative 1, the baseline 2001 Roadless Rule, about 230,000 acres of old growth and 334,000 acres of young growth are currently suitable for timber production.

Alternative 2 provides limited additional timber harvest opportunity while maximizing roadless area designations. It removes approximately 142,000 acres from roadless designation that have been substantially altered as identified by known prior road construction or timber harvest including both development and non-development LUDs. These areas are generally known as "roaded roadless" areas but include additional areas considered to be substantially altered. Alternative 2 also maximizes the geographic scope of roadless area designation by adding 110,000 acres as Alaska Roadless Areas (ARAs).

Alternative 3 provides more timber harvest opportunities than Alternative 2 by removing substantially-altered roadless areas (including roaded roadless, similar to Alternative 2) and extending the bounds of these areas to logical end points of existing road and timber harvest systems, generally defined as the nearest watershed boundary (i.e., ridgeline of 14th-field hydrologic unit) from an existing road system. Removing these areas from the roadless inventory represents the logical extensions of substantially altered acres from existing infrastructure and likely encompasses the more economically feasible locations for future timber harvest with the least impact to roadless characteristics. Approximately 3,259,000 acres under Alternative 3 would be managed under Watershed Priority category and applied to areas identified in the Forest Plan as Tongass 77 (T77) Watersheds and The Nature Conservancy (TNC)/Audubon Conservation Priority Areas. Alternative 3 also provides additional timber harvest opportunity by designation of Community Priority areas around seven communities, Hydaburg, Juneau, Kake, Ketchikan, Sitka, Wrangell, and Yakutat. The Community Priority ARA allows for small-scale timber harvest and associated road construction/reconstruction. In addition, it allows for infrastructure development to connect and support local communities and traditional Alaska Native cultural uses. Further detail on this and other Alaska Roadless Area Land Management Categories are provided in the next section.

Alternative 4 provides significant additional timber harvest opportunity but maintains roadless protections for Scenic Viewshed Land Use Designations (LUD) and Tongass 77 (T77) Watersheds/The Nature Conservancy (TNC)/Audubon Conservation Priority Areas that are in roadless areas. There is a small amount of young growth within these areas that would be

available for timber harvest. Approximately 401,000 acres are removed from roadless designation, including substantially-altered areas and logical extensions of substantially-altered acres (similar to Alternatives 2 and 3), along with selected additional locations for potentially feasible economic timber sales. These acres are also converted from unsuitable to suitable timber lands, resulting in significant additional timber harvest opportunity.

Alternative 5 provides the same timber harvest opportunity as the Alternative 6 final rule while maintaining some roadless area protection in areas where the Forest Plan currently does not allow commercial timber harvest. Though the 2001 Roadless Rule represents baseline conditions, the final rule is compared to the other regulatory alternatives to fully understand the impacts of the final rule. Table 1 provides a comparison of the regulatory alternatives and further discussion of the ARA management categories are provided below.

Alternative 6 is the final rule and provides maximum additional timber harvest opportunity and is the full exemption alternative. A description of this regulatory alternative is provided first in this section.

Table 1. Roadless Areas by Alternative and Management Category

	Alternative					
	Baseline	**2**	**3**	**4**	**5**	**Final Rule**
Roadless Category (acres)	**2001 Roadless Rule**	**Roaded Roadless Alternative**	**Logical Extension Alternative**	**Partial Dev LUDs[1] Alternative**	**All Dev LUDs Alternative**	**Full Exemption Alternative**
Total Designated Roadless Area	9,368,000	9,336,000	8,224,000	8,975,000	7,047,000	0
ARA Management Categories						
LUD II Priority	N/A	854,000	0	854,000	847,000	0
Watershed Priority	N/A	3,284,000	3,259,000	0	0	0
Roadless Priority	N/A	5,199,000	4,595,000	7,363,000	6,200,000	0
Community Priority	N/A	0	370,000	0	0	0
Timber Priority	N/A	0	0	757,000	0	0
Old-Growth Acres Suitable for Timber Production						
Total Acres	227,000	247,000	312,000	388,000	395,000	395,000
Net Change	0	20,000	85,000	161,000	168,000	168,000
T77 & TNC/ Audubon Conservation Priority Areas Outside of Roadless given Long-term Regulatory Protection						
Total Acres	0	0	507,000	0	0	0

N/A = not applicable

[1] Includes Timber Production and Modified Landscape LUDs, but not Scenic Viewshed.

Alaska Roadless Area Land Management Categories

Regulatory alternatives, apart from the baseline 2001 Roadless Rule and the final rule, provide for a variety of management approaches within roadless areas through ARA land management categories which include LUD II Priority, Watershed Priority, Community Priority, Roadless Priority, and Timber Priority. The management categories prohibit timber harvest, road construction, and road reconstruction with a range of exceptions that are applied differentially across the regulatory alternatives. A brief description of each management category follows.

Roadless Priority (Alternatives 2, 3, 4 and 5)
The Roadless Priority management category is similar to the 2001 Roadless Rule but is less restrictive and addresses Alaska-specific concerns. Specifically, it expressly provides for infrastructure development to connect and support local communities, and road construction/reconstruction for access to renewable energy and leasable minerals. The leasable minerals exception provides for roading associated with geothermal, oil, gas, and/or coal development. In addition, the Roadless Priority category includes specific exceptions that, while they are already allowed under the 2001 Roadless Rule, are included to improve overall clarity.

LUD II Priority (Alternatives 2, 4 and 5)
LUD II designated areas existed before the 2001 Roadless Rule and approximately 870,000 acres of the Tongass are congressionally designated as LUD II (847,000 acres currently are additionally designated as IRA under the 2001 Roadless Rule and 22,000 acres currently not designated as IRA) managed in a roadless state to retain their wildland character (as defined in the Tongass Timber Reform Act of 1990 and the National Defense Authorization Act for Fiscal Year 2015). Alternatives 2 and 4 propose to designate 854,000 LUD II acres as LUD II Priority ARA.

Under Alternatives 2, 4 and 5 the LUD II Priority category would reduce confusion by having the roadless regulatory management direction manage these areas only in accordance with the statutory direction: that these lands will be managed in a roadless state to retain their wildland character as defined in the Tongass Timber Reform Act of 1990 (Title II, Section 201) and the National Defense Authorization Act for Fiscal Year 2015 (Public Law 113-291, 128 Stat. 3729, Section 3720(e)(4)). Alternatives 2 and 4 propose to designate all of the congressionally designated LUD II acres as LUD II Priority ARAs. Notably, Alternative 3 proposes to remove all LUD II areas from roadless designation rather than designating an ARA category. LUD II areas under Alternative 3 would continue to be managed under their congressional designations. Alternative 5 proposes to apply the LUD II Priority category only to LUD II areas that are currently designated as IRA.

Watershed Priority (Alternatives 2 and 3)
The Watershed Priority category is more protective than the 2001 Roadless Rule as it offers fewer exceptions for timber harvest, road construction and road reconstruction. It also provides for activities specific to aquatic habitat improvement. Approximately 3,284,000 acres under Alternative 2 and 3,259,000 acres under Alternative 3 would be managed under this management category. The Watershed Priority category is applied to areas identified in the Forest Plan as T77 Watersheds and TNC/Audubon Conservation Priority Areas. Also, the Watershed Priority management designation was applied to high priority sockeye salmon watersheds. Additionally, for Alternative 3, commercial old-growth timber harvest would be prohibited on National Forest System lands in T77 and TNC/Audubon Conservation Areas including those that extend beyond Alaska Roadless Area boundaries.

Community Priority (Alternative 3)
The Community Priority category allows for small-scale timber harvest and associated road construction and reconstruction. In addition, it allows for infrastructure development to connect

and support local communities, and traditional Alaska Native cultural uses. In all cases, activities within Community Priority ARAs would have to be consistent with the underlying Forest Plan LUD requirements. This is to say that even if a timber harvest, road building, or other activity would be permissible under the Alaska Roadless Rule, it may not be allowable because of Forest Plan requirements specific to the LUD that applies to the area. This management category applies to approximately 370,000 acres and is only proposed under Alternative 3 adjacent to seven communities: Hydaburg, Juneau, Kake, Ketchikan, Sitka, Wrangell, and Yakutat.

This management category was developed to address specific desires of some communities to retain roadless protections while also allowing for small timber operators in the community, infrastructure development to support the communities, and provide for traditional Alaska Native cultural uses. The provision allows for road building to accommodate small commercial sales of less than one million board feet (which does not exclude larger operators but is designed to reduce barriers to entry for smaller operators).

T77 Watersheds and TNC/Audubon Conservation Priority Areas – Additional Protections (Alternative 3)

Watershed protection is a key element of roadless management. Watersheds are highly valued sources of municipal drinking water, support fisheries and wildlife habitat, and can act as keystones for economic activities. Under Alternative 3, areas identified in the 2016 Tongass Forest Plan as T77 and TNC/Audubon Conservation Priority Areas (high priority watershed areas) would be afforded added protection through the roadless regulation. Specifically, old-growth timber harvest would be prohibited within these areas, subject to the described exceptions. A prohibition on old growth harvesting already exists through the Tongass Forest Plan. But Alternative 3 establishes regulatory continuity between these roadless and watershed management systems given how extensively they overlap (the listed watersheds comprise over half of the Tongass' roadless areas, and approximately 90% of the watershed areas are within roadless area boundaries). Thus the old growth harvest prohibition would be extended beyond the designated roadless area boundaries in order to maintain the balance and integrity of the watershed protection system. Young-growth timber harvest outside of Alaska Roadless Areas within the high priority watershed areas is not prohibited.

As with all roadless rule instructions, the new old growth harvest prohibition would operate as an overlay to the forest plan, with the plan continuing to provide management direction in other regards. In this manner, Alternative 3 affords high priority watershed areas greater protection than under the 2001 Roadless Rule.

Timber Priority (Alternative 4)

The Timber Priority category allows timber harvest, road construction, and road reconstruction to facilitate timber management and provide economic opportunity. This management category applies to approximately 757,000 acres and is only proposed under Alternative 4.

ANALYSIS REQUIREMENTS

Executive Order (EO) 12866, Regulatory Planning and Review, issued in 1993, reformed the federal government's regulatory process as highlighted by primary objectives: 1) enhancing planning and coordination across regulations; 2) reaffirming federal government primacy in regulatory decision-making; 3) restoring the integrity of regulatory review; and 4) making the regulatory process more accessible to the public.

The final rule (Alternative 6) is classified as significant, as determined by the Office of Management and Budget and this report meets the requirements of Executive Order 12866 for a significant rule. Executive Orders 13563 and 12866 direct agencies to assess costs and benefits of available regulatory alternatives and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, public health and safety effects, distributive impacts, and equity). Executive Order 13563 emphasizes the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. Analysis is required to "assess both the costs and benefits" of the intended regulation, recognizing quantifiable analysis is not always possible, but that the agency make a reasoned determination that the benefits justify the regulatory costs.

The Regulatory Flexibility Act (RFA, 5 U.S.C. et seq., Public Law 96-354) as amended by the Small Business Regulatory Flexibility Enforcement Fairness Act of 1996 generally requires an agency to prepare a regulatory flexibility analysis describing the impact of the regulatory action on small entities as part of the rulemaking. This is required of any rule subject to notice and comment requirements under the APA or any other statute unless the agency certifies that the rule will not have a "significant impact on a substantial number of small entities". Small entity impacts and opportunities are examined in the compliance document titled Alaska Roadless Rulemaking, Regulatory Flexibility Analysis (USDA Forest Service 2020c).

REGIONAL ECONOMIC OVERVIEW

Southeast Alaska employment in 2018 is summarized by sector in Table 2. Government and the visitor sector were the largest employers, accounting for 29 percent and 18 percent of total employment, respectively. The government sector is the main source of year-round employment in all the communities in Southeast Alaska. In addition to direct employment in government, many of the area's private sector jobs are also dependent on government funding and contracts. Private sector activities dependent on government funding include road construction and health care services.

State government employment has dropped significantly since 2012, with a loss of 850 state jobs in Southeast Alaska from 2012 through July 2018. Three-quarters of these losses occurred in Juneau. These losses have accompanied declining oil production and prices, with state revenues falling by 70 percent from fiscal year 2013 to fiscal year 2018, and the state budget dropping by 40 percent. Federal government employment has also declined in Southeast Alaska over the past decade, with the loss of 600 jobs since 2005 (Southeast Conference 2018).

Table 2. Southeast Alaska Annual Employment and Earnings by Sector, 2018

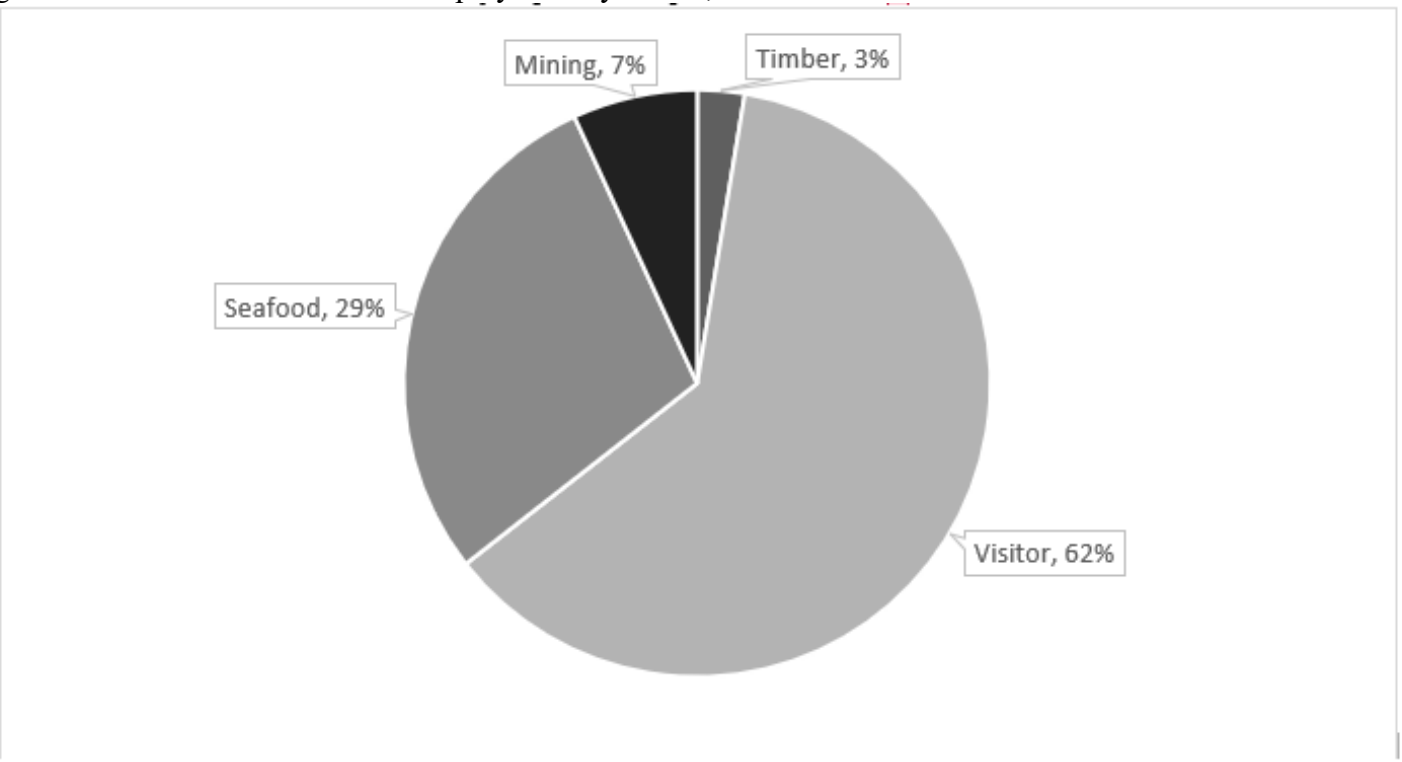
Economic Sector[1]	Total Employment (Jobs)	Total Earnings ($M)[2]	Percent of Total	
			Employment	Earnings
Government (includes Coast Guard)	13,148	776.9	29%	34%
Visitor	8,004	249.3	18%	11%
Seafood	3,711	237.4	8%	10%
Retail and Wholesale Trade	4,490	145.1	10%	6%
Health Care (private only)	2,852	168.6	6%	7%
Construction	1,909	121.6	4%	5%
Financial	1,830	122.2	4%	5%
Professional and Business Services	2,910	123.0	6%	5%
Social Services	1,476	46.4	3%	2%
Mining	889	93.0	2%	4%
Information[3]	541	23.5	1%	1%
Timber	337	18.8	1%	1%
Warehousing, Utilities, Transportation[4]	943	61.8	2%	3%
Other	2,602	94.5	6%	4%
Total	45,642	2,282	100%	100%

Notes:
[1] These data were compiled on behalf of Southeast Conference based on data collected by the Alaska Department of Labor (DOL) and the U.S. Census Bureau. The Alaska DOL data are for 2017 for non-agricultural wage and salary employment. These data do not include proprietors or self-employed workers, and are, therefore, supplemented using data from the 2016 US Census Nonemployer Statistics, which specifically count proprietors and the self-employed.
[2] Total earnings are expressed in millions of 2018 dollars.
[3] The Information sector, as defined here, includes publishing, broadcasting, and telecommunications.
[4] Includes non-visitor-related transportation only. Visitor-related transportation is included in the visitor sector.
Source: Southeast Conference 2019

Natural Resource-Based Industries

Employment in natural resource-based industries – timber, visitor, seafood, and mining – together accounted for an estimated 12,941 jobs in 2018, more than one-quarter (28 percent) of total employment in Southeast Alaska (Table 2). The estimated distribution of resource-dependent employment is shown by industry in Figure 1. The visitor industry accounted for more than half (62 percent) of this total, followed by the seafood sector, which accounted for almost one-third (29 percent). Mining accounted for 7 percent and wood products made up 3 percent (Figure 1).

Figure 1. Natural Resource-Based Employment by Sector, 2018



Note:
Total = 12,808 Employees
Source: Southeast Conference 2019

Forest Products

Southeast Alaska timber is primarily purchased and harvested from Tongass National Forest lands managed by the USDA Forest Service, from the State of Alaska (Division of Forestry, Alaska Mental Health Trust Land Authority, and University of Alaska Trust Land Office), and Alaska Native Village and Regional corporations (Alaska Native corporations). Sawmill employment has historically been supported by Forest Service timber sales, with state timber harvest also contributing. Logging employment is generated from all ownerships, including Alaska Native corporation lands.

Timber industry employment in Southeast Alaska peaked at the end of the 1980s, before dropping sharply in the 1990s. Much of this job loss was associated with closure of the large pulp mills in Sitka (1993) and Ketchikan (1997). Timber employment has continued to decline since the 1990s, falling from a recent high of 561 jobs in 2003 to 202 jobs in 2017 (Table 3; Figure 2). Tongass National Forest-related employment in logging and sawmilling declined from 199 jobs in 2003 to a low of 61 jobs in 2017. Non-Tongass timber employment also declined over this period, falling from a recent high of 362 jobs in 2003 to 109 jobs in 2017, a drop of 70 percent (Table 3). From 2002 to 2018 harvest activities on the Tongass supported about 41 percent of timber jobs in Southeast Alaska, on average. Factors contributing to the decline include changes in the structure of the Alaska forest sector, macroeconomic conditions both in the United States and overseas (e.g., shifting demand from Asian markets), markets for Alaskan

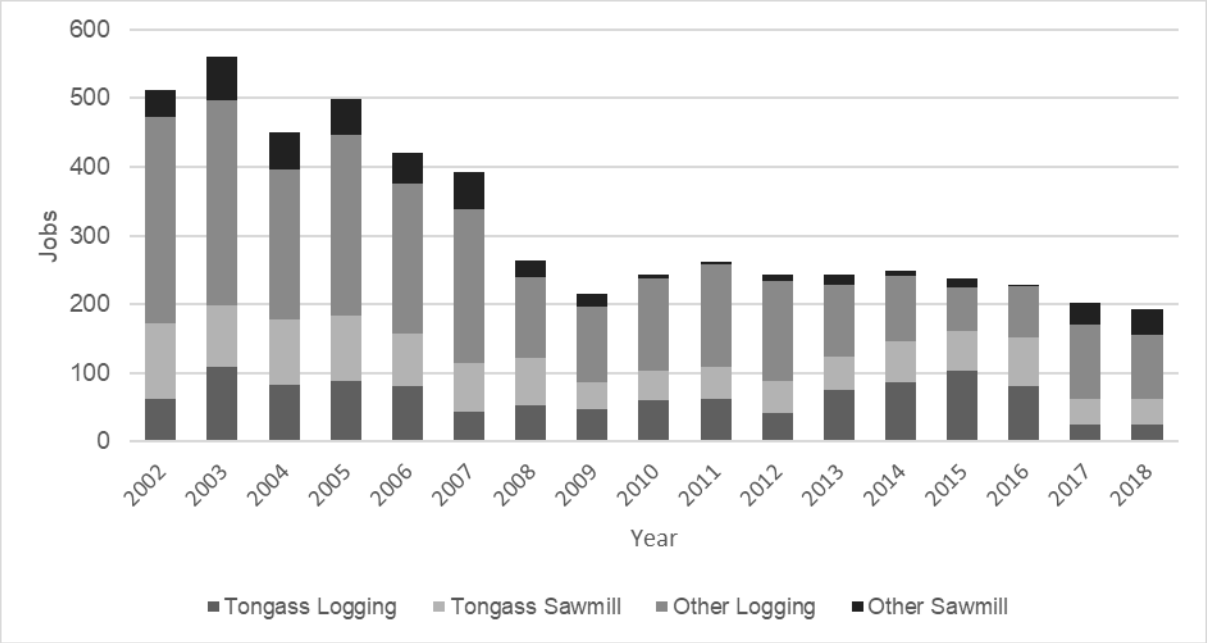
products, and conditions faced by Alaska's competitors. In addition, Alaska faces competitive challenges due to its remote location: the high costs of harvesting and transportation in remote areas of southeast Alaska and the relatively lower price commanded in dimensional lumber markets limits profitability (Daniels et al. 2016). Harvest activities supporting employment have included pre-commercial thinning, generally defined as a silvicultural treatment to reduce stand density, to improve understory habitat (deer), improve the growth characteristics of trees, shorten rotation times, and improve forest health.

Table 3. Timber Industry Employment in Southeast Alaska, 2002-2018

Year[1]	Tongass Logging	Tongass Sawmill	Total Tongass-Related Employment	Other Logging	Other Sawmill	Total Other Timber Employment	Total Timber 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
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	25	37	62	108	32	141	202
2018	25	37	62	94	37	131	193

Note:
[1] Data are presented by calendar year. Source: USDA Forest Service 2018a, 2020a

Figure 2. Timber Industry Employment in Southeast Alaska, 2002-2018



Source: USDA Forest Service 2018a, 2020a

Timber harvest in Southeast Alaska also peaked in the late 1980s, with harvest levels slightly below 1 billion board feet. Total harvest in 2017 was 74.2 MMBF, about 8 percent of peak levels. Harvest on the Tongass accounted for about 21 percent (16.0 MMBF) of this total, with almost two-thirds (63 percent, 46.4 MMBF) of the overall total provided by Alaska Native corporation lands and 16 percent (11.9 MMBF) provided by the State of Alaska (Table 4). Table 4 displays general declining trends in timber harvest; however caution is recommended when inferring causality between timber harvest and market demand.

Table 4. Timber Harvest in Southeast Alaska by Ownership, 2002–2018. Timber harvest volume reported by calendar year, in MMBF

Year[1]	Tongass National Forest	State of Alaska[2]	Alaska Native Corporation	Total
2002	31.9	57.3	101.7	190.9
2003	48.1	34.8	105.7	188.6
2004	49.2	24.2	98.9	172.3
2005[3]	46.6	42.9	103.9	193.4
2006[3]	40.0	44.6	71.2	155.8
2007[3 4]	22.5	44.6	50.0	117.1
2008	30.0	11.9	52.3	94.2
2009	28.3	13.5	51.8	93.6
2010	35.7	10.5	66.4	112.6
2011	31.6	16.3	63.1	111.0
2012	17.5	10.8	56.1	84.4
2013	41.2	11.2	47.4	99.8
2014	36.7	12.0	29.3	78.0
2015	59.5	6.2	32.4	98.1

2016	43.5	27.5	34.6	105.6
2017	16.0	11.9	46.4	74.2
2018	20.0	17.6	58.4	96.0
Average	35.2	23.4	62.9	121.5

Notes:
[1] Timber harvest volume reported by calendar year, in million board feet (MMBF), and includes both sawlog and utility.
[2] State of Alaska includes Division of Forestry, Mental Health Trust, and University of Alaska Trust Lands.
[3] The relative increase in State harvest was an effort to provide additional timber to make up for a shortfall in supply from the Tongass.
[4] The relative drop in Tongass harvest in 2007 was the result of an injunction that stopped Tongass logging over most of the operating season.
Source: USDA Forest Service 2018a, 2020a

Recreation visitor related employment and contribution to the regional economy

Recreation and tourism-related employment is difficult to accurately quantify because visitors spend their money throughout the local economy. Recreation and tourism is not classified or measured as a standard industrial category. Components of travel and tourism activities are instead partially captured in other economic sectors, such as retail trade (e.g., grocery stores and gift shops), transportation, hotels and other lodging places, and amusement and recreation services. Information presented above for the visitor sector is considered generally representative of recreation and tourism-related employment in Southeast Alaska (see Table 2 and Figure 1).

According to the Alaska Department of Labor (DOL) (Bell 2015), visitor-related jobs in Southeast Alaska are concentrated in Juneau, Ketchikan, and Skagway, which together accounted for more than three-quarters of the regional total in 2014. Transportation is the largest visitor-related economic sector in Southeast Alaska making up about one-third of visitor-related employment, with jobs ranging from whale watching boats, to tour buses, to airlines. The highest paying visitor-related occupations are also in the transportation sector, including captains and mates of water vessels (Bell 2015).

A separate study prepared on behalf of the Alaska Department of Commerce, Community, and Economic Development (DCCED) found that the visitor industry supported 11,925 jobs and $445 million in labor income in Southeast Alaska from October 2016 through September 2017 based on direct visitor spending of $705 million (McDowell Group 2018). These estimates are for total employment and labor income, meaning that they include workers employed directly by the visitor industry (direct jobs and income), as well as jobs and income supported elsewhere in the economy (indirect and induced jobs and income).[4] A separate estimate of direct employment developed from Alaska DOL and U.S. Census data identified a total of 8,004 direct jobs supported by the visitor industry in 2018 (Table 2).

[4] Economic activity in one sector generates activity in others as firms purchase services and materials as inputs (termed “indirect” effects) and employees spend their earnings within the local economy (“induced” effects).

Nature-Based Tourism

A study prepared by the Institute of Social and Economic Research at the University of Alaska Anchorage provides insight into the contribution of nature-based tourism to the regional economy. This study, which involved field research conducted in the summers of 2005, 2006, and 2007, focused on a limited number of communities and sought to provide insight into revenues generated, the types of nature-based activities attracting tourists, and the resulting flows of money through the economy (Dugan et al. 2009). The findings of the study indicate that nature-based tourism generates substantial revenues in the region, with an estimated $277 million generated in annual direct business revenues for the companies surveyed in Sitka, Juneau, Chichagof Island, Prince of Wales Island, Petersburg, and Wrangell (Dugan et al. 2009).

Dugan et al. (2009) also found that nature-based tourism takes a number of different forms and the ratio of cruise ship passengers to independent travelers varies by location. Most nature-based activities that originate in Ketchikan, for example, fell into four general categories: flightseeing, marine charters, adventure experiences, and general sightseeing. In all cases, the majority of clients participating in these activities were cruise ship passengers. Cruise lines contract with other visitor service businesses operating in the Ketchikan area to provide these nature-based activities. Nature-based tourism on Chichagof Island, on the other hand, included a mix of cruise ship passengers and independent travelers, depending on the location and activity involved (Dugan et al. 2009). An estimated 1.2 million people visited Southeast Alaska in 2016, with most of these visitors (86 percent) arriving by cruise ship (McDowell Group 2017). Data on visitation trends of cruise ship visitors, from the FEIS (USDA Forest Service 2020) and other data on visitation trends for the state of Alaska from the McDowell Group (McDowell Group 2018a) shows demand for recreation in Southeast Alaska and the state is increasing.

Another study, conducted on behalf of Alaska Department of Fish and Game (ADF&G), estimated that residents and visitors to Southeast Alaska spent $363 million hunting and viewing wildlife in 2011, with visitors viewing wildlife accounting for an estimated 59 percent of this total (ECONorthwest 2014). Based on these estimated expenditures, the study estimated that hunting and wildlife viewing, respectively, supported 390 and 1,390 direct jobs and a combined total of $107 million in labor income in Southeast Alaska in 2011, with additional indirect and induced jobs and income supported elsewhere in the economy (ECONorthwest 2014).

Recreation on the Tongass National Forest

While it is reasonable to assume that the majority of visitor recreation and tourism activity in the region is related to the natural environment, not all of the activity generating this employment can be directly linked to the Tongass National Forest. Many visitors experience the Tongass from the deck of a cruise ship without directly using the forest for recreation purposes. In addition, while the Tongass includes approximately 80 percent of the land area in Southeast Alaska, there are other lands that offer wildland recreation opportunities in the region, including 3.3 million acres of National Park Service lands, and recreation lands managed by the State of Alaska. Further, other popular recreation and tourism activities, such as saltwater fishing, sea kayaking, and shopping, do not take place on the Tongass, although the forest may provide a backdrop for these activities, as well as contributing via ecosystem production services.

The Alaska Region of the Forest Service (Region 10) has been participating in the Forest Service's National Visitor Use Monitoring (NVUM) program since 2000. Based on the results of the NVUM program for 2010 to 2014 and coefficients developed by White and Stynes (2010), the Forest Service (2017a) calculated a visitation estimate of 2,874,000 annual visits to the Tongass National Forest. The results of earlier surveys indicated that half of Alaska residents surveyed who live in Southeast Alaska reported using a boat or plane to access the national forest (White and Stynes 2010). Almost half (49.7 percent) of non-resident visits to the Tongass National Forest involved the use of a guide or outfitter at some point, with local cruises, wildlife viewing, and flightseeing reported most frequently. Alaska residents in contrast were found to very rarely use outfitters or guides (White and Stynes 2010).

Spending profiles were estimated for residents and non-residents visiting the Tongass NF based on data compiled during the NVUM surveys. Using coefficients developed by White and Stynes (2010), the Forest Service (2017a) estimated that 2,874,000 annual visits to the Tongass NF generated about $382 million in spending and supported 3,947 direct jobs and an additional 1,110 jobs elsewhere in the regional economy. This overall estimate specific to visitation on the Tongass NF is equivalent to about 42 percent of the regional visitor estimate in Southeast Alaska developed for Alaska DCCED in 2017 (McDowell Group 2018), and the direct component is about 51 percent of the direct visitor jobs in Southeast Alaska estimated by Southeast Conference (2018). Recreational visitors with an expectation of a remote experience would be most affected by timber production in Primitive, Semi Primitive Non-Motorized, and Semi Primitive Motorized settings. These are three of seven Recreation Opportunity Spectrum (ROS) categories described in the Cost-Benefit analysis below.

Commercial Fishing and Seafood Processing

Data for the entire Southeast Alaska region on seafood production, seafood industry harvest and ex-vessel value from Alaska Department of Fish and Game is provided by the 2018 Southeast Conference report (Southeast Conference 2018). In 2018, an estimated 185 million pounds of seafood was harvested in Southeast Alaska with an ex-vessel value of $247 million. Viewed in terms of value, salmon accounted for more than half (55 percent) of the total commercial catch in Southeast Alaska in 2018, with the remainder divided among black cod (16 percent), halibut (13 percent), crab (7 percent), herring (2 percent), and other (8 percent) (Southeast Conference 2019).

Employment in the seafood harvesting and processing sectors varies from year-to-year, but remains relatively stable compared to the fluctuations in the volumes and value of salmon harvested each year. Salmon harvesting employed an estimated 864 people in Southeast Alaska in 2018, with an additional 1,281 people employed harvesting other fish (Alaska DOL 2019). A further total of 1,300 people were employed in fish processing in 2018 for a combined total of 3,445 jobs (Alaska DOL 2019a). Seafood harvesting and fish processing employment trends are shown for 2000 to 2013 in the Tongass Forest Plan FEIS (USDA Forest Service 2016).

Unlike other basic sectors of Southeast Alaska's economy, components of the seafood industry are spread throughout the region with an important presence in virtually every community.

Seafood processing workers, for example, were employed in all of the boroughs in 2017, ranging from 15 workers in Skagway to 1,024 workers in Sitka (Alaska DOL 2019a).

The seafood processing sector is generally characterized by high seasonality and low resident hire, as well as low hourly wages, with a median annual wage of $24,689 in 2013 (Strong 2014). The industry does, however, have a number of higher paid occupations, including ship engineers, captains, mates, boat pilots, and general and operations mangers, which accounted for just 1.2 percent total employment, but 6 percent of wages, with a median annual wage of $66,720 (Strong 2014).

Mining and Mineral Development

Mineral exploration and mining have been a part of life in Southeast Alaska for more than a century. Estimates developed using Alaska DOL data found that a total of 889 workers were employed in the mining sector in Southeast Alaska in 2018 (Table 2). According to a recent economic impact study prepared for Alaska's mining industry, the Greens Creek and Kensington mines employed 420 workers and 387 workers in 2018, respectively, with the Kensington Mine employing an additional 90 contractors (McDowell Group 2019). Mining jobs are the highest-paying jobs in the region, with average annual wages of $104,650 in 2018 (Southeast Conference 2019). The high wages in this sector reflect the skilled nature of the job, as well as the demands of working in remote locations (Abrahamson 2013). The region's two large mines (Greens Creek and Kensington) accounted for the majority of the mining employment in Southeast Alaska in 2018 (Southeast Conference 2019).

Both the Greens Creek and Kensington mines are located in the City and Borough of Juneau, mostly on Tongass NFS lands. Greens Creek Mine is a primary silver mine located on Admiralty Island; Kensington Mine is a gold mine located on the mainland approximately 45 miles north of Juneau. Alaska residents make up about two-thirds of the total labor force at each mine, 66 percent at Greens Creek and 67 percent at Kensington while nonresidents make up the remainder of the labor force. Alaska resident employees of both mines live throughout the region. More than two-thirds of Greens Creek's Alaska resident employees live in Juneau. The other third live in other Southeast Alaska communities or elsewhere in the region (McDowell Group 2018).

Two proposed underground mine projects on NFS lands on Prince of Wales Island received approval for financial assistance through the Alaska Industrial Development and Export Authority in June 2014 (Bradner 2014). Senate Bill 99 authorized $145 million and $125 million in infrastructure and construction financing, respectively, for the proposed Bokan Mountain and Niblack projects. The Bokan Mountain project is a rare earths mine that would include on-site ore processing facilities. The McDowell Group (2013) in a study prepared for the Bokan Mountain project estimated that construction of the project would last 2 years and employ an average construction workforce of 200, with peak employment potentially reaching 300 workers. Operation would be expected to employ 190 workers with approximately $18 million in annual payroll (McDowell Group 2013). The governor of Alaska asked that the White House CEQ designate the Bokan Mountain project as a high priority infrastructure project in August 2019 (Southeast Conference 2019). The Niblack Project is a proposed underground copper-gold-zinc-silver mine. The project owners estimate that the construction and operation phases of the project

would both employ approximately 200 workers (Niblack Project LLC 2015). No exploration activity was reported for either project in 2016 and 2017 (McDowell Group 2018).

COST-BENEFIT ANALYSIS

Benefits and costs are divided into two parts: 1) those which are realized by any organization or individual, and 2) those realized by the Forest Service. Financial considerations include revenues and costs from the perspective of the Forest Service or other government agencies. Other benefits and costs can be realized by users of roadless areas in NFs, including backpackers, hunters, viewers of wildlife, permitted outfitters and guides, timber processors, and water users. Other benefits and costs can also be realized by those who never set foot in roadless areas and/or who desire the retention of wildland characteristics for their children, whether they are Alaska residents, other U.S. residents or others.

The word "value" can have a variety of meanings. In one sense, value can mean that which is desirable or worthy for its own sake. In another, value can mean a fair or proper equivalent in money, commodities, etc. (Freeman, 2003). Economics considers value in the latter sense, using tradeoffs to determine the "equivalence." Often these values and tradeoffs are expressed in monetary terms. At other times where monetary expressions are not available, value and tradeoffs are considered in qualitative terms. Executive Order 13563 recognizes that a quantifiable analysis is not always possible, but must include a reasoned determination that the benefits justify the regulatory costs. In the sections below (***Analysis of Roadless Area Characteristics***, ***Potential Impacts by Resource Area*** and ***Agency Costs including Control of Regulatory Costs***) values are discussed qualitatively as well as quantitively. The final section on ***Agency Costs including Control of Regulatory Costs*** includes discussion of E.O. 13771.

General Assumptions

This analysis compares the benefits and costs associated with the final rule (Alternative 6). According to Office of Management and Budget (OMB) direction, the benefits and costs of proposed regulations and Forest Service directives must be compared or measured against a baseline. The baseline, applies to the provisions of the 2001 Roadless Rule to inventoried roadless areas under the No Action Alternative discussed as Alternative 1 in the FEIS (USDA Forest Service 2019).

The benefits and costs of this rule both come primarily from changes in land use that may occur with removal of the roadless standard. Timber harvest may move from less efficient acres to more efficient acres that can now be more easily accessed, reducing the overall cost of timber production in the area. In addition, increases in timber value are anticipated with increased access to old-growth suitable acres (considering the higher value of acres with older stands of trees). These increases in efficiency represent the benefit of the rule. Any adverse effects of such changes, such as environmental impacts or shifts in lands available to other businesses represent the cost associated with relaxing the existing standards. These costs and benefits are inextricably linked. If no change in land use patterns occur (or less than estimated changes in land use), then the adverse effect of those changes will also not be realized. The cost benefit analysis discusses benefits and costs that are not readily quantifiable, but demonstrate benefits, costs and efficiencies gained from

the final rule (Alternative 6). The potential benefits and costs are dependent on local conditions and the complexity and nature of issues associated with future decisions that are unknown and difficult to predict. Many benefits and costs are therefore not quantified, but discussed in a qualitative manner for the baseline 2001 Roadless Rule, final rule and other regulatory alternatives below. An analysis of stumpage value, potential lost revenue from recreation related displacement, and costs to the agency is provided in the cost-benefit discussion below.

As discussed in the introduction above, the types of benefits derived from uses of roadless areas in Alaska are far ranging and include a number of non-market and non-use benefit categories. The section on ***Analysis of Roadless Area Characteristics*** provides this detail. The section below on ***Potential Impacts by Resource Area*** provides detail on market values related to affected resource areas. Lastly there is a section on ***Agency Costs including Control of Regulatory Costs.*** Table 5 summarizes the environmental consequences, for both market and non-market categories, for each alternative in a comparative format. The nine categories below used for the qualitative ratings in Table 5 are as follows (from most adverse to most beneficial):

- Substantial Adverse Effect
- Moderate Adverse Effect
- Minimal Adverse Effect
- Very Minimal Adverse Effect
- Neutral/No Effect
- Very Minimal Beneficial Effect
- Minimal Beneficial Effect
- Moderate Beneficial Effect
- Substantial Beneficial Effect

The final rule is programmatic and does not directly authorize any ground-disturbing activities. Ground-disturbing activities may occur in areas formerly designated as IRAs and are considered as indirect effects. Before authorizing a land-use activity, the Forest Service must complete a site-specific environmental analysis, pursuant to NEPA and its implementing regulations. When a specific project or activity is proposed on NFS land, the Forest Service conducts site-specific analyses of the effects associated with that project or activity and makes a decision that authorizes implementation of that project or activity (this requirement exists under all regulatory alternatives including the baseline 2001 Roadless Rule). Ground disturbing activities covered by NEPA would adhere to the Tongass Forest Plan and would be consistent with the goals, objectives, management prescriptions, standards, guidelines, projected timber sale quantity, projected wood sale quantity, and young-growth transition strategy. This includes standards and guidelines for non-timber resources, for example riparian management standards and guidelines which provide protection for fisheries with subsistence and commercial importance. All timber harvest, including harvest in areas formerly designated as inventoried roadless areas, would be compelled to adhere to these resource standards and guidelines (fisheries, water quality, air, recreation, etc.), thus providing continuation of Forest Plan direction under all the regulatory alternatives. Regardless these activities would have indirect effects on roadless area characteristics and are discussed below.

Table 5. Qualitative comparison of the Alternatives

	Alternative					
	Baseline	**2**	**3**	**4**	**5**	**Final Rule**
Resource/Category	**2001 Roadless Rule**	**Roaded Roadless Alternative**	**Logical Extension Alternative**	**Partial Dev LUDs[1] Alternative**	**All Dev LUDs Alternative**	**Full Exemption Alternative**
Analysis of Roadless Area Characteristics						
Overall Protection of Roadless Characteristics on the Tongass	Neutral/No Effect	Neutral/No Effect	Very Minimal Adverse Effect	Minimal Adverse Effect	Moderate Adverse Effect	Moderate Adverse Effect
Potential Impacts by Resource Area						
Forest Products	Neutral/No Effect	Very Minimal Beneficial Effect	Minimal Beneficial Effect	Minimal Beneficial Effect	Minimal Beneficial Effect	Minimal Beneficial Effect
Recreation/Tourism (Visitor) Industry Employment	Neutral/No Effect	Neutral/No Effect	Very Minimal Adverse Effect	Minimal Adverse Effect	Minimal Adverse Effect	Minimal Adverse Effect
Fisheries Employment	Neutral/No Effect	Neutral/No Effect	Neutral/No Effect	Neutral/No Effect	Neutral/No Effect	Neutral/No Effect
Minerals Development Potential						
Locatable	Neutral/No Effect	Neutral/No Effect	Neutral/No Effect	Neutral/No Effect	Neutral/No Effect	Neutral/No Effect
Leasable	Neutral/No Effect	Very Minimal Beneficial Effect	Very Minimal Beneficial Effect	Moderate Beneficial Effect	Moderate Beneficial Effect	Moderate Beneficial Effect
Infrastructure: Renewable Energy Project Development Potential	Neutral/No Effect	Minimal Beneficial Effect	Minimal Beneficial Effect	Minimal Beneficial Effect	Minimal Beneficial Effect	Minimal Beneficial Effect
Infrastructure: Potential for Development of State Roads and Other Transportation Projects	Neutral/No Effect	Minimal Beneficial Effect	Minimal Beneficial Effect	Moderate Beneficial Effect	Moderate Beneficial Effect	Moderate Beneficial Effect
Alaska Native Customary and Traditional Uses	Neutral/No Effect	Minimal Beneficial Effect	Minimal Beneficial Effect	Minimal Beneficial Effect	Minimal Beneficial Effect	Minimal Beneficial Effect
Subsistence	Neutral/No Effect	Minimal Adverse and Beneficial Effects	Minimal Adverse and Beneficial Effects	Minimal Adverse and Beneficial Effects	Minimal Adverse and Beneficial Effects	Minimal Adverse and Beneficial Effects

Analysis of Roadless Area Characteristics

Roadless areas are important because of their wildlife and fish habitat, recreation values, importance to multiple economic sectors, inherent passive use values, traditional properties and sacred sites for local indigenous people, and ecosystem service values they provide (USDA Forest Service 2020). Under the Forest Plan, timber management activities are governed by a number of rules and regulations designed to protect or mitigate adverse impacts to natural resources that provide ecosystem services (USDA Forest Service 2016). Ecosystem services values on the Tongass NF are discussed further in the 2008 Forest Plan EIS (USDA Forest Service 2008, pp. 3-553 to 3-556). The effects of the alternatives on these types of services are assessed in the final rule FEIS sections that address fisheries, wildlife and subsistence use, and timber and vegetation, among others. Monetary values are not assigned to these services, but this does not lessen their importance in the decision-making process. Passive use values represent the value that individuals assign to a resource independent of their use of that resource and typically include existence, option, and bequest values. These values represent the value that individuals

obtain from knowing that expansive roadless areas provide ecosystem services by virtue of being roadless and that they exist, knowing that they are available to visit in the future should they choose to do so, and knowing that they are available for future generations to inherit.

Passive use values exist for individuals and households both in and beyond Southeast Alaska and should thus be considered in the aggregate alongside changes to roadless protection under the regulatory alternatives. The cost and benefit analysis below quantifies a potential range of values held by Alaska residents' using a measure of willingness to pay for conserving Tongass old growth forests as opposed to harvesting them (Hjerpe and Hussain 2016). These values are primarily passive, due to the design of the study, but more traditional use values cannot be excluded. While the Hjerpe and Hussain research quantifies the economic value of old-growth preservation on the Tongass uncertainty exists about the applicability of those values to the suitability designation under the regulatory alternatives. Designation of old-growth as suitable timber does not mean conservation benefits described in the Hjerpe and Hussain paper (i.e., biological regulation, climate regulation, biodiversity refugia, and numerous cultural and recreational services) are not provided. Even if suitable old-growth is harvested, these services and benefits would still be provided, per legal requirements (e.g., NFMA implementing regulations, 36 CFR Part 219) to provide for ecological sustainability, species of concern, and multiple uses such as wildlife habitat and clean water[5] but at possibly lower or altered levels from those assumed by Hjerpe and Hussein for old-growth preservation. However this was not clear in description of the survey provided in the paper and respondents might assume that failing to preserve old growth would eliminate the ecosystem services associated with old-growth. Regardless the Hjerpe and Hussain paper can be used to examine the more passive value to society from conservation of old-growth. A per acre value for average marginal willingness to pay for conserved old growth is derived by Hjerpe and Hussain (2016) by dividing the mean marginal willingness to pay (by Alaska households[6]) for conservation of 50% of remaining harvestable old-growth on the Tongass NF ($33.3 million) by the harvestable old-growth acres for that attribute (222,500) revealing an average marginal willingness to pay of $150 per acre to conserve remaining old-growth. Using a consumer price index deflator this value is $171 per acre in 2020 dollars. This willingness to pay value is adopted as a proxy for measuring potential passive use benefits forgone by removing existing levels of old growth conservation (implicit in current roadless area designations), and allowing for harvest through timber suitability designations under the regulatory alternatives.

[5] NFMA directs that plans assure that timber will be harvested from National Forest System lands only where soil, slope, or other watershed conditions will not be irreversibly damaged. 16 U.S.C. 1604(g)(3)(E) for example, in the case of fisheries stream buffers and soils standards and guides provide protection to fisheries. In addition, the harvest of timber is subject to the legal context (e.g., Clean Water Act, Clean Air Act, Endangered Species Act, National Historic Preservation Act, etc.) within which forest plans and site specific environmental analysis (NEPA) is performed.

[6] Hjerpe and Hussein were not able to adequately determine willingness to pay for Alaska households with annual income less than $50,000. As a consequence, WTP values are only for AK households with annual incomes greater than $50,000.

Forgone benefits from timber suitability designations are applied to a 'worst case scenario' or high estimate (i.e. greatest reduction in old-growth conservation benefits), where willingness to pay values are applied to all old-growth suitable acres under the regulatory alternatives (Table 6), implying benefits from the ecosystem services provided by old growth are reduced for all areas, regardless of harvest occurring. This scenario is most consistent with the format of the Hjerpe and Hussein survey questions. Table 6 provides the high estimate of forgone old growth conservation benefits as discounted in Table 11 (in year one) and annualized over 100 years. A lower estimate can also be generated, to account for the uncertainty regarding potential inconsistencies about benefits with and without old-growth conservation described above, and to account for actual projections of harvest acres on suitable timber acres. Since the values elicited by Hjerpe and Hussain did not describe the benefits from lands designated as suitable but not harvested, or from forest lands post harvest, levels of benefits in the 'worst case scenario' can be considered an overestimate of Alaska residents forgone old growth conservation benefits under the regulatory alternatives.

Under the lower estimate, the $171 per acre value is applied to an estimate of acres harvested to estimate the value of forgone old growth conservation benefits to Alaska residents. While harvest levels do not vary across the regulatory alternatives, the level of suitable old growth acreage does vary across the regulatory alternatives (Table 1) and provides a frame of reference for measuring change in forgone old growth conservation benefits. While annual levels of old growth harvest within suitable acres are uncertain, the Record of Decision for the Tongass Forest Plan estimated that a total of approximately 24,000 old-growth acres would be harvested Forest-wide after 25 years, with a total of 42,500 old-growth acres harvested after 100 years (USDA Forest Service 2016a). While only a portion of suitable acres will be harvested, using the 100-year estimate of 42,500 acres provides lower estimates of annual harvest for analysis than assuming all suitable old-growth acres would be harvested over the 100 years (apart from under Alternative 2). Using this higher value (except for Alternative 2 which uses the highest value 42,500 acre estimate since higher than 20,000 suitable acres) multiplied by $171 per acre provides a low estimate of Alaska resident's forgone old growth conservation benefits.

Table 6. Average annual forgone old growth conservation benefits to Alaska households

	Baseline - 2001 Roadless Rule	Alt 2	Alt 3	Alt 4	Alt 5	Final Rule
Net change in old growth acres suitable for harvest[1]	0	20,000	85,000	161,000	168,000	168,000
High estimate - forgone old growth conservation benefits (suitable acres * $171)	$0	$3,420,000	$14,535,000	$27,531,000	$28,728,000	$28,728,000
High estimate - forgone old growth conservation benefits (annualized)[2]		$239,676	$1,018,624	$1,929,394	$2,013,280	$2,013,280
Low estimate - forgone old growth conservation benefits (annual harvest acres * $171)[3]	$0	$72,675[2]	$145,350	$275,310	$287,280	$287,280

[1] From Table 1.

[2] Annualization could assume forgone conservation benefits per acre into perpetuity however 100 years is used for consistency with the low estimate of forgone conservation value. While discount rates for annualization could apply the range of 3 to 7 percent just 7 percent is used for the high estimate.

[3] The low estimate of forgone conservation value for the regulatory alternatives use the largest measure of estimated annual harvest, which is suitable acres divided by 100, except for Alternative 2 which uses the larger 100 year 42,500 acre estimate (USDA Forest Service 2016a).

While the range of estimates provide insight on the forgone old growth conservation benefits held by households in Alaska, these estimates are an underestimate because they do not consider the conservation values held by US households outside of Alaska, and their corresponding forgone benefits. As stated in the Hjerpe and Hussain paper 'the passive use values held by nonresidents may not be the same as held by the locals' These forgone conservation benefits to Alaska residents, are incorporated in the cost benefit analysis in Table 11 below.

The qualitative values considered under roadless characteristics include biological, physical and social values. Roadless areas are considered high in biological value if they contain a diversity of plant and animal communities, old-growth forests, and/or habitat for threatened, endangered, or sensitive species or wide-ranging species that are dependent on large, undisturbed tracts of land. The physical values associated with roadless areas include soils, water, and air. The social values considered under roadless characteristics include remoteness, scenic quality, traditional cultural areas and sacred sites, reference landscapes, and other locally-unique characteristics. The current condition of most roadless areas on the Tongass is nearly pristine relative to these values. Exceptions include the roaded roadless areas, where previous road development and timber harvest has taken place and localized areas along the shoreline where historic development has occurred or localized areas where mining-related activities have occurred. This section first provides findings specific to the final rule (Alternative 6) and then provides a comparison of the final rule to the baseline 2001 Roadless Rule and other regulatory alternatives for the values considered under roadless characteristics (biological, physical and social values). Analysis of values assumes indirect effects from ground disturbing activities, including timber harvest, occurs.

Analysis of Roadless Characteristics under the Final Rule

Under the final rule, all 9.4 million acres of roadless areas would be removed as designated roadless, with an estimated net increase of about 168,000 acres of suitable old growth available

for harvest. As depicted in Table 5, "Overall Protection of Roadless Characteristics" (first row) is the resource/category with the most adverse effects anywhere in the table, with Alternatives 5 and 6 showing the same impact.

Alternatives 2 and 3, would remove roadless protection from "roaded roadless" areas. In addition, areas adjacent to existing road and harvest systems would also be removed from roadless protection. Under Alternative 3, adjacent areas, considered "logical extensions" of the existing road and harvest systems within the same watersheds, would revert acres of previously unsuitable lands to suitable old-growth lands that would be available for harvest. In addition, the removal of roadless protections from roaded roadless acres along with logical extension acres (including ownership changes and updated mapping) would result in a net increase of about 85,000 acres of suitable old-growth lands that would be available for harvest.

Under Alternative 4, though a smaller reduction than for Alternative 3, there would be an overall reduction in roadless area acres, with an estimated total of 401,000 acres removed from roadless designation, 7,000 acres added, and a net loss of approximately 394,000 acres. In addition, the Timber Priority roadless category (see description above) would result in the conversion of about 43,000 acres of previously unsuitable lands to suitable old-growth lands that would be available for harvest, resulting in an increase of 161,000 acres of suitable old growth. Additions to roadless protection under Alternative 4 include the LUD II acres not designated as roadless in 2001.

Under all of the regulatory alternatives projected harvest on suitable acres is not expected to change because of Forest Plan limitations, but would be spread over a wider pool of lands. Harvest in the areas converted from roadless would reduce the roadless characteristics that are presently protected under Alternative 1.

As depicted in the first row of Table 5, the baseline 2001 Roadless Rule and Alternative 2 result in no adverse effects (Neutral/No Effect) to "Overall Protection of Roadless Characteristics" and the values they provide to multiple economic sectors, inherent passive use values, traditional properties and sacred sites for local indigenous people, and ecosystem services. Changes under Alternatives 3 and 4 would result in very minimal and minimal adverse effects, respectively to "Overall Protection of Roadless Characteristics" and the values they provide. While more adverse than the baseline 2001 Roadless Rule and Alternative 2 (Neutral/No Effect) adverse effects under Alternatives 3 and 4 are less than Alternatives 5 (operation subject to requirements under the Forest Plan) and the final rule (moderate adverse effects). Detail on effects to the values considered under roadless characteristics (biological, physical and social values) are provided below.

Biological Diversity

Biological diversity of the Tongass, associated with old-growth forests, is considered of high importance to residents and visitors to the Tongass and from a national and worldwide perspective. Protection of this resource has been given high priority by the Tongass NF through the Old-growth Habitat Conservation Strategy, which was originally developed for the 1997 Forest Plan and has subsequently been carried forward through the 2008 and 2016 Forest Plan FEISs (USDA Forest Service 2008, 2016a).

The Tongass Forest Plan Old-growth Habitat Conservation Strategy was developed to maintain the integrity of the old-growth forest ecosystem, and thereby conserve biological diversity across the Forest, by retaining intact, largely undisturbed habitat. This strategy, initially incorporated into the 1997 Forest Plan, was reviewed and amended for incorporation into the 2008 and 2016 Forest Plans. The Old-growth Habitat Conservation Strategy includes two major components: (1) a forest-wide network of variably sized old-growth reserves (OGRs) allocated to the Old-growth Habitat LUD plus other non-development LUDs and all small islands less than 1,000 acres, and (2) a series of standards and guidelines applicable to lands where timber harvest is permitted, also known as the matrix (USDA Forest Service 2020).

The effects of the alternatives on biological diversity and the Old-growth Habitat Conservation Strategy are described in detail in the Biological Diversity section of the FEIS for this rule (USDA Forest Service 2020). Effects related to old-growth harvest acres under all the regulatory alternatives are the same as those for the Alternative 1 of the 2016 Forest Plan FEIS, which allows for a harvest level much lower than the level originally allowed under the Conservation Strategy (see 1997 Forest Plan and 2008 Forest Plan Amendment; USDA Forest Service 2008, 2016a). However, effects due to the distribution of harvest, related to fragmentation and connectivity, would vary. The baseline 2001 Roadless Rule and Alternatives 2 and 3 would have very low effects, while the final rule and Alternatives 4 and 5 would have greater effects because of entry into more remote watersheds and roadless areas.

Habitat in Roadless Areas

Roadless areas provide expansive areas of high-quality intact habitat for the full range of native species and ecosystem components. These include threatened, endangered, and sensitive species, endemic species, and wide-ranging species dependent on large, undisturbed areas. The Tongass National Forest currently has no threatened or endangered species associated with terrestrial habitats. However, it does have 16 plant and 4 bird species designated as sensitive (see the section Key Issue 3, Fish and Wildlife and the Sensitive and Invasive Plants section of the FEIS for this rule; USDA Forest Service 2020). Of the 16 sensitive plant species, only 4 species have known occurrences expected to be within suitable young-growth or old-growth harvest areas. For these populations and for previously undocumented populations that are located during project surveys, Forest-wide standards and guidelines under all the regulatory alternatives would result in consideration for protection to minimize impacts to these species. Among the bird species, three are marine or shoreline species and are expected to be protected from almost all adverse effects by Forest Plan LUDs and standards and guidelines. However, the Queen Charlotte goshawk (Accipiter gentiles laingi) is a wide-ranging species that seems to prefer mature and old-growth forest habitats for nesting and foraging. This species would be affected under all regulatory alternatives; effects would generally be similar among the regulatory alternatives but slightly higher for the final rule and Alternatives 4 and 5 because of longer road developments and associated fragmentation expected under these alternatives relative to the baseline 2001 Roadless Rule and Alternatives 2 and 3.

Endemic species occur in isolated populations and can have limited mobility or specific habitat requirements (see the Key Issue 3, Wildlife section of the FEIS for this rule; USDA Forest

Service 2020). Thus, they are vulnerable to the effects of habitat loss and fragmentation, introduced non-natives, pathogens and disease, natural events (i.e., climate change), and overharvesting (Dawson et al. 2007). Although timber harvest levels are the same among all alternatives, Alternatives 4, 5, and 6 would have the greatest potential for effects on endemics because the degree of fragmentation is likely to be higher under these alternatives (landscape connectivity and fragmentation are discussed in detail in the Biological Diversity section of the FEIS for this rule; USDA Forest Service 2020). Most endemic species would benefit from the transition to young-growth harvest permitted under all alternatives due to the reduced amount of scheduled productive old-growth harvest over the long term.

Roadless areas may be of greatest value to wide-ranging species that require large, undisturbed areas of land. In general, this group consists of predators. Three mammals are included in this category: Alexander Archipelago wolf (Canis lupus ligoni) (for which there is a petition to US Fish and Wildlife Service to list this species as threatened or endangered), brown bear (Ursus arctos), and American marten (Martes americana; see the Key Issue 3, Wildlife section of the FEIS for this rule; USDA Forest Service 2020). These species are of concern because their numbers are relatively low (they are at or near the top of the food chain), they are under harvest pressure (which is affected by access), they are sensitive to disturbance, and they range widely so they are often subject to many disturbances within their home ranges. Remote roadless areas often represent optimum habitats for them and may serve as important refugia for populations under harvest and development pressures. Of greatest concern on the Tongass is the Alexander Archipelago wolf, particularly on Prince of Wales and surrounding islands. Although the alternatives would be similar in terms of overall harvest levels, the final rule and Alternatives 4 and 5 would result in the largest adverse effects on these species because of greater road lengths, penetration into remote roadless areas, and habitat fragmentation that they would produce relative to the baseline 2001 Roadless Rule and Alternatives 2 and 3.

Roadless Characteristics: Physical Values

The physical values associated with roadless areas include soils, water, and air. The Tongass roadless areas are generally in near pristine condition in terms of soils, water quality, and air quality.

Large acreages of excessive soil erosion, detrimental soil disturbance, or landslides attributed to management activities generally do not exist within roadless areas. However, there are localized areas within the roaded roadless portion that include past management-related soil impacts. During project-level analysis, areas sensitive to surface erosion or landslides are identified and appropriate mitigation measures, including the Forest-wide standards and guidelines for Soil and Water (USDA Forest Service 2016), are used to reduce surface erosion and sediment production. Although timber harvest, energy project development, mining activities, and other development would be similar under each regulatory alternative, the potential for adverse impacts on the soil and water resource in roadless areas would differ slightly among the regulatory alternatives based on different levels of projected road construction. The final rule and Alternatives 4 and 5 would have a slightly larger potential for adverse effects, relative to the baseline 2001 Roadless Rule and Alternatives 2 and 3, because they are expected to result in slightly more road development. However, the differences among regulatory alternatives would be minor because

effects from those projected activities would be mitigated through the use of site-specific analysis, Forest-wide standards and guidelines, and other best management practices, including post-project rehabilitation of disturbed soil. In addition, actual impacts on water quality anticipated from any alternative would be small in magnitude and scattered over a wide geographic area. Most of the potential effects would be of short duration, with disturbed soil areas rehabilitated after projects are completed in those areas.

Effects on air quality would also not substantially differ among regulatory alternatives. Based on the projected land management activities that differ among regulatory alternatives, atmospheric emissions in roadless areas are not anticipated to directly, indirectly, or cumulatively increase to a level that would be likely to exceed state or federal air quality standards. Air quality impacts from dust emissions would be negligible and would not vary significantly by regulatory alternative.

Scenic Quality

The Tongass NF offers a variety of high-quality scenery to its visitors, from spectacular mountain ranges and glaciers to low-lying marine landscapes composed of intricate waterways, bays, and island groups. Scenic quality is based on two definable elements, landscape character and scenic integrity. Tongass roadless areas have natural appearing landscapes and have very high scenic integrity and generally have high value for landscape character as well. The exception for scenic integrity is the roaded roadless areas, which have significantly reduced scenic integrity because of past harvest and road construction. Roadless areas are viewed from a variety of vantage points, including the communities of Southeast Alaska, the Alaska Marine Highway ferry route, cruise ship routes, existing road systems, popular small boat routes and anchorages, small aircraft, and hiking trails.

Road construction and timber harvest can have varying degrees of adverse effects on the scenic integrity of a landscape. The scenery analysis in the FEIS cited here (USDA Forest Service 2020) is not directly related to acres in roadless protection. To help focus the visual effects on more familiar areas, the alternatives were analyzed by selected large viewsheds in the Tongass. These 23 viewsheds were selected for their popularity and intensity of public use and travel. In most studied viewsheds, the highest effects on scenery would be associated with Alternatives 5 and the final rule, followed in order by Alternative 4, Alternative 3, Alternative 2, and the baseline 2001 Roadless Rule. In addition, the final rule and Alternatives 4 and 5 would likely result in more road development to reach more remote places, which would have a greater adverse effect on scenery than with less road development under the baseline 2001 Roadless Rule and Alternatives 2 and 3. Road mileage differences, however, would not be large, because all regulatory alternatives would have the same level of harvest (estimated maximum difference for new road construction of 49 miles among alternatives; Table 3.3-21 of the FEIS, USDA Forest Service 2020).

Recreation Opportunities

Roadless areas provide recreation opportunity due to the variety of primitive, semi-primitive motorized, and semi-primitive non-motorized Recreation Opportunity Spectrum (ROS) classes of dispersed recreation. Approximately 95 percent of the 2001 roadless areas on the Tongass

consist of primitive and semi-primitive ROS classes, and almost two-thirds of these are primitive. The ROS system portrays the combination of activities, settings, and experience expectations along a continuum that ranges from highly modified to primitive environments. The following seven classifications are identified along this continuum from most to least developed:

- Urban
- Rural
- Roaded Modified
- Roaded Natural
- Semi-Primitive Motorized
- Semi-Primitive Non-Motorized
- Primitive

The setting indicators and applicable standards and guidelines for the seven ROS classes are described in Appendix I to the Tongass Forest Plan (USDA Forest Service 2016).

Under Alternative 2, roaded roadless and other substantially altered areas would lose protection as roadless. The net change in roadless designations would result in an increase of 20,000 acres of suitable old growth and 11,000 acres of suitable young growth. Under Alternative 2 approximately 95 percent of Tongass roadless areas would be maintained as primitive and semi-primitive ROS classes.

Under Alternative 3, approximately 96 percent of the roadless areas on the Tongass would be maintained as primitive and semi-primitive ROS classes. The net changes in roadless designations would provide 85,000 more acres of suitable old growth and 15,000 more acres of suitable young growth. Under Alternatives 4 and 5, the remaining roadless areas would maintain approximately 96 and 97 percent of their areas as primitive and semi-primitive ROS classes, respectively. The net change in roadless designations under these two alternatives would provide 161,000 and 168,000 more acres of suitable old growth and 15,000 and 17,000 more acres of suitable young growth, respectively. Under the final rule (Alternative 6), all roadless designations would be removed. The areas removed from roadless designation would provide 168,000 acres of suitable old growth and 20,000 acres of suitable young growth. Under all other regulatory alternatives, the retained roadless areas would remain similar in terms of their ROS allocations. The exception would be the final rule, which would include no retained roadless designations.

Similarly, outfitter-guide use on the Tongass includes activities in more remote areas. The majority of these areas would be retained as roadless under the baseline 2001 Roadless Rule and Alternatives 2 and 3. Substantially more lands in the primitive ROS class would be removed under Alternatives 4, 5 and the final rule.

Traditional Cultural Properties and Sacred Sites

The final rule and other regulatory alternatives require compliance with existing laws and regulations; therefore, before any management actions take place, the standard process for considering effects would be conducted as required by the implementing regulations for the National Historic Preservation Act and other relevant law, policy, and guidance provided in agreement documents. Consideration of effects would occur on a site specific basis if projects

were proposed in areas of historic importance. In most cases impacts would be avoided or mitigated. Tribal consultation is an integral part of the planning process for management actions; as well as consultations with the State Historic Preservation Officer and other interested parties.

For cultural resources, including historic and traditional cultural and sacred sites, prior to management actions taking place on the ground under the final rule and other regulatory alternatives, resource inventories and appropriate mitigation are required by law. Increasing risk to cultural resources may occur under the final rule and other regulatory alternatives because of potentially greater road lengths and potential activity in areas currently and previously protected from development, associated with harvest activities.

Locally Identified Unique Characteristics

A range of distinctive characteristics occur within the Tongass roadless areas. Many of these are already identified in the Forest Plan and managed as Special Interest Areas. These include Geological Areas, Recreation Areas, Zoological Areas, Botanical Areas, Cultural Areas, and Scenic Areas. Special Interest Areas cover 186,000 acres within 2001 inventoried roadless areas. In addition, a number of Research Natural Areas occur within the Tongass roadless areas (21,000 acres). The Research Natural Areas, along with some of the Special Interest Areas, serve as reference landscapes. Further, a number of river corridors are managed under the Forest Plan as wild and scenic rivers. Within 2001 inventoried roadless areas, there are 14,000 acres of Recreational River, 16,000 acres of Scenic River, and 48,000 acres of Wild River. Finally, there are other small areas, not included within these special LUDs, such as areas with unique karst features that occur within roadless areas.

Altogether, these special LUDs cover 285,000 acres within 2001 inventoried roadless areas (the baseline 2001 Roadless Rule). Under Alternative 2, these acres would remain at 285,000 acres, and they would be little changed under Alternatives 3, 4 and 5 at 281,000 acres, 279,000 acres, and 283,000 acres, respectively. However, under the final rule (Alternative 6), the roadless acreage within these special LUDs would decrease to zero. Long term regulatory certainty is afforded with roadless acres under these special LUDs under Alternative 5, while roadless acreage within these special LUDs would decrease to zero under the final rule.

Potential Impacts by Resource Area

The final rule and regulatory alternatives have implications for specific places on the Forest used by various communities. They also have potential implications for resource dependent industries, infrastructure development, Alaska Native customary and traditional uses, and the availability of subsistence resources.

The final rule and regulatory alternatives are programmatic, meaning that they establish direction and allowable activities for broad land areas, rather than schedule specific activities in specific locations. This makes it difficult to predict effects on individual communities and locations. This is a common source of frustration to local residents and businesses, who want to know exactly how they and the places they care about could be affected. While many potentially affected outputs of forest management, such as scheduled timber harvest, generally translate into social and economic activity, such as employment in the timber industry, it is difficult to predict which

communities would benefit the most from that activity. Forest Service activities provide economic opportunities to the private sector. How that sector and the various industries that comprise it respond depends on many variables in addition to Forest Service management. Communities that rely on a given resource-related industry would, however, be expected to be the first to benefit or lose from significant changes in planned output levels affecting that industry. The degree of local ownership of those industries would further affect the degree to which communities benefit or lose from changes in output levels.

Forest Products

Analysis of stumpage value under the final rule (and Alternatives 2 through 5) indicate stumpage value could potentially increase by approximately $460,000 to $922,000 dollars as a result of improved flexibility to the timber sales program (USDA Forest Service 2019b). The final rule and Alternatives 2 through 5 would all increase the suitable acres available for harvest, with the potential to provide additional opportunities for the Forest Service to develop economic timber sale offerings. Suitable acres would be added in three broad categories or areas: areas that have been substantially altered as identified by known prior road construction or timber harvest[7] (the final rule and Alternatives 2 through 5); logical extension areas (the final rule and Alternatives 3, 4 and 5); and areas more distant from roads (the final rule and Alternatives 4 and 5). In addition, suitable old-growth acres would be added in Community Priority ARAs (Alternative 3). The added suitable acres in areas where roads already exist (roaded roadless) or could be logically extended (logical extensions) are generally considered relatively economic to harvest. Acres identified as more distant from roads are likely to be more expensive to harvest and less likely to be accessed for timber production.

In practice, many factors can influence the cost of timber harvest, adding economic risks for potential purchasers and affecting the ability of the Forest Service to offer timber sales. Road construction, helicopter yarding, complex silvicultural prescriptions, setting size, and other factors may increase costs, which then decrease the value of the offering. The value of the timber offered must be sufficient to cover costs and include profit for the purchaser. Under the Further Consolidated Appropriations Act, 2020 P.L. 116-94, 133 Stat. 2751 (Sec. 436), timber sales that do not appraise positive using the current Region 10 Residual Value (RV) appraisal cannot be offered (USDA Forest Service 2020). Estimated costs per thousand board feet vary substantially across the Forest. Transportation infrastructure costs and haul distances are typically higher in more remote areas, i.e., those areas that are further from existing infrastructure and markets. In this context, markets may include a mill or export yard.

The Record of Decision for the Tongass Forest Plan estimated that a total of approximately 24,000 old-growth acres would be harvested Forest-wide after 25 years, with a total of 42,500 old-growth acres harvested after 100 years (USDA Forest Service 2016a). These estimates represent an approximate upper estimate of the number of roadless acres that could be potentially

[7] Removed areas include both development and non-development LUDs. These areas are generally known as "roaded roadless" areas but also include additional areas considered to be substantially altered.

harvested under any of the regulatory alternatives. The 2016 Forest Plan FEIS (USDA Forest Service 2016a) estimated that approximately 5 MMBF of small and micro-sales of old-growth timber is required each year to meet the needs of existing small old-growth mills that produce high value products such as appearance grade lumber and cedar shingles. This annual small and micro-sale demand (5 MMBF) is anticipated to be met for the duration of the planning period under all of the regulatory alternatives, including the baseline 2001 Roadless Rule.

For larger sales, more acres of suitable old-growth land would allow the Forest Service greater flexibility in the selection of future timber sale areas, as well as the potential for more flexibility in sale design, depending on the planning areas selected. This improved flexibility could, in turn, potentially improve the Forest Service's ability to offer economic sales that meet the needs of industry. This greater flexibility could be especially beneficial during the first two decades of the Forest Plan (the transition period), when most old-growth harvest would take place. While many factors can influence the cost of timber harvest, as noted above, areas along existing roads or those using marine access facilities are typically more economically efficient, followed by areas where existing roads can be easily extended. Transportation infrastructure costs can include road construction, reconditioning, reconstruction, and maintenance, as well as log transfer facility development. Road construction, reconditioning, reconstruction, and maintenance involve substantial costs and have the potential to strongly influence timber sale economics.

Areas closer to markets, either a mill or export facility, are also more likely to offer more economic timber sale options. Existing old-growth mills in Southeast Alaska are primarily located in the south part of the region, with a concentration of mills, including the last remaining medium-sized mill (Viking Lumber), on Prince of Wales Island. Sales on the south part of the Forest are, therefore, more likely to appraise positive. In cases where the Regional Forester allows 100 percent export, which is permissible on a case-by-case basis, proximity to an export facility may also result in sales being more likely to appraise positive (USDA Forest Service 2020).

The analysis uses stumpage value (all costs to sale purchasers subtracted from end product selling price) to measure benefit from a more efficiently managed timber sales program. Forest level "stump-to-truck" data on cost of harvest are used to examine costs to industry with and without roadless restrictions. Changes in stumpage value reflect efficiency gains from a portion of all costs to purchasers, covering just "stump to truck" from felling, yarding, and loading. Transportation and towing costs are assumed to remain constant. Harvest near existing roads and closer to markets may provide 'stump to truck' costs saving as readily available acres in areas formerly designated as IRAs are harvested first. As these acres are exhausted efficiency gains from lower "stump to truck" costs are likely to be absorbed by increased transportation and towing costs. Information on transportation and towing costs are not available and highly speculative given the influence of external market forces and lack of site specific knowledge on where and when harvest will occur.

Stump-to-truck cost estimates used in this assessment are based on actual appraised values for past timber sales specific to felling, yarding, and loading costs. Under the Further Consolidated Appropriations Act, 2020 P.L. 116-94, 133 Stat. 2751 (Sec. 436), timber sales that do not

appraise positive using the current Region 10 Residual Value appraisal cannot be offered. The Region 10 RV appraisal and other timber valuation programs are based on the best available information (collected from timber companies, price reports, and cost indices) to appraise timber sales on the Tongass National Forest. The main cost center affected by roadless restrictions is "fell yard load" because most of the easier ground (lower logging cost) was logged in the first and second entry. In these cases, each subsequent entry into the roaded base has an increasing higher percentage of units with cable or helicopter logging or lower quality smaller timber in units deemed uneconomical ("left-overs") in previous entries. In 2011 the federal court (District of Alaska) set aside the Tongass NF's exemption and reinstated the 2001 Roadless Rule on the Tongass NF. Cost per thousand board feet (MBF) in the 8 years before and after 2011 provide a useful means for comparison. In the period during the exemption (2003 to 2010) the average cost per MBF harvested was $267 while the average cost was $287[8] per MBF over the period when roadless restrictions were in place (2011 to 2018) (USDA Forest Service 2019b). This increase in logging cost likely reflects the increased need for cable and heli-logging to harvest the units previously deemed "uneconomical" and "left-over". This analysis however does not reflect road cost changes before and after 2011, which were twice as high before 2011 (0.4 vs 0.2 road miles per MMBF before and after 2011; USDA Forest Service 2019b). While reduced need for heli-logging provides cost saving, road construction and decommission costs paid by purchasers would increase without roadless restrictions.

In addition, analysis assumes road construction and decommissioning costs associated with timber sales are not covered by the agency given the influence of the limited export policy, specific to hemlock and spruce-fir enacted in 2009. In 2007, the Forest Service approved a Limited Export Policy in an effort to boost appraised values and provide purchasers economical sale opportunities and additional processing options. The policy was again expanded in November 2009 to apply to all contracts and allowed export of unprocessed Sitka spruce and hemlock logs, up to 50 percent of the total sale sawtimber volume, upon Regional Office approval. The Limited Export Policy is discussed in detail in Appendix H to the Tongass Forest Plan Amendment FEIS (USDA Forest Service 2016a).

As stated previously projected harvest levels are not expected to be different under any of the regulatory alternatives. Timber harvest levels on the Tongass NF depicted in the Forest Plan (USDA Forest Service 2016) as assessed by continual timber demand monitoring and provide an upper estimate (46 MMBF per year) for estimating potential change to stumpage value. This upper estimate of 46 MMBF, is guided by the Forest Plan, and is a projection of future demand. This includes the agency's responsibilities under the Tongass Timber Reform Act, which directs the Forest Service to seek to provide a supply of timber from the Tongass National Forest that meets annual market demand and the market demand for each planning cycle to the extent consistent with providing for the multiple-use and sustained-yield of all renewable resources and other applicable requirements, including NFMA. Applying cost averages before and after the federal court decision in 2011 ($267 and $287 per MBF, respectively) indicates the final rule and

[8] Average costs for both periods were deflated to 2020 dollars prior to averaging.

Alternatives 2 through 5 could provide approximately $922,000 dollars in annual increase in stumpage value at the harvest estimate of 46 MMBF under the Forest Plan FEIS.

In addition, a lower estimate of stumpage value change is provided to address uncertainty. Average annual timber harvest on the Tongass NF over the 17 years depicted in Table 4 is 36 MMBF; in any given year harvest may be different than the average. In the interest of estimating a lower level, one standard deviation (12 MMBF) is subtracted from the average timber harvest for an estimate of average timber harvest (23 MMBF). In addition, using average annual harvest from the past 17 years reflects harvest levels under the 2016 Forest Plan and 2008 Forest Plan. Applying cost averages before and after the federal court decision in 2011 ($267 and $287 per MBF, respectively) indicates the final rule and Alternatives 2 through 5 could provide approximately $460,000 dollars in annual increase in stumpage value at the lower harvest estimate of 23 MMBF. Thus stumpage value could increase by approximately $460,000 to $922,000 dollars in as a result of improved flexibility under the final rule and Alternatives 2 through 5.

As mentioned previously these potential increases in stumpage value reflect efficiency gains from just a portion of overall costs to purchasers covering just "stump to truck" from felling, yarding, and loading and thus assume that transportation and towing costs remain constant. To the extent that transportation and towing costs increase (especially with distance from existing roads and markets), these stumpage value gains may be overestimated. Harvest near existing roads and closer to markets may provide the full 'stump to truck' costs saving in the near term if the most readily available acres in areas formerly designated as IRAs are harvested first. As these acres are exhausted efficiency gains from lower "stump to truck" costs are likely to be absorbed by increased transportation and towing costs. Information on transportation and towing costs are not available and highly speculative given the influence of external market forces and lack of site specific knowledge on where and when harvest will occur.

Recreation and Tourism

Changes in land management have the potential to affect recreation opportunities on the Forest. Impacts could occur where timber management and development activities conflict with recreation opportunities for community residents and/or commercial recreation operators and their clients. Changes in old-growth and young-growth acres available for harvest provide an indicator of potential displacement of recreationists interested in primitive recreation experiences. For some recreation uses, additional development for timber harvest and other infrastructure could provide increased access to the Forest and more opportunities.

A range of potential lost revenue to outfitter and guides is estimated under the final rule (and Alternatives 2 through 5). Under the final rule estimated lost revenue, relative to the baseline of the 2001 Roadless Rule, ranges from approximately $65,000 to $213,000 annually in outfitter and guide related expenses in Southeast Alaska from IRA visitors who may be subject to displacement from changes to young- and old-growth areas available for harvest. These upper- and lower bound estimates are used to consider potential lost revenue and should not be used as precise estimates of roadless area visitor expenditures or losses. Expenditures by visitors are estimated as entirely lost but may be just subject to displacement related changes. While some

businesses may lose revenues, if visitors choose not to travel to Southeast Alaska, others may see increases in revenues if visitors choose to stay longer or travel to substitute sites within Southeast Alaska. Thus these losses are most likely distributional or considered a redistribution of wealth; if there are substitute opportunities in Southeast Alaska or on the Tongass NF. Travel to substitute sites isn't necessarily realized as increased revenue by outfitters and guides if visitors choose to go elsewhere due to higher travel costs (time and money). However, in some cases visitors may choose to not come to Southeast Alaska thus these estimates are appropriate for inclusion in the analysis of societal costs and benefits. Further, these estimates of lost revenue do not represent the loss in benefits to recreationists from reduced access to current recreation opportunities which are estimated below. Detailed explanation and sources for this analysis are provided in the following paragraphs.

The following analysis uses changes in suitable young- and old-growth acres in conjunction with information on existing outfitter/guide use to help focus on potentially affected areas. Not all of the outfitter/guide use areas were used over the past 5 years; a number do not include any roadless acres; others include roadless acres, but none are suitable for old-growth harvest; and others would see little change in suitable old-growth acres by alternative. The EIS for the final rule performed a screening review based on these factors and identified 15 outfitter/guide use areas where potential conflicts between existing outfitter/guide use and future management could occur based on recent patterns of existing use. These are outfitter/guide use areas with recent outfitter/guide use where there would be increases in suitable old-growth acres under one or more of the action alternatives. Areas with no or limited existing use and no or small estimated changes in suitable old-growth acres relative to Alternative 1 were removed from further review. A majority of the areas removed had no or minimal change in suitable old-growth acres under all five action alternatives (see Table C-4 in Appendix C of the FEIS for the final rule; USDA Forest Service 2020).

This location information is useful at the programmatic level, but does not identify actual patterns of outfitter/guide use, which may extend over relatively large areas, depending on the activity. It is also important to note that outfitter/guide use areas are large areas ranging from about 63,000 acres to more than 1.3 million acres in size; many are larger than the District of Columbia and three are larger than the state of Rhode Island. Use in some of these areas involves multiple outfitter/guides, activities, and locations. Potential conflict could occur in multiple locations in each area. The following assessment is not a site-specific review, rather it uses available information to illustrate broad patterns of use and differentiate between the regulatory alternatives.

The analysis uses outfitter/guide related visitation in outfitter/guide use areas and the level of timber suitability designation under the regulatory alternatives to assess outfitter and guide related visitation displacement. Suitable timber lands represent those lands on the Forest that are suitable for timber production based on all multiple-use objectives of the Forest (see the Suitable Timberland Assumptions section of the FEIS (USDA Forest Service 2020). Suitable acres vary under the regulatory alternatives depending on the level of roadless area protections. Table 7 below provides visitation for the 15 outfitter/guide use areas (from Table C-1 of the FEIS Appendix C; USDA Forest Service 2020). The adjustment of visitation of each regulatory

alternative is based on their suitability acreage as a percent of total suitable acres under the final rule (from Tables C-4 and C-5 of the FEIS Appendix C; USDA Forest Service 2020)for an upper estimate of displacement; this is offered to provide a broad orders-of-magnitude comparison with other costs and benefits. Visitation and potential harvest does not occur evenly across the forest. The adjustment of visitation, using old-growth and young-growth timber suitability relative to the final rule, avoids mischaracterizing visitor displacement as an assumption that visitation and harvest occurs evenly across outfitter/guide areas. In addition, this provides for a baseline estimate of visitor displacement from current harvest and associated lost revenue under the baseline 2001 Roadless Rule. Net change in visitation and lost revenue is measured against this baseline.

The review by outfitter/guide use area also considers projected old-growth and young-growth harvest by alternative. Based on the assumptions used to distribute estimated old-growth harvest acres, very limited to no old-growth harvest is projected to occur in eight of the 15 outfitter/guide use areas discussed above, specifically those areas located on the north part of the Forest. In the remaining seven, old-growth and young-growth harvest is projected to decrease relative to Alternative 1, based on the relative distribution of suitable acres across the Forest. The remaining seven areas include the entire Craig and Thorne Bay Ranger Districts, and outfitter/guide use areas on the Petersburg (four areas) and Ketchikan-Misty Fjords (one area) Ranger Districts. The subset of seven outfitter/guide use areas provide a lower estimate of displaced visitation; adjusted based on the change in suitable acres (old-growth and young-growth) as a share of total suitable acres under the final rule (Table 7).

Table 7. Outfitter/guide visitation and change in suitable acres as a percentage of the final rule (Alternative 6)

Outfitter/Guide Use Areas	Average Annual visitation	Baseline – 2001 Roadless Rule	Alt 2	Alt 3	Alt 4	Alt 5	Final Rule
01-03 EAST CHILKATS	294	65%	71%	71%	91%	100%	100%
04-03 SITKA AREA	5,632	83%	83%	83%	100%	100%	100%
04-04A RODMAN BAY	384	76%	76%	76%	100%	100%	100%
04-04B KELP BAY	4,926	61%	62%	62%	100%	100%	100%
04-11A PORT FREDERICK	896	57%	57%	58%	98%	99%	100%
04-11B FRESHWATER BAY	1,389	68%	70%	77%	98%	98%	100%
04-12 TENAKEE INLET	186	66%	63%	71%	100%	100%	100%
04-13 PERIL STRAIT	1,179	82%	82%	82%	93%	100%	100%
CRD 00-00NO AREA DESIGNATED	1,869	60%	74%	88%	97%	100%	100%
K19 NORTH REVILLA	213	61%	63%	63%	96%	100%	100%
P01 MITKOF ISLAND	928	87%	87%	92%	99%	100%	100%
P08 NORTH LINDENBERG PENINSULA	278	46%	69%	91%	99%	100%	100%
P12B KUIU ISLAND ROAD SYSTEM	139	89%	85%	92%	100%	100%	100%
P21 MUDDY RIVER AREA	347	51%	52%	74%	100%	100%	100%
TBRD 00-00NO AREA DESIGNATED	1,239	89%	91%	97%	99%	100%	100%
Total displaced visitation in the 7 outfitter/guide use areas (shaded above) [1]		3,595	3,954	4,462	4,939	5,004	5,013

Total displaced visitation in all 15 outfitter/guide use areas above[1]	14,273	14,721	15,356	19,648	19,834	19,899

Notes:
[1] Totals in the first column correspond to all visitation in the 7 and 15 outfitter/guide use areas while the totals under the regulatory alternatives are the sum of all products of visitation in each outfitter/guide use area and the respective percent for each outfitter/guide use area under each regulatory alternative.

Revenue to outfitter and guides from visitors to the Tongass NF is an important source of income for many communities in Southeast Alaska. The University of Alaska Anchorage assessed the economic importance of nature-based tourism in Southeast Alaska, as measured by business revenue (Dugan et al. 2009). Information from Dugan et al. indicate that average annual outfitter and guide revenues (associated with Tongass NF activities) range from $122 to $1,280 and average $711 per trip (deflated to 2020 dollars); excluding guided hunting trips. Hunting trips can cost from $4,270 to the most expensive $15,370 per trip (deflated to 2020 dollars). The average (excluding hunting) is used for 78 and 72 percent of potential visitation displacement while the most expensive hunting trip cost are applied to 22 and 28 percent (for the fifteen and seven outfitter/guide use areas, respectively where 22 and 28 percent of clients were on guided hunting trips; USDA Forest Service 2019c) (Table 8).

Table 8. Projected change from the Alternative 1, the baseline 2001 Roadless Rule, in average annual potential displaced visitors and lost revenue (2020 dollars) in outfitter/guide use areas

	Baseline – 2001 Roadless Rule	Alt 2	Alt 3	Alt 4	Alt 5	Final Rule
15 outfitter/guide use areas						
Displaced Clients[1]	142.7	147.2	153.6	196.5	198.3	199.0
Net Change in displaced clients[2]	0.0	4.5	10.8	53.7	55.6	56.3
Max potential lost revenue	$567,000	$585,000	$610,000	$781,000	$788,000	$791,000
Net Change in lost revenue	$0	$18,000	$43,000	$214,000	$221,000	$224,000
7 outfitter /guide use areas						
Displaced Clients[1]	36.0	39.5	44.6	49.4	50.0	50.1
Net Change in displaced clients[2]	0.0	3.6	8.7	13.4	14.1	14.2
Max potential lost revenue	$174,000	$191,000	$216,000	$239,000	$242,000	$242,000
Net change in potential lost revenue	$0	$17,000	$42,000	$65,000	$68,000	$68,000

[1] Under the final rule and regulatory alternatives projected harvest acres are not subject to harvest in a single year. This provides for variation in annual harvest in any given outfitter/guide use area but visitation displacement noted above would occur over the 100 years of harvest projected thus estimates of displaced clients are divided by 100.
[2] Totals may not add due to rounding.

These estimates should not be used as precise estimates of IRA visitor expenditures. Expenses incurred by visitors are not necessarily lost but subject to displacement related changes. While some businesses may lose revenues, if visitors choose not to travel to Southeast Alaska, others may see increases in revenues if visitors choose to stay longer or travel to substitute sites within Southeast Alaska. Potential lost visitor expenditures for the 15 outfitter/guide use areas are used

as an upper estimate to examine economic significance[9] while the displaced users and lost revenue in the seven outfitter/guide use areas are discounted (over a 20 year period at a 3 and 7 percent discount rate) and compared to benefits from the timber program, and costs to the agency from road maintenance in Table 11 below.

In addition to the analysis of potential lost revenues to outfitter and guides, the potential loss in value for other recreationists *not using outfitter and guides* is examined. Table 5 and the recreation discussion above, under the section ***Analysis of Roadless Area Characteristics***, provides effects related to the non-market value of the recreation experience under the final rule and other regulatory alternatives; providing qualitative examination of these values (Scenery, Recreation Opportunities, etc.) while the forgone conservation values (Table 6) examine non-use or existence values. In addition, use-values associated with recreation opportunities in roadless areas exist and are examined quantitatively here using 16 activity specific values (Backpacking Cross-country Skiing, Fishing, Gathering Forest Products, Hiking / Walking, Hunting, Nature Study, No Activity Reported, Non-motorized Water, Other Non-motorized, Picnicking, Primitive Camping Relaxing, Some Other Activity, Viewing Natural Features, and Viewing Wildlife) for Alaska from the Recreation Use Values Database that include an exhaustive review of economic studies spanning 1958 to 2015 (Rosenberger et al. 2017).

Information from NVUM on the type of site visit for the Tongass indicates general forest area visits made up 64 percent of all forest site (2,874,000 visits) or 1.8 million visits annually. General forest area visits include IRA visitation, because such visitation does not make day use or overnight use of developed sites, as well as wilderness visits. An overview of land area percentages on the Tongass provides perspective on the application of general forest area visits to IRAs: the existing 110 IRAs on the Tongass cover 9.4 million acres which is 56 percent of the forest outside of wilderness. Developed areas cover about 1.3 million acres (about 8 percent), wilderness covers about 5.9 million acres (35 percent); leaving 1 percent of the remaining forest area classified as other general forest area. Visitation in IRAs, wilderness and other general forest area visits rely upon access routes and thus the assumption that general forest area visits are evenly distributed on a per acre basis is an overestimate of IRA visitation. However this provides an upper estimate useful for analysis of forgone value due to displacement from timber harvest.

Although the alternatives would vary in terms of the amount and location of acres suitable for timber harvest, the total volumes expected to be harvested would be the same under each regulatory alternative. The Record of Decision for the 2016 Forest Plan estimated that a total of approximately 24,000 old-growth acres would be harvested Forest-wide after 25 years, with a total of 42,500 old-growth acres harvested after 100 years. Using the same assumptions for young growth, an estimated 284,000 acres of young growth would be harvested over 100 years (USDA Forest Service 2016). These estimates represent an approximate upper estimate of

[9] Economically significant regulatory actions are those that have an annual effect on the economy of $100 million or more or adversely affect the economy or economic sectors.

roadless acres that could be potentially harvested under any of the regulatory alternatives (USDA Forest Service 2020) and provide a per acre basis for measuring potential displacement of IRA visitors.

Young- and old-growth harvest acreages need to be converted to annual averages in order to estimate potential displacement of IRA visitors. An upper estimate of the 25 year old growth estimate (24,000 acres/25 years = 960 acres per year) is added to the annual average of the 100 year young growth estimate (284,000 acres/100 years = 2,840 acres per year) to estimate average annual disturbance due to harvest (960 + 2,840 = 3,800 acres). In any given year the annual harvest is likely to be less than or greater than the annual average over the 25 or 100 year periods, thus the estimate of disturbance is tripled (3,800 * 3 = 11,400 or roughly 12,000). Assuming that the 1.8 million general forest area visitors and harvest locations are both evenly distributed over IRAs approximately 2,400 visitors may be displaced due to annual harvest of suitable young- and old-growth (12,000 acres / 9,368,000 acres *1,839,360 visits).

Similar to the outfitter/guide analysis above, the following analysis uses changes in suitable young- and old-growth acres under the regulatory alternatives in conjunction with information on visitation in IRAs to help focus on potentially affected areas and provide variation across the alternatives. The analysis assumes all potentially displaced visitation is displaced under the highest level of suitability designation, under the final rule, to provide an upper estimate of displacement; this is offered to provide a broad orders-of-magnitude comparison with other costs and benefits. Potentially displaced visitation under the regulatory alternatives is adjusted based on the change in suitable acres (old-growth and young-growth) as a share of total suitable acres under the final rule. This provides adjustment to the assumption based on harvest above to account for visitation and potential harvest not occurring evenly across the forest. In addition, this provides for a baseline estimate of visitor displacement from current harvest and associated lost revenue under the baseline 2001 Roadless Rule. Net change in visitation and lost revenue is measured against this baseline.

Table 9. Potential forgone value of access to non-outfitter/guide recreation from harvest

	Baseline – 2001 Roadless Rule	Alt 2	Alt 3	Alt 4	Alt 5	Final Rule
Old growth plus Young growth suitable acres [1]	560,980	30,796	99,695	175,742	184,688	187,907
change in suitable as a share of Final Rule	75%	79%	88%	98%	100%	100%
Displaced visitors	1,798	1,896	2,117	2,361	2,390	2,400
Forgone value of non-outfitter guide recreation access [2] (2020 dollars)	$240,000	$253,000	$282,000	$315,000	$319,000	$320,000
Net change in value (2020 dollars)		$13,000	$43,000	$75,000	$79,000	$80,000

[1] USDA Forest Service 2020

[2] Rosenberger et al. 2007

Potential forgone value of access to recreation are discounted (over a 20 year period at a 3 and 7 percent discount rate) and compared to benefits from the timber program, and costs to the agency

from road maintenance in Table 11 below.

Commercial Fisheries

The final rule and other regulatory alternatives are not expected to have a significant change to the commercial fishing or fish-processing industries over the planning period, provided that Forest Plan direction remains in place. Riparian Management standards and guidelines established in the Forest Plan (USDA Forest Service 2016) would remain in place under the final rule and all of the regulatory alternatives. While there would be some variation in the level of protection, these variations are not expected to affect the fishing industry. The future of the fishing industry in Southeast Alaska is more likely to depend upon occurrences outside of the Tongass NF such as hatchery production, offshore harvest levels, and changes in ocean conditions.

The absence of an effect due to the final rule and regulatory alternatives is based on the conclusion from the 1997 FEIS (USDA Forest Service 1997); which noted that the amount of acreage of timber harvest was at most less than 20,000 acres per year, representing approximately 0.5 percent of the total remaining productive old growth (or 5 percent over the next decade) and less than 0.02 percent of the entire Forest. That EIS concluded that this was not expected to result in a significant change to commercial fishing. The final rule and other regulatory alternatives would allow considerably less timber harvest and new road construction than the alternatives evaluated in the 1997 FEIS. Total annual old-growth harvest allowed over the 100-year planning period would be approximately 42,500 acres, substantially lower than the maximum proposed in the 1997 FEIS.

Infrastructure Development

With some exceptions, federal and state road development is presently limited in IRAs. Exceptions include roads with reserved or outstanding rights, roads provided for by statute or treaty, or road development related to a Federal Aid Highway. Roadless protection would be removed to various degrees under the final rule and Alternatives 2 through 5 with corresponding implications for regional highway development. In most cases, changes in roadless management, as well as changes in the number of acres managed as roadless, would be more permissive with respect to regional road systems. In addition to those roads presently excepted, Roadless Priority ARAs would also allow roads needed for the connection of communities and development of the regional transportation system as identified in the State of Alaska's Southeast Alaska Transportation Plan. Timber Priority ARAs and areas removed from roadless protection would remove roadless rule-related restrictions on road building. As a result, more areas would be available for additional types of regional road development under the final rule and Alternatives 4 and 5. Future road projects would be subject to funding constraints and evaluated in detail on a project-by-project basis.

None of the regulatory alternatives are expected to substantially affect the development of energy projects or related infrastructure. Removing roadless designations in areas under the final rule and Alternatives 2 through 5 would simplify the process for projects but would not necessarily result in an increase in the number of projects developed.

In areas where new roadless areas are added or expanded, the permitting process could be more complicated, but projects would not be prohibited. An exemption for utility systems in Roadless Priority ARAs under Alternatives 2 through 5 and Community Priority ARAs (under Alternative 3) would allow for tree cutting and road construction. Under Alternative 4, Timber Priority ARAs would not prohibit tree cutting or road construction at all. Where restrictions are removed, or exemptions added, the greatest effect may be in making the permitting process for developers less burdensome, resulting in a more rapid permitting process rather than an increase in the number of sites developed.

Alaska Native Customary and Traditional Uses

Areas allocated to Roadless Priority and Community ARAs would explicitly allow the cutting, utilization, customary trade, and removal of trees for the purposes of Alaska Native customary and traditional uses, as well as road construction deemed necessary by a federally recognized Tribe for access to Alaska Native cultural sites. This type of use would also be allowed in Timber Priority ARAs, which allow all timber harvest and road construction. These types of uses would also be allowed in areas removed from roadless protection, subject to applicable Forest Plan standards and guidelines.

Subsistence

Marine resources, including fish, mammals, and plants, account for more than half of total per capita harvest in all Southeast Alaska communities, ranging from 55 percent in Tenakee Springs to 88 percent in Skagway (USDA Forest Service 2020). These resources are not expected to be affected by any of the regulatory alternatives. Among the subsistence resources of greatest importance (salmon, other finfish, marine invertebrates, and deer), deer is the only one that could be potentially significantly affected by the alternatives evaluated in the 2016 Tongass Forest Plan EIS (USDA Forest Service 2016a). Therefore, the subsistence analyses prepared for each Community area for that EIS used deer as a key indicator for potential impacts to subsistence resources.

Multiple species of fish (including salmon) harvested for subsistence and personal use, commercial fisheries, and tourism and guided recreational fishing. Salmon, trout, char, and eulachon (hooligan) of the Tongass National Forest are harvested in subsistence fisheries and for personal use by local residents. Salmon and trout are also the basis of tourism and guided fisheries enjoyed by thousands of visitors, supporting hundreds of tourism and support businesses. The commercial fisheries derived from Tongass streams and rivers produce 28 percent of the Alaska salmon harvest, and support fishing and processing jobs for thousands of local residents and nonresidents (USDA Forest Service 2017).

The subsistence analysis conducted for the 1997 Forest Plan Revision FEIS found that some effects to fish habitat may result from land management activities, but the magnitude of the effects could not be calculated. The 1997 FEIS (USDA Forest Service 1997) noted that the amount of acreage of timber harvest was at most less than 20,000 acres per year, representing approximately 0.5 percent of the total remaining productive old growth (or 5 percent over the next decade) and less than 0.02 percent of the entire Forest. The final rule and other regulatory alternatives would allow considerably less timber harvest and new road construction than the

alternatives evaluated in the 1997 FEIS. Total annual old-growth harvest allowed over the 100-year planning period would be approximately 42,500 acres, substantially lower than the maximum proposed in the 1997 FEIS. Regardless of the absence of Watershed priority protections under the final rule, Riparian Management standards and guidelines established in the Forest Plan (USDA Forest Service 2016) would remain in place.

The final rule, and other regulatory alternatives, including the baseline 2001 Roadless Rule, would result in a reduction in deer habitat capability from existing conditions due to the harvest of mature young-growth and productive old-growth forest. Over the long term, reductions in habitat capability would reduce carrying capacity, or the numbers of deer an area is capable of supporting given the available resources. This could lead to a decline in the deer population, particularly following severe winters, if the demand for resources (e.g., food or habitat) exceeds the amount available.

Timber harvest tends to affect deer-related subsistence activities in two ways. In the short run, approximately 20 to 30 years following harvest, deer populations tend to increase in harvested areas. In the long run, populations tend to decline as the canopy in even-aged forest stands closes, resulting in lower habitat quality. Reductions in habitat quality can be reduced through management (e.g., thinning) of young-growth stands.

Deer populations in unharvested areas are likely to remain at fairly constant levels that are typically lower than a comparable harvested area in the short run, but higher in the long run. Road construction also affects subsistence by providing subsistence hunters with ready access to areas that may have been previously inaccessible. This effect may be perceived as either positive or negative depending on the parties involved, as increased access may lead to increased competition for resources. Potential effects are likely to vary by community and may be perceived differently by members of the same or neighboring communities. Potential effects by community are assessed in the Communities section in the 2016 Forest Plan EIS (USDA Forest Service 2016a).

While there would be some new road access under the final rule and regulatory alternatives in the long run, nearly all new roads constructed under the regulatory alternatives would be closed following harvest. These roads would, therefore, not be available for use by highway vehicles or high-clearance vehicles. They would, however, be available for access by other methods and would, as a result, have the potential to affect existing subsistence patterns. Some roads would be left open and available for access on maintained roads for administrative use, recreation and other uses such as infrastructure.

Mining and Mineral Development

The Forest Service divides minerals resources into three groups: locatable minerals, leasable minerals, and salable minerals. Locatable minerals are those minerals that may be located and removed from Federal lands under the authority of the General Mining Law of 1872, as amended. Examples of locatable minerals on the Tongass include gold, silver, copper, molybdenum, iron, nickel, lead, and zinc. The General Mining Law of 1872, as amended, grants every United States citizen the right to prospect and explore public domain lands open to mineral entry. The right of reasonable access is guaranteed and is not at the discretion of the Forest Service. Exploration, mining, and mineral processing activities, including road construction and reconstruction, are presently allowed in IRAs to the extent provided by statute and would continue to be allowed under the final rule and all the other regulatory alternatives. Changes in roadless management under the final rule is, therefore, not expected to affect existing or future locatable mineral exploration or mining activities on the Forest.

Leasable minerals are certain types of minerals, primarily energy resources (e.g., oil, gas, coal, and geothermal resources) that are not subject to mining claim location but are available for exploration and development under provisions of the Mineral Leasing Act of 1920. Roadbuilding is currently prohibited for any new leasable projects, including geothermal projects, within IRAs. For Alternatives 2 through 5, this prohibition would continue in ARAs with watershed (Alternative 2) and LUD II priorities. Following project-specific analyses, roads could be approved for leasable projects within ARAs with timber (Alternative 4) or roadless priorities. Under the final rule roadbuilding would not be prohibited for any new leasable projects, including geothermal projects, with removal of roadless areas on the Tongass NF. The Tongass has no current leasable mineral activity and the anticipated demand for leasable minerals is expected to remain low. The Bureau of Land Management (BLM) conducted an assessment of mineral resource potential in support of a resource management plan for the Ring of Fire planning area, which includes Southeast Alaska. While there has been oil and gas exploration activity in the Yakutat area in the past, the resource development potential is considered low; therefore, the BLM expects no exploration or development activity within the Forest Plan period of analysis (10 to 15 years). Outside of the Yakutat area, oil and gas occurrence potential elsewhere in the Tongass is considered low to none. Occurrences of coal found at several locations in Southeast Alaska; however, the BLM considers development of these resources to be uneconomic in the near future, other than possibly for local use, and does not foresee associated exploration or development activity (USDA Forest Service 2016). As a result, changes in roadless management are expected to have limited effect on leasable mineral development.

Salable minerals from the Forest are mainly used to construct NFS roads. Since road construction is not expected to vary much between regulatory alternatives, there would be little difference in salable mineral development between the regulatory alternatives.

Agency Costs Including Control of Regulatory Costs

This section discusses the potential for relative changes in agency costs and revenues, across regulatory alternatives, for activities related to roadless area designations. The final rule does not prescribe project-level or site-specific activities. As a consequence, agency costs and differences in program costs across regulatory alternatives have not been quantified.

The Forest Service also incurs costs associated with planning, preparation, and administration of treatment projects and timber sales. On average, the Forest Service spent approximately $12.5 million per year to administer Tongass timber sales from 2005-2014, excluding road building costs, and received approximately $1.1 million in revenue per year (GAO 2016). The proportion of funds allocated to projects in roadless areas may increase or decrease as a function of the amount of treatment (e.g., cutting) and road maintenance projected to occur under each regulatory alternative but costs cannot exceed program budgets that have remained relatively flat. Budgetary constraints may limit prospects for increasing overall timber harvest levels, separate from considerations regarding future amendments to the Forest Plan. Regardless, a small incremental reduction in cost associated with conducting compliance reviews with the 2001 Roadless Rule may occur but cannot be quantified. This final rule and the regulatory alternatives are programmatic, meaning that they establish direction and allowable activities for broad land areas, rather than schedule specific activities in specific locations. None of the alternatives authorize any site-specific projects or other ground-disturbing activities and, therefore, it is not possible to estimate future activities and subsequent marginal changes in environmental activities. Additional cost to the agency from timber management and road maintenance are quantified and detailed below.

As stated previously timber harvest levels do not vary under the alternatives and the potential timber sale quantity of 46 MMBF is examined alongside a lower estimate of volume of 23 MMBF (one standard deviation below the average annual level of Tongass harvest from Table 4) to address uncertainty in harvest levels. Associated costs to the agency from timber program administration and road maintenance (for roads that are not decommissioned following a sale) are not included in the benefit and cost analysis since harvest levels do not vary from the baseline 2001 Roadless rule.

Road maintenance costs may increase under the regulatory alternatives. Road construction and decommissioning costs are not considered since it is unlikely they would be paid by the agency given the influence of the limited export policy. In 2007, the Forest Service approved a Limited Export Policy in an effort to boost appraised values and provide purchasers economical sale opportunities and additional processing options. The policy was again expanded in November 2009 to apply to all contracts and allowed export of unprocessed Sitka spruce and hemlock logs, up to 50 percent of the total sale sawtimber volume, upon Regional Office approval. The Limited Export Policy is discussed in detail in Appendix H to the Tongass Forest Plan Amendment FEIS (USDA Forest Service 2016a). This boost in appraised value has made the construction of roads by the agency in advance of timber sales rare.

While road construction and decommissioning costs are covered by the purchaser, some roads may remain open following completion of harvest activities. The number of new road miles estimated beyond the current forest plan (the baseline 2001 Roadless Rule) would range from 0 to 49 miles total. Information from the FEIS for the final rule (see Table 3.3-21 in USDA Forest Service 2020) show the baseline 2001 Roadless Rule and Alternative 2 would have about the same amount of road miles as indicated in the current Forest Plan evaluation, with Alternative 3 a slight increase over the baseline 2001 Roadless Rule and Alternative 2, and Alternatives 4, 5

and the final rule similar with slightly more road miles than Alternative 3. The baseline 2001 Roadless Rule would result in a 20 percent increase in new roads over existing conditions; none of the other alternatives would increase this value more than 1 percent (i.e., 21 percent). In addition to new road construction, roads built over decommission roads would occur on less than half a mile under Alternatives 3 and 4 (zero miles under the baseline 2001 Roadless Rule and Alternative 2) and less than a mile under Alternative 5 and the final rule. Also road reconstruction would occur on less than half a mile under Alternative 3 (zero miles under the baseline 2001 Roadless Rule and Alternative 2) and less than a mile under Alternative 4, 5 and the final rule (USDA Forest Service 2020). . It is estimated that 5 percent of roads built for timber sales are left open and maintained as part of the Tongass road system. Not all of these roads are maintained at the same frequency or level as other roads, however it is helpful to assume that they receive some maintenance for consideration of costs.

Table 10. Agency cost of road maintenance

	Alternatives					
	Baseline	2	3	4	5	Final Rule
Industry	2001 Roadless Rule	Roaded Roadless Alternative	Logical Extension Alternative	Partial Dev LUDs Alternative	All Dev LUDs Alternative	Full Exemption Alternative
Road Construction over Decommissioned Roadbeds (miles) [1]	527	527	532	535	539	541
Total	2,625	2,625	2,655	2,683	2,701	2,707
Cost of maintenance	$8,005,000	$8,005,000	$8,097,000	$8,182,000	$8,237,000	$8,255,000
Net cost from baseline		$0	$92,000	$177,000	$232,000	$250,000

[1] From Table 3.3-21 in USDA Forest Service 2020

This analysis assumes a cost of $50,000 per mile for maintenance from the 2008 Tongass Land Management Plan Appendix B (USDA Forest Service 2008). Adjusting for inflation provides an average annual road construction costs for the Tongass NF of approximately $58,000 per mile. These costs are applied to 5 percent of road mile changes under the alternatives, discounted (over a 20-year period at a 3 and 7 percent discount rate) and included in Table 11. Revenue and cost savings are reported as positive numbers and costs and forgone benefits are reported as negative numbers in Table 11.

Table 11. Benefits and costs (annual values in current 2020 dollars) and net-present value under the regulatory alternatives

	Alternatives					
	Baseline	2	3	4	5	Final Rule
Industry	2001 Roadless Rule	Roaded Roadless Alternative	Logical Extension Alternative	Partial Dev LUDs Alternative	All Dev LUDs Alternative	Full Exemption Alternative
Low estimate – Stumpage value	$0	$460,000	$460,000	$460,000	$460,000	$460,000
Low estimate - Potential lost revenue outfitter/guide recreation	$0	-$17,000	-$42,000	-$65,000	-$68,000	-$68,000
Low estimate - forgone old growth conservation benefits		-$73,000	-$145,000	-$275,000	-$287,000	-$287,000
Upper-bound (3 % discount rate)	$0	$12,183,000	$8,931,000	$4,901,000	$3,805,000	$3,513,000
Lower-bound (3 % discount rate)	$0	$3,061,000	-$9,902,000	-$26,817,000	-$28,956,000	-$29,293,000
Upper-bound (7 % discount rate)	$0	$8,676,000	$6,360,000	$3,490,000	$2,711,000	$2,503,000
Lower-bound (7 % discount rate)	$0	$1,348,000	-$10,586,000	-$25,792,000	-$27,607,000	-$27,847,000

[1] High and low estimates of stumpage value increase are bounded by 46 MMBF harvest estimate and at 23 MMBF (one standard deviation below the 16 year average Tongass NF harvest from Table 4).

[2] High and low estimates of Recreation/Tourism are bounded by expenditures per displaced client days; respectively $711 and $15,370 per trip (Dugan et al. 2009).

[3] High and low estimates of forgone conservation value are bounded by timber suitability under the alternatives and estimates of annual harvest levels (see Table 6 above). The high estimate is discounted in year one only (since these values were elicited as a one-time payment) while the low estimate is discounted over the 20 year period.

[4] Road maintenance costs are based on $50,000 cost per mile (USDA Forest Service 2008).

[5] The Upper-bound NPV is the sum (discounted over 20 years and discounted at both 3 and 7 percent per OMB Circular A-4 - Regulatory Analysis (Sep 17, 2003)) of the high estimate of stumpage value, the low estimate of potential lost revenue, the forgone value of non-outfitter guide recreation access, low estimate of forgone old-growth conservation benefits, and agency road maintenance cost; and the lower bound NPV is the opposite summing the low estimate of stumpage value, the high estimate of potential lost revenue, the forgone value of non-outfitter guide recreation access, high estimate of forgone old growth conservation benefits, and agency road maintenance cost. The intent is to provide the widest range of possible net present value outcomes by considering the high and low estimates of revenue and costs to 'bound' the NPV range within the realm of plausible outcomes. The lower bound includes maximum potential lost revenue to outfitter/guides alongside the low estimate of timber stumpage value since this is possible and the lowest possible absolute value. For example, it is possible, and not improbable, that low harvest levels occur with high levels of recreation displacement. In the discussion above, the analysis explains that displacement is focused on outfitter/guide use areas where conflict is likely to occur (15 and 7 outfitter/guide use areas identified above) and not based on volume of timber removed. While this is plausible there is no implied correlation between high recreation displacement and low harvest levels; and are summed in order to provide the lower bound of possible NPV outcomes. This is the lowest possible NPV

Industry	Alternatives					
	Baseline	2	3	4	5	Final Rule
	2001 Roadless Rule	Roaded Roadless Alternative	Logical Extension Alternative	Partial Dev LUDs Alternative	All Dev LUDs Alternative	Full Exemption Alternative

value and a plausible 'worst case scenario'. Similarly the upper bound represents a set of plausible outcomes under the regulatory alternatives and is the highest possible NPV. Further, there is no implied correlation between low recreation displacement and high harvest levels; and these are summed in order to provide the upper bound of possible NPV outcomes.

Control of Regulatory Costs

In addition, the final rule has been reviewed in accordance with E.O. 13771 on reducing regulation and controlling regulatory costs. Additional government expenditures may be required to facilitate Tongass NF timber sales. However, given that the final rule will remove all roadless areas on the Tongass NF under the 2001 Roadless Rule, the rule is considered to be an E.O. 13771 deregulatory action. The final rule is the response to the State of Alaska's petition requesting that the Secretary of Agriculture consider exempting the Tongass NF from the 2001 Roadless Rule. Under the final rule, roadless protection would be removed from all roadless areas on the Tongass, resulting in a reduction of 9.4 million acres of roadless areas (Table 1) and resulting in more flexibility for the agency and timber industry.

Public comments received on the proposed rule noted that the Notice of Proposed Rulemaking (NPRM) states the proposed rule is a deregulatory action and would create an incremental reduction in the cost of conducting compliance reviews, thus reducing expenditure of taxpayer dollars. Commenters further noted that neither the DEIS nor the NPRM attempt to quantify this potential reduction and reviews for projects in roadless areas do not impose a significant burden, as demonstrated by the 50 projects approved in roadless areas on the Tongass. In addition, the incremental saving for reviewing projects would be far outweighed by the additional expense taxpayers would incur from expanding Tongass timber projects into roadless areas. Commenters also expressed concern that the Forest Service had not adequately evaluated the costs of this proposed rule, stating that the proposed rule has a total cost greater than zero, making it a "new regulatory action," not a "deregulatory action" under Executive Order 13771.

The discussion above provides detail on costs to the agency of environmental analysis, sale preparation, sale administration, and engineering support of treatment projects and timber sales on the Tongass NF. In addition, language has been added to the Regulatory Impact Assessment qualitatively addressing the incremental reduction in cost associated with conducting compliance reviews, alongside other costs to the agency. An "EO 13771 deregulatory action" is an action that has been finalized and has total costs less than zero. As presented in Table 11 the upper bound estimate of net benefits for the final rule are positive.

DISTRIBUTIONAL EFFECTS

The Tongass NF comprises approximately 80 percent of the land area in Southeast Alaska and therefore plays a critical role in supporting local and regional economy, promoting economic diversification, and also enhancing rural community well-being. The visitor industry, seafood industry, and resource extraction industries contribute to local jobs and income alongside public

sector employment spanning federal, state, and local government. While the visitor and seafood industries are the largest private-sector employers across Southeast Alaska, resource extraction remains important in some rural communities where jobs are limited and unemployment is oftentimes high.

Forest Products

Timber program output levels are expected to remain constant between the baseline 2001 Roadless Rule, the final rule and remaining regulatory alternatives; and involve a similar number of acres under all regulatory alternatives, varying only by the location of timber harvest. None of the regulatory alternatives propose changes to the projected timber sale quantity or timber demand projections from the Tongass Land and Resource Management Plan. The Tongass National Forest, in compliance with the Tongass Timber Reform Act (1990), seeks to provide an annual supply of timber to meet market demand to the extent consistent with providing for multiple use and sustained use of all renewable forest resources, and other requirements, including NFMA. Thus, the proportion of harvest occurring within versus outside of roadless areas would vary by regulatory alternative, but overall economic impacts are assumed to remain constant. These impacts were estimated for the first decade following implementation in the 2016 Forest Plan FEIS (USDA Forest Service 2016a) and are based on an annual average harvest of 46 MMBF. All regulatory alternatives, including the final rule, are assumed to support a similar range of direct jobs and income. Based on the 2016 Forest Plan EIS assessment, all of the regulatory alternatives would support an estimated 92 jobs in logging, 49 to 100 jobs in sawmilling, and 29 to 46 jobs related to transportation and other services, with direct income ranging from $9.8 million to $10.4 million. Thus no change in timber related employment or income is expected as a result of the final rule or other regulatory alternatives.

The local sawmilling and transportation-related employment estimates (from the 2016 Forest Plan EIS) were based on a range, from maximum possible shipment out of state (export of all Alaska yellow-cedar and western redcedar plus hemlock and Sitka spruce export equal to 50 percent of total sale net sawlog volume), to no shipment of western redcedar, hemlock, or Sitka spruce, and export of 100 percent Alaska yellow cedar. Transportation and other services include water transportation, independent trucking, stevedoring, scaling, and export marking and sort yard employment for export volume, and water transportation, scaling, and independent trucking for locally sawn volume. Export employs more workers in transportation and other services per million board feet harvested than domestic production, which is reflected in the range of values estimated for transportation and related services.

Actual employment and income in Southeast Alaska would depend on choices made by purchasers; those choices may change as markets and prices shift. Under current market conditions, purchasers are likely to export as much as they can while processing enough material locally to keep manufacturing facilities open, and take advantage of opportunities to produce high-value sawn material in Southeast Alaska. In addition, the Regional Forester has allowed increased export on a case-by-case basis, as discussed above and explained in Appendix H of the Tongass Forest Plan (USDA Forest Service 2016). If purchasers were allowed on a case-by-case basis to export a larger share of a particular sale in unprocessed form, there would be a commensurate reduction in sawmilling jobs and an increase in transportation-related jobs.

Recreation and Tourism

Potential impacts to recreation and tourism are evaluated with respect to *Recreation Opportunity Spectrum* (ROS) settings, *Recreation Places* and *Visitor Use*. The Recreation discussion of the Regulatory Flexibility Analysis for the final rule (USDA Forest Service. 2020c) also assesses impacts to outfitter/guide businesses.

Recreation Opportunity Spectrum

Under the baseline 2001 Roadless Rule, most projected harvest is expected to occur in ROS settings where some modification of the natural environment is expected. Less than 1 percent of the acres currently allocated to Primitive (P), Semi-Primitive Non- Motorized (SPNM), and Semi-Primitive Motorized (SPM) ROS settings would be harvested after 100 years, assuming the maximum allowable levels of harvest were to occur. Assuming that the estimated total number of acres harvested would be the same for each alternative and that harvest would be evenly distributed across the available suitable acres, Roaded Modified as a share of the estimated total would decrease relative to the baseline (2001 Roadless Rule) under the final rule and other regulatory alternatives, dropping from almost 90 percent under the baseline (2001 Roadless Rule) to 67-68 percent under the final rule and Alternatives 4 and 5. Much of this decrease would be made up by an increase in SPNM acres. SPNM as a share of the estimated total would range from about 6 percent under the baseline 2001 Roadless Rule and Alternative 2 to 23 percent under the final rule and Alternatives 4 and 5.

Recreation Places

The pattern of use associated with known protected boat anchorages, boat landings, aircraft landing sites, and the limited road systems makes it possible to identify specific "recreation places" on the Tongass. A total of 1,436 recreation places, encompassing approximately 3.6 million acres, were identified as part of the planning process for 1997 Forest Plan Revision (USDA Forest Service 1997). Recreation places are classified in two basic ways. First, recognizing that access plays a key role in recreation in Southeast Alaska, "home ranges" were defined for each community. Inventoried recreation places were classified into two categories: those located within a radius of approximately 20 miles from communities ("home range") and those farther than 20 miles from a community. Almost half (48 percent) of the identified recreation place acres are within a community home range. Second, recreation places were identified as either important or ordinary/common based on five categories: facilities, marine, hunting, fishing, and tourism. Recreation places may be important for one, several, or none of the identified categories. Important recreation places by category are summarized in Table 11.

Table 11. Important Recreation Places by Category[1]

	Number of Places	Percent of Total[2]	Acres (1,000s)	Percent of Total[2]
Facilities[3]	402	28	1,053	29
Marine[4]	617	43	1,089	30
Hunting[5]	373	26	1,452	40
Fishing[6]	187	13	472	13

Tourism	876	61	1,924	53
Total	**1,436**	**NA**	**3,630**	**na**

na = not applicable

[1] Recreation places are rated as either important or common/ordinary.

[2] The Percent of Total columns sum to more than 100 because a recreation place can be rated important in more than one category.

[3] All recreation places with facilities were rated as being important. In addition, other recreation places with some type of facility, such as a viewing platform, and facilities authorized by a special use permit for recreation purposes, were identified as important.

[4] The marine category identified here is different to the marine type identified in Table 3.15-6 of the Tongass NF Forest Plan (USDA Forest Service 2016). The marine category in this table only includes those recreation places that are truly unique or typify the Southeast Alaska marine experience.

[5] Important hunting areas were distinguished from ordinary hunting areas based on a number of factors, including heavy recurring use, hunter success, ease of access, opportunities for several species, and prized species, such as mountain goats and moose.

[6] Important fishing recreation places were identified using ADF&G ratings for recreational fishing.

Source: USDA Forest Service 2016, Table 3.15-7

As discussed with respect to ROS settings, although the regulatory alternatives would vary in terms of the amount and location of acres suitable for timber harvest, the total volumes expected to be harvested would be the same under the final rule and each regulatory alternative. The following analysis assumes that the estimated total number of acres harvested over 100 years would be the same for each alternative and that harvest would be evenly distributed across available suitable acres, including those that coincide with important recreation places. Based on these assumptions, the acres of old-growth acres harvested within four of the recreation place categories (home range, facilities, marine, and hunting) would mostly decrease relative to the baseline 2001 Roadless Rule. This relative decrease would occur because old-growth acres in these recreation places would make up a smaller share of total Forest-wide suitable old-growth acres.

Visitor Use

Based on the results of the National Visitor Use Monitoring program for 2010 to 2014 and coefficients developed by White and Stynes (2010), the Forest Service (2017) calculated a visitation estimate of 2,874,000 annual visits to the Tongass. The results of earlier surveys indicated that half of Alaska residents surveyed who live in Southeast Alaska reported using a boat or plane to access the national forest (White and Stynes 2010). Almost half (49.7 percent) of non-resident visits to the Tongass involved the use of a guide or outfitter at some point, with local cruises, wildlife viewing, and flightseeing reported most frequently. Alaska residents in contrast were found to very rarely use outfitters or guides (White and Stynes 2010).

Timber harvest and associated road construction in Primitive and Semi-Primitive (SPNM and SPM) ROS settings has the potential to affect recreation activities and users dependent on remote, natural settings with low to no evidence of human use. Harvest in these settings could affect the quality of the recreation experience and displace visitors to other parts of the Forest. These types of impacts are likely to occur in Primitive, SPNM, and SPM ROS settings in recreation places, especially in "home range" recreation places (i.e., those within approximately 20 miles of communities). Impacts are likely to be most acute in Primitive and Semi-Primitive

areas where recreation use is already at or near capacity, including areas where competition already exists between resident recreationists, independent visitors, and commercial outfitter/guide operations.

Changes in roadless area protections could also indirectly affect nearby Primitive and Semi-Primitive ROS settings, as displaced recreationists seek other locations with similar qualities. In addition to long-term impacts in Primitive and Semi-Primitive settings, in the short term, resident and other recreationists could be displaced by logging operators in the nearby vicinity, with the presence of logging equipment potentially affecting access and the overall quality of the recreation experience. This type of short-term impact would potentially affect recreationists across all ROS settings.

The regulatory alternatives evaluated here could also result in different supply-induced changes in participation. In the past, supply-induced changes in participation on the Tongass have been mainly related to changes in road systems and road access. This type of change in participation appears to have occurred on Prince of Wales, Wrangell, and Mitkof Islands, for example. In these locations, road systems developed for timber harvesting created an opportunity for road-related access to previously inaccessible recreation settings and, therefore, an opportunity for recreation activities involving wheeled vehicles. In addition, new roads that provide easier access to a wider area may create new semi-primitive opportunities that increase the capacity of a recreation place or create a new recreation place. Over time, continuation of such new opportunities would be dependent on the availability of funds for road maintenance and other system management needs.

There would be some new road access in the long run under all regulatory alternatives. In addition, the Community Priority ARA (under Alternative 3) would allow road construction and reconstruction in conjunction with the construction, expansion, or maintenance of a developed recreation site. Nearly all new roads constructed under the regulatory alternatives would be closed following harvest. These roads would, therefore, not be available for use by highway vehicles or high-clearance vehicles. They may, however, be available for access by other methods and would, as a result, have the potential to affect existing recreation patterns. Any potential increase in recreational access may be limited by the extent to which road closures include restoring the road bed to a more natural condition, possibly blocking or discouraging non-vehicle access as well. The final rule and Alternatives 2 through 5 would increase the acres available for timber harvest, but harvest levels are expected to remain the same across all regulatory alternatives. As a result, the amount of new or reconstructed road miles would be similar across the regulatory alternatives, but would be lowest under the baseline 2001 Roadless Rule and Alternative 2 and highest under the final rule and Alternatives 4 and 5. Alternative 3 would likely result in more roads than the baseline 2001 Roadless Rule and Alternative 2, and fewer than the final rule and Alternatives 4 and 5. In addition, based on the distribution of suitable acres, the final rule and Alternatives 4 and 5 would be more likely to result in new road construction in Primitive or Semi-Primitive ROS settings.

Commercial Fisheries

The final rule and other regulatory alternatives are not expected to have a significant change to

the commercial fishing or fish-processing industries over the planning period provided that Forest Plan direction remains in place. Riparian Management standards and guidelines established in the Forest Plan (USDA Forest Service 2016) would remain in place under the final rule and all of the regulatory alternatives. While there would be some variation in the level of protection, these variations are not expected to affect the fishing industry. Regardless of the absence of Watershed priority protections under the final rule, the Riparian Management standards and guidelines established in the Forest Plan would continue. The future of the fishing industry in Southeast Alaska is more likely to depend upon occurrences outside of the Tongass NF such as hatchery production, offshore harvest levels, and changes in ocean conditions.

The 1997 FEIS (USDA Forest Service 1997) noted that the amount of acreage of timber harvest was at most less than 20,000 acres per year, representing approximately 0.5 percent of the total remaining productive old growth (or 5 percent over the next decade) and less than 0.02 percent of the entire Forest. That EIS concluded that this was not expected to result in a significant change to commercial fishing employment. The final rule and other regulatory alternatives would allow considerably less timber harvest and new road construction than the alternatives evaluated in the 1997 FEIS. Total annual old-growth harvest allowed over the 100-year planning period would be approximately 42,500 acres, substantially lower than the maximum proposed in the 1997 FEIS.

Mining and Mineral Development

As noted above in the Cost-Benefit Analysis section the General Mining Law of 1872, as amended, grants every United States citizen the right to prospect and explore public domain lands open to mineral entry. The right of reasonable access is guaranteed and is not at the discretion of the Forest Service. Exploration, mining, and mineral processing activities, including road construction and reconstruction, are presently allowed to the extent provided by statute in IRAs and would continue to be allowed under the final rule and all the other regulatory alternatives. Changes in roadless management under the final rule is, therefore, not expected to affect existing or future locatable mineral exploration or mining activities on the Forest.

As noted above in the Cost-Benefit Analysis section roadbuilding is currently prohibited for any new leasable projects, including geothermal projects, within IRAs. For Alternatives 2 through 5, this prohibition would continue in ARAs with watershed (Alternative 2) and LUD II priorities. Following project-specific analyses, roads could be approved for leasable projects within ARAs with timber (Alternative 4) or roadless priorities. Under the final rule roadbuilding would not be prohibited for any new leasable projects, including geothermal projects, with removal of roadless areas on the Tongass NF. The Tongass has no current leasable mineral activity and the anticipated demand for leasable minerals is expected to remain low. The Bureau of Land Management (BLM) conducted an assessment of mineral resource potential in support of a resource management plan for the Ring of Fire planning area, which includes Southeast Alaska. While there has been oil and gas exploration activity in the Yakutat area in the past, the resource development potential is considered low; therefore, the BLM expects no exploration or development activity within the Forest Plan period of analysis (10 to 15 years). Outside of the Yakutat area, oil and gas occurrence potential elsewhere in the Tongass is considered low to none. Occurrences of coal found at several locations in Southeast Alaska; however, the BLM

considers development of these resources to be uneconomic in the near future, other than possibly for local use, and does not foresee associated exploration or development activity (USDA Forest Service 2016). As a result, changes in roadless management are expected to have limited impacts on related economic activity.

Salable minerals from the Forest are mainly used to construct NFS roads. Since road construction is not expected to vary much between regulatory alternatives, there would be little difference in salable mineral development between the regulatory alternatives.

CONCLUSIONS

The final rule is intended to provide for economic development opportunities in Southeast Alaska in response to the State of Alaska's petition requesting that the Secretary of Agriculture consider exempting the Tongass NF from the 2001 Roadless Rule. The final rule is programmatic and does not directly authorize the implementation of any ground-disturbing activities. The final rule provides the most flexibility, across the regulatory alternatives, for the selection of future timber sale areas and sale design (depending on the sale areas selected); and could, in turn, potentially improve the Forest Service's ability to offer economic sales that meet the needs of industry; improving flexibility for timber managers for designing timber sales that appraise positive. Cost savings from improved flexibility for the agency and timber industry would accrue alongside other benefits, displayed in Table 5 and discussed above; including reduced cost for potential leasable mineral availability, renewable energy development potential, potential for development of state roads and other transportation projects, and benefits to Alaska native customary and traditional uses. Upper bound estimates of net-benefits are positive for the final rule and regulatory alternatives. Annual harvest levels do not vary by regulatory alternative given the agency's responsibilities under the Tongass Timber Reform Act (which directs the Forest Service to seek to provide a supply of timber from the Tongass National Forest that meets annual market demand to the extent consistent with providing for the multiple-use and sustained-yield of all renewable resources and other applicable requirements, including NFMA). Potential increase in stumpage value reflects efficiency gains from just a portion of overall costs to purchasers covering just "stump to truck" from felling, yarding, and loading and assume transportation and towing costs remain constant. Harvest near existing roads and closer to markets may provide 'stump to truck' costs saving as readily available acres in areas formerly designated as IRAs are harvested first. As these acres are exhausted efficiency gains from lower "stump to truck" costs are likely to be absorbed by increased transportation and towing costs. Agency road maintenance cost and potential lost revenue to the recreation industry are based on projected road miles and timber suitability, respectively and vary across the regulatory alternatives. In addition, forgone conservation value is based on changes in suitable old-growth available for harvest. Negative net benefits are possible if upper bound estimates of these costs correspond with low stumpage value or timber production; however the upper and lower estimates of stumpage revenues, agency costs, forgone conservation value and potential lost recreation revenue are uncertain outcomes provided for a broad orders-of-magnitude comparison of costs and benefits.

Where monetary expressions are not available, value and tradeoffs are considered in qualitative terms pursuant to Executive Order 13563. Thus, qualitative analysis of the final rule and regulatory alternatives is provided for Scenic Quality, Recreation Opportunities and Traditional Cultural Properties and Sacred Sites. As discussed in the section on ***Analysis of Roadless Characteristics under the Final rule***, the highest effects on scenery would be associated with the final rule and Alternative 5, more lands in the primitive Recreation Opportunity Spectrum class would be removed under 4, 5 and the final rule, and the most risk to cultural resources may occur under the final rule and Alternatives 4 and 5. None of the regulatory alternatives propose changes to the projected timber sale quantity or timber demand projections guided by the Tongass Land and Resource Management Plan; thus the final rule would not decrease timber related jobs, income or output. Lastly, the final rule is not anticipated to alter output or employment in local economies associated with recreation and tourism, commercial fisheries and mining related industries.

APPENDIX

Comments on cost-benefit analysis. Commenters expressed concern about the cost-benefit analysis using changes in suitable old-growth and young-growth acres as an indicator for potential displacement of recreationists interested in primitive recreation experiences. There was concern about the methodology used to measure adverse visitor impacts. Commenters also sought consideration of scenic values in the cost-benefit analysis. Commenters sought a cost-benefit economic analysis that uses best available science to assess socioeconomic impacts of each alternative as well as analysis of the socioeconomic value and impact on fisheries, ecotourism, special use permits, recreation, game populations, and subsistence resources. Other commenters expressed concern about the inclusion of harvesting costs (felling, yarding, and loading) and recreation expenditures, as a distributional impact, in the cost-benefit analysis.

In response to public comment, the analysis of recreation visitation related displacement and associated expenditures, in the Regulatory Impact Analysis (RIA), has been updated based on new information received during proposed and final rule preparation. Scenic values, game species, and subsistence are discussed qualitatively in the RIA and examined in more detail in the EIS. A cost-benefit analysis has also been included in the RIA with new data and information received during proposed and final rule preparation. This analysis includes benefits from a more efficiently managed timber sales program alongside agency costs of road maintenance, forgone conservation value, and costs of potentially displaced recreationists. The revised RIA includes discussion and analysis of costs from felling, yarding, and loading timber and acknowledges their limited scope alongside other costs to the timber industry and costs to the agency from road maintenance. In addition, detail has been added to the RIA noting that road cost changes before and after 2011 were twice as high during the exemption, and the relevance of these costs alongside haul cost savings. Potential recreation related revenue losses can be considered distributional; if there are substitute opportunities in southeast Alaska or on the Tongass National Forest. However, in some cases visitors may choose to not come to southeast Alaska, and these estimates are appropriate for inclusion in the costs and benefits analysis.

Comments on ecosystem services. Commenters sought an effects analysis disclosing how the rule will directly and indirectly impact ecosystem services in the region, including economic cost and benefits related to impacts on ecosystem services. There was concern that exemption from the rule could lead to removal of trees and damage to ecosystems which can adversely impact ecosystem services.

In response to the comments received, additional qualitative information and discussion related to biological and physical ecosystem services values has been added to the RIA between proposed and final rule preparation. In addition, the cost-benefit analysis includes quantitative estimates of forgone conservation value, from peer reviewed research designed to facilitate the consideration of ecosystem services in land management. Cost of forgone conservation value are applied to the net-change in suitable old-growth acres across the alternatives. While only a portion of suitable acres will be harvested, this analysis includes an upper estimate of value associated with all suitable old-growth acres and a lower estimate assuming all suitable old-growth acres would be harvested over 100 years. This range of estimates accounts for uncertainty in application of value associated with conservation demand.

Comments on road costs. Commenters sought cost data for road building and maintenance (per mile) in the areas considered for exemption from the rule.

The RIA for the final rule includes new information on road costs. Road construction and decommissioning costs are not considered since it is unlikely that they would be paid by the agency given the influence of the limited export policy. In 2007, the Forest Service approved a limited export policy and this boost to appraised values has made the construction of roads by the agency in advance of timber sales rare. Road maintenance costs are considered quantitatively in the cost-benefit analysis of the final rule and regulatory alternatives.

Comments on agency costs. Commenters were concerned that the reduction in expenses from exempting the Tongass from the 2001 Roadless Rule were not quantified. In addition, commenters disagreed with the assertion that the rule would not increase agency costs because it would not increase timber harvest levels and sought a more comprehensive estimate of anticipated agency costs and losses from below-cost timber sales. In addition, commenters asserted that analysis should include an overall assessment of the Tongass timber program costs including road costs. In addition, commenters noted the agency costs section should also include the estimated cost for conducting this rulemaking.

Detail on agency costs from road maintenance have been added to the RIA for the final rule in the RIA section called "Agency Costs including Control of Regulatory Costs". This final rule and the regulatory alternatives are programmatic, meaning that they establish direction for broad land areas, rather than schedule specific activities in specific locations. None of the alternatives authorize any site-specific projects or other ground-disturbing activities and, therefore, it is not possible to estimate future activities and subsequent marginal changes in environmental activities. However potential incremental reductions in compliance costs are noted in the RIA for the final rule. The cost of rulemaking is the cost of managing NFS lands as a part of normal

agency operation and exists as part of the baseline 2001 roadless rule so there are not incremental costs.

Comments on recreation and tourism. Some commenters suggested that the recreation-related assessment provided in the RIA understated potential impacts to the visitor industry because it considers only changes in suitable timber acres and does not address indirect effects to adjacent areas, whereas, timber harvest and road construction have the potential to affect much larger areas than the area that is logged. In addition, commenters expressed concern that the Forest Service did not analyze the corresponding effects on rural communities from the displacement of outfitters, guides, and tour operators.

The analysis of recreation in the RIA for the final rule is not a site-specific review, rather it uses available information to illustrate broad patterns of use and differentiate between the regulatory alternatives. It assumes all visitation, and half of visitation, is displaced under the highest level of timber suitability designation, under the final rule, to provide an upper and lower estimate of displacement; for a broad orders-of-magnitude comparison with other costs and benefits. Assuming all visitation is displaced considers not just visitation occurring physically on lands suitable for timber production is displaced but also visitation outside suitable areas is also displaced. The revised analysis also includes assessing the economic importance of nature-based tourism in southeast Alaska, as measured by business revenue, from data collected by the University of Alaska Anchorage.

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