ALASKA WILDERNESS LEAGUE – CENTER FOR BIOLOGICAL DIVERSITY
DEFENDERS OF WILDLIFE – EARTHJUSTICE – GEOS INSTITUTE
NATURAL RESOURCES DEFENSE COUNCIL – SIERRA CLUB
SOUTHEAST ALASKA CONSERVATION COUNCIL

February 22, 2016

VIA EMAIL & EXPRESS MAIL

Earl Stewart
Forest Supervisor
Tongass National Forest
Attn: Forest Plan Amendment
648 Mission Street
Ketchikan, AK 99901
Email: comments-alaska-tongass@fs.fed.us

Dear Forest Supervisor Stewart,

The U.S. Forest Service is in the process of amending the Tongass Land Management Plan and has prepared a draft plan (the Draft Forest Plan) and has prepared an accompanying Draft Environmental Impact Statement (the DEIS). These comments are submitted on behalf of the undersigned organizations. These groups have long-standing interest in the social and ecological values of the Tongass National Forest and any developments that may affect those values. For the reasons described below, the Forest Service should not adopt the Draft Forest Plan as proposed and should instead should consider and adopt a transition that rapidly—within less than five years—ends industrial-scale old-growth logging.

The undersigned groups share Secretary of Agriculture Thomas Vilsack's vision of taking immediate steps to conserve the Tongass National Forest, promote sustainable development, strengthen the wildlife conservation strategy by maintaining future options, enlist its globally significant carbon-rich old-growth forests to advance America's climate preparedness, and help reduce the effects of climate change worldwide. The Tongass, an internationally significant and nationally valued natural treasure, must be managed to conserve biological diversity, support local communities, and protect the ecological integrity of the coastal temperate rainforest in Southeast Alaska. Additionally, the Tongass is the nation's carbon forest and as such should reflect the Administration's commitment to addressing global climate change.

Since the Forest Service revised the Tongass Plan in 1997, Southeast Alaska has witnessed an explosion in demand for Southeast Alaska's fish, wildlife, and outdoor recreation resources and grappled with effects from enduring changes in global timber markets. Today, the Tongass National Forest is both a world-class salmon forest and superlative tourist destination. While the customary and traditional use of deer, salmon, and other renewable Tongass forest resources

continue to support a way of life vital to the cultural and economic resiliency of local communities.

We agree with the Forest Service's decision to bring an end to industrial-scale old-growth logging. The Draft Forest Plan, however, compromises the Tongass's ability to support essential economic, environmental, and social interests because it does not provide a fixed and rapid end to industrial-scale old-growth logging on the Tongass. Indeed, the plan as proposed has no mechanism whatsoever to bring about an end to industrial-scale old-growth logging. Instead, the Draft Forest Plan proposes 16 years and likely many more of business as usual, concentrating the Tongass's entire logging program on a handful of islands to the detriment of social, cultural, and environmental considerations.

Rather than implement the goal of a rapid-transition out of industrial old-growth logging through a targeted, narrow amendment to the Tongass Forest Plan, the Forest Service has proposed wide-spread changes that are both controversial and extraneous, such as extensive modifications to the wildlife conservation strategy. Even more troubling, however, the agency proposes these changes without the benefit of a scientifically defensible and informed process.

The undersigned groups appreciate that, consistent with current agency policy and practice on the Tongass, the Draft Forest Plan appears to provide additional conservation measures for the Tongass's inventoried roadless areas. This will improve America's climate preparedness and assure the ecological, social, and economic sustainability of the Tongass by removing roadless areas from logging to protect remaining intact old-growth habitat and to maintain existing carbon stocks while also increasing stored carbon, considered nationally and globally significant. We also appreciate that the agency has proposed additional protections for areas of high value for salmon, wildlife, and other non-logging uses, where past logging, particularly on Prince of Wales Island, has diminished old-growth habitat to perilously low levels and stressed rare species. We support these protections. Focusing on the forest's world-class fisheries, tourism, and recreational values is a positive direction for forest management.

Because most damage to the Tongass's fish, wildlife, and other natural values has been associated with old-growth logging and related road-building, a rapid transition out of industrial-scale old-growth logging will greatly reduce future harm, particularly in a rapidly changing global and regional climate. The enormous amount of old-growth volume proposed for logging under the Draft Forest Plan during and after the transition has been completed will cause significant problems for ecosystems and vulnerable species. This added harm is unnecessary and inconsistent with transition goals. To avoid the continuing controversy surrounding industrial-scale old-growth logging, the Forest Service should adopt a forest plan that brings about real change on the Tongass and fulfills the Secretary's directive to "transition to a more ecologically, socially, and economically sustainable forest management."[1] Adopting a forest plan amendment that ends industrial-scale old-growth logging on the Tongass in less than five years accomplishes those important objectives.

[1] PR 769_01_000046 at PDF 1 (U.S. Department of Agriculture, Office of the Secretary, Secretary's Memorandum 1044-009 Addressing Sustainable Forestry in Southeast Alaska (July 2, 2013)) (Secretary Vilsack's Memo).

CONTENTS

PURPOSE AND NEED

I. THE DEIS MISCHARACTERIZES A KEY COMPONENT OF SECRETARY VILSACK'S MEMORANDUM AND IGNORES OTHER IMPORTANT CONSIDERATIONS.

The DEIS's statement of purpose and need section ignores critical aspects of the rationale underlying the proposed plan amendment. In July 2013, Secretary Vilsack directed the Tongass National Forest to "transition to a more ecologically, socially, and economically sustainable forest management . . . ."[2] Secretary Vilsack made it clear that "[t]he intent of the actions announced today is that second-growth timber sales will continue to increase, and within 10 to 15 years that the vast majority of timber sales on the forest will be from second-growth forests."[3] Thus, Secretary Vilsack sought a transition out of old-growth logging that was to be completed no later than 10 to 15 years after his 2013 announcement (i.e., July 2028).

In stark contrast, the Forest Service has proposed a Draft Forest Plan that has no enforceable end to old-growth logging. Indeed, the DEIS makes clear that the agency selected an alternative that increases rates of old-growth logging higher than the recent 10-year average for at least another 16 years, but even that "end" is nothing more than aspirational.

The DEIS purports to analyze the Secretary's intent "to transition [the Tongass] forest management program to be more ecologically, socially, and economically sustainable,"[4] but the DEIS focuses almost exclusively on the economic viability of the timber industry. The "Purpose" section of the DEIS, for example, never even mentions social or ecological factors.[5] Similarly, the "Need" section describes the importance of maintaining a "viable timber industry," but never explains how the agency proposes to address the "social" or "ecological" aspects of the transition.[6] The agency cannot ignore two of the three critical parts of the Secretary's direction;

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[2] Secretary Vilsack's Memo at PDF 1.

[3] U.S. Department of Agriculture, *Secretary Vilsack Announces Steps to Conserve 17-Million Acre Tongass National Forest by Transitioning to Sustainable, Second-growth Forest Management*, Press Release No. 0140.13 (July 3, 2013). All of the documents cited in these comments that are not included in the agency's planning records (including the records for the 1997 Tongass Land Management Plan (1997 Forest Plan) and the 2008 Amended Tongass Land Management Plan (2008 Amended Forest Plan) have been hand-delivered to the Forest Service and also sent via Express Mail with a copy of these comments. All of those sources as well as these comments should be included in the administrative record for the decision to amend the Tongass Land Management Plan.

[4] DEIS at 1-4.

[5] *Id*. at 1-4 to 1-5.

[6] *Id*. at 1-5.

the FEIS must expand the scope of the purpose and need statement to examine and account for these concerns.[7]

II. CHANGES TO THE FOREST PLAN'S DIRECTIVES FOR TRANSPORTATION DO NOT FULFILL THE PURPOSE AND NEED FOR THE AMENDMENT.

The Draft Forest Plan contains new direction for transportation whose purpose is "to facilitate the availability of National Forest System land for the development of existing and future transportation systems."[8] In the context of this amendment, however, it does not appear that the Forest Service has ever identified a need to facilitate transportation systems.[9] Neither the Purpose and Need section of the DEIS, nor the Purpose section of the Draft Forest Plan, nor the Notice of Intent to Prepare an EIS, nor Secretary Vilsack's Memo, describes such a need.[10]

The Purpose and Need section of the DEIS simply states that "[c]hanges to the Forest Plan are needed to make the development of renewable energy resources more permissible, including considering access and utility corridors to stimulate economic development in Southeast Alaska communities."[11] But the new Transportation Systems Corridor Direction in the Draft Forest Plan is not related to or limited to renewable energy projects.[12] Besides, the Renewable Energy Direction in the Draft Forest Plan accomplishes this more directly by opening all LUDs to renewable energy sites, which include associated access roads and transmission lines.[13]

Under the 2012 planning rule, forest plan amendments should be based on an identified need to change the plan.[14] Here, the Forest Service never identified, and still has not identified a need to change the forest plan's transportation direction.[15] As a result, neither the public nor the agency was adequately prepared to address this issue, much less the potentially sweeping transportation changes proposed in the Draft Forest Plan.[16] Their inclusion in the amendment is inappropriate.

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[7] *See* 36 C.F.R. § 219.8 (2012 Planning Rule requires plans to "provide for social, economic, and ecological sustainability").

[8] Draft Forest Plan at 5-13; *see also generally infra* pp. 111-18.

[9] *See* 36 C.F.R. § 219.13(b)(1) ("The responsible official shall . . . [b]ase an amendment on a preliminary identification of the need to change the plan.").

[10] *See generally* DEIS at 1-4 to 1-5; Draft Forest Plan at 1-1; 79 Fed. Reg. 30,074, 30,075 (May 27, 2014); Secretary Vilsack's Memo.

[11] DEIS at 1-5.

[12] *See* Draft Forest Plan at 5-13 to 5-15.

[13] *Id.* at 5-12 (making all Tongass land potentially suitable for renewable energy sites); *id.* at 7-55 (defining "renewable energy site" to include access roads and transmission lines).

[14] 36 C.F.R. § 219.13(b)(1).

[15] Draft Forest Plan at 5-13.

[16] *See infra* pp. 111-18.

RANGE OF ALTERNATIVES

Consistent with Secretary Vilsack's directive to transition out of industrial-scale old-growth logging no later than 10 to 15 years, several groups provided the agency an alternative proposing a five-year transition out of industrial-scale old-growth logging on the Tongass (the Conservation Alternative).[17] The DEIS explains that the agency refused even to consider the Conservation Alternative in its detailed consideration.[18] The agency's rationale for dismissing this alternative is arbitrary, inconsistent with the Secretary's directive, and not based on the best available information.

As an initial matter, the Forest Service must transition out of industrial-scale old-growth logging regardless of the availability of second-growth. For the ecological, social, and economical reasons outlined in this letter, the agency must bring an end to the controversy and destruction of old-growth logging. Clear-cutting Tongass old-growth is a sad reflection of bygone era. Today's economic drivers depend upon the forest's old-growth stands to support Southeast Alaska's fish, wildlife, and outdoor recreation industries. Clear-cutting these ancient trees also compromises America's climate preparedness, and reduces the country's ability to address the effects of climate change worldwide.

The DEIS explains the agency dismissed the Conservation Alternative because it failed to provide sufficient second-growth volume to facilitate a transition in five years. The comments submitted by Natural Resources Defense Council (NRDC) and Geos Institute (Geos) explain the agency's explanation is based on flawed reasoning given available information demonstrates a five-year transition meets and soon exceeds the agency's timber targets. Rather than repeat those arguments, the undersigned groups incorporate the comment letter and the supporting exhibits and materials.[19] The undersigned groups request that the agency fully analyze the Conservation Alternative, including the new information.

Additionally, all of the alternatives in the DEIS are essentially the same as to the transition out of old-growth—all action alternatives seek to provide similar volumes under similar 10-15 years timeframes. The agency artificially constrained its development of the alternatives in such a way that compromises the agency's overall analysis.[20]

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[17] *See* PR 769_02_000013 (Southeast Alaska Conservation Council *et al.*, Letter to F. Cole Re: Request for Addition of a Conservation Alternative into Tongass Transition Framework (Feb. 5, 2015)); PR 769_04_000014 (F. Cole email to R. Abt and S. Howle Re: FW: follow up on conservation alternative for transition DEIS (Mar. 6, 2015) (Attachment "FC Ltr re Additional Info on Transition Alt final.pdf"))).

[18] DEIS at 2-7 to 2-8 (Alternative 7 in the DEIS).

[19] *See* Natural Resources Defense Council and Geos Institute Letter to Earl Stewart, Tongass Forest Supervisor at Sec. I (Feb. 22, 2016).

[20] *See* Council for Environmental Quality, Effective Use of Programmatic NEPA Reviews at PDF 21-22 (Dec. 2014); *Ctr. for Biological Diversity v. Nat'l Highway Transportation Safety Administration*, 538 F.3d 1172, 1218 (9th Cir. 2008).

ROADLESS AREAS

It appears that the Draft Forest Plan is intended to keep Inventoried Roadless Areas off limits to logging in its own right, regardless of the fate of the Roadless Area Conservation Rule in two pending court actions or in any future amendments to or litigation over that rule.[21] Commenters appreciate this important amendment and strongly urge the Forest Service to adopt a final plan amendment that protects roadless areas from logging.

The Forest Service should clarify this intent in Appendix A of the Proposed Forest Plan, the suitable lands analysis. That analysis identifies Inventoried Roadless Areas as not suitable for timber production on legal grounds in "Step 1," since logging on those lands is prohibited by the Roadless Rule.[22] This is correct, but it should be made clear that even if the Roadless Rule were struck down by a court, or amended by USDA, the intent of this forest plan amendment is to preclude logging in roadless areas, as stated in the DEIS. Therefore, the "Step 2" analysis should specify that Inventoried Roadless Areas would be deemed not suited for timber production even if they lost their protection under Step 1.

SUITABLE LANDS

As discussed above, the suitable lands analysis in Appendix A of the Proposed Forest Plan should clarify that Inventoried Roadless Areas are not suited for timber production at either Step 1 or Step 2, without regard to the fate of the Roadless Area Conservation Rule.

The structure of the Proposed Forest Plan also creates confusion regarding the status of lands in Development LUDs that are not suited for timber production, and the final plan should clarify the intent. Appendix A states that Phase 2 and 3 lands from the 2008 Amended Forest Plan, as well as lands identified by Trout Unlimited and The Nature Conservancy, are deemed not suited for timber production, even though they are in Development LUDs.[23] Confusingly, however, the plan leaves in place prescriptions for Development LUDs in Chapter 3 that "[f]orest lands are suitable for timber production…."[24] The Proposed Forest Plan does make clear that Chapter 5 Plan Components (which include the changes to the suitable land base)[25] take priority over the

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[21] *See, e.g.*, DEIS at 3-238 ("Alternative 3 would permit old-growth and young-growth harvest in 2001 Roadless Areas, but only if the Roadless Rule changed or the Tongass Roadless Rule Exemption were reinstated. No harvest in Roadless Areas would occur under Alternatives 1, 4, and 5"); *id.* at 3-409 ("Only Alternatives 2 and 3 would allow harvest within IRAs and a change to existing regulations would be required for this to happen."); *id.* at 2-34, Table 2-14, Key Components of Alternative 5 ("No harvest is allowed in Inventoried Roadless Areas").

[22] Draft Forest Plan, App. A at A-2.

[23] Draft Forest Plan, App. A at A-4.

[24] Draft Forest Plan at 3-114 (TIM4), 3-121 (TIM4).

[25] Draft Forest Plan at 5-4 (noting that Appendix A has been updated to comply with the 2012 Planning Rule).

Chapter 3 prescriptions.[26] Therefore, it appears to be the intent of the plan that no logging would be allowed on unsuitable lands, despite the inconsistent prescriptions in Chapter 3. The plan should make this clear, either by taking the unsuitable lands out of Development LUDs, or by changing the Chapter 3 TIM4 prescriptions to make clear that not all forest lands within those LUDs are suitable for timber production.

MARKET DEMAND

The entire Draft Forest Plan and all of the alternatives (including no action) in the DEIS are based on a flawed estimate that market demand for timber will average 46 mmbf per year for the next fifteen years, regardless of the allocation between old-growth and second-growth. The Forest Service should revise this estimate downward to more accurately reflect realistic market conditions and trends, and recognize in the alternatives the likely variation from these projections. As it stands, the inflated market demand levels distort the entire DEIS, because the Forest Service has used it in restricting the range of alternatives to those that have a single unvarying timber output and in misrepresenting the ostensible jobs and economic benefits from logging. This violates NEPA, misapplies the market demand provision of the Tongass Timber Reform Act, and skews the multiple use balancing choices under the National Forest Management Act and the Multiple-Use Sustained-Yield Act.

The market demand projections are based on a draft report from the Pacific Northwest Research Station (PNW), *Tongass National Forest Timber Demand, Projections for 2015 to 2030* (Daniels *et al*.).[27] As explained in the attached comments by Natural Resource Economics, Inc.,[28] Daniels *et al*. overestimates the likely actual market demand for timber. The undersigned parties hereby attach the Natural Resource Economics analysis in its entirety as their own comments.

Daniels *et al*. perpetuates the use of a methodology that has consistently and repeatedly overestimated market demand projections in the past.[29] It does not account for the powerful economic forces that have caused logging levels to decline continuously from a peak of nearly 600 mmbf in 1973 to less than one-tenth that level today.[30] Although the most defensible assumption would be for those forces to continue, Daniels *et al*. assumes instead that they will cease and reverse.[31] Like past failed market demand projections, all of the scenarios in Daniels *et al*. show rising demand over time, contrary to the four-decade trend.[32] The Daniels *et al*.

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[26] Draft Forest Plan at 1-4.

[27] J.M. Daniels *et al.*, *Tongass National Forest Timber Demand, Projections for 2015 to 2030* (manuscript in preparation, Dec. 2, 2015). (NOTE: This document is listed on the project record index without a record number, but instead with the web link.)

[28] E. Niemi, *Socioeconomic Comments: Timber Demand* (Feb. 2015) (Niemi, *Timber Demand*).

[29] *Id.* at PDF 7-8.

[30] *Id.* at PDF 8-9.

[31] *Id.* at PDF 9.

[32] *See* DEIS App. G at G-6, Table G-1.

analysis is based on a set of implausible and unsupported assumptions that the Tongass will retain the same share it currently has of rising global demand.[33] The Forest Service should recognize that this approach has failed to accurately predict demand in the past, and should at least consider of the more realistic scenario that the long-standing historic trend will continue, with demand continuing to decline.

The DEIS should also consider the plausible scenario that future logging levels will fall below the Daniels projections and display the economic effects of the alternatives accordingly.[34]

Because of the high degree of uncertainty in projecting market demand, the forest plan should not include an objective tied to any specific annual offer level. The 2008 Forest Plan includes an objective to "[s]eek to provide an economic timber supply sufficient to meet the annual market demand," without fixing it to any projected level.[35] This allows flexibility to adjust the annual market demand projections according to actual market conditions. The Draft Forest Plan would add an objective to "offer an average of 46 MMBF annually," regardless of actual demand.[36] This is too inflexible and will likely lead the Forest Service to waste resources offering excessive, unwanted sales. This objective is unnecessary and should be deleted. Objective O-TIM-02 continues the objective to seek to meet market demand and is more flexible.

The project record also discloses that the DEIS notably inflates the volume of old-growth—5 mmbf per year—needed to sustain small timber operators.[37] In email correspondence, the Regional Economist and Dr. Daniels agreed that the volume used by small operators "is probably somewhere between 1.4 MMBF and 3.0 MMBF. 5.0 MMBF at the VERY HIGH end with VERY AGGRESSIVE marketing of products elsewhere."[38] Despite this "very aggressive" estimate, the Forest Supervisor directed, "Use 5 for the draft. . . ."[39] The result is a level of old-growth logging, in perpetuity, higher than needed to meet the established goal of serving small operators.

The exaggerated market demand forecasts—adopted across the board for old-growth, second-growth, and small operators—also violate the economic sustainability requirement of the 2012 forest planning regulations. Chapter 5 of the Draft Forest Plan explicitly adopts, for the first

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[33] Niemi, *Timber Demand* at PDF 12-16.

[34] *See id.* at PDF 16-18.

[35] 2008 Forest Plan at 2-7.

[36] Draft Forest Plan at 5-16 (O-TIM-01).

[37] *See* DEIS at 2-9 ("Old-growth volume would continue to decrease until it reaches about 5 MMBF per year and it would remain at that level, to support limited small timber operators.").

[38] PR 769_05_000794 at 1 (N. Grewe email to M. Lisowski Re: Question from Forrest (Apr. 2, 2015)) (emphasis in original).

[39] PR 769_05_000794 at 1 (F. Cole email to R. Abt Re: Fw: Fwd: Question from Forrest (Apr. 3, 2015)).

time, a Projected Timber Sale Quantity (PTSQ) of 46 mmbf.[40] Therefore, this new provision must comply with the 2012 planning rules, which require that the plan must provide for economic sustainability.[41] There are multiple reasons to believe that the PTSQ is not economically sustainable: it is based on unreasonable assumptions of a cessation and reversal of historic trends depressing the demand for timber from the Tongass; it disregards the fact that past and present logging has consistently targeted the most valuable and accessible stands of timber in the Tongass, leaving a remaining pool of old-growth timber that is less valuable and more expensive to cut; and it unrealistically assumes that Congress will continue to fund a timber sale program that results in enormous losses to taxpayers, far in excess of any reasonable measure of the benefits of the program. The DEIS contains no analysis of whether the new PTSQ, and the associated plan objective to meet it, complies with the economic sustainability requirement of the 2012 planning rules. This is an important omission that must be corrected.

Over-estimating market demand forecasts also has a negative influence on the timber sale program in its yearly implementation. Each year, the Forest Service uses the Morse methodology to calculate the volume of timber needed to offer for sale to maintain adequate inventory for purchasers.[42] This methodology uses the PNW forecasts—which, in the future, will be Daniels (2015)—as the "projected harvest."[43] If the PNW forecasts overstate market demand, the Morse methodology will, each year, tell the Forest Service to prepare more timber than actually needed to satisfy the market. The result is wasteful preparation of excessive timber that frequently is not of interest to industry and fails to appraise positively. This flaw has existed for years without correction. The Forest Service must take steps either to monitor demand on an annual basis and bring its timber offerings into line with actual market conditions or to find a different, more realistic input for the "projected harvest" in the Morse methodology.

Similarly, the Draft Forest Plan sets a goal of maintaining a three-year supply of timber under contract based on "annual timber consumption (i.e., the amount that is expected to be logged in a given year)."[44] If the expected logging is based on the PNW forecasts, it will likely be too high. This over-estimate then gets tripled in the attempt to maintain a three-year supply, again causing the Forest Service to waste public resources on excessive, uneconomic timber sale preparation.

Under the 2008 Amended Forest Plan, the Forest Service has calculated the multi-year timber supply goal in different, inconsistent ways, which should be corrected in the plan amendment. The DEIS clearly states that the goal should be three years of "the amount that is expected to be harvested in a given year."[45] Similarly, the Big Thorne Final Environmental Impact Statement

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[40] Draft Forest Plan at 5-16.

[41] 36 C.F.R. § 219.8, 219.8(b); *see also id.* § 219.19 (defining "sustainability").

[42] *See* DEIS App. G at G-1 to G-2, G-6; 2008 TLMP AR 603_0393 (K.S. Morse, *Evaluating the Demand for Tongass Timber* (1998)) (Morse).

[43] *See* DEIS App. G at G-1 to G-2, G-6; *see also* Morse at PDF 28-29.

[44] DEIS App. G at G-7.

[45] *Id.*

(Big Thorne FEIS) stated that the goal was "three times the amount of annual projected harvest."[46] When calculating the goal, though, the Big Thorne DEIS tripled not the expected harvest, as stated in the plan and the text of the EIS, but the result of the Morse methodology, a timber *offering* goal that greatly exceeds the expected harvest.[47] The result is a greatly inflated number for the goal of volume under contract, creating even further pressure to prepare wasteful, unwanted sales. In the amended forest plan, please provide direction ensuring that agency staff use the expected harvest level when calculating the three-year volume-under-contract goal.

Finally, the plan amendment should correct a change that was made without explanation between the 2008 Amended Forest Plan and the Draft Forest Plan, raising the volume-under-contract goal. In the current forest plan, the goal is "Provide 2 to 3 years supply of volume under contract…."[48] This goal was supported by an analysis in Morse showing this was a typical range.[49] The Draft Forest Plan, however, raises that goal to "Provide about 3 years of supply of volume under contract…."[50] Raising the goal from 2-1/2 years to 3 years is a 20% increase, and it is made with no explanation and no analysis. When so much unwanted timber is already being prepared, an increase in timber sale goals is unwarranted. The amended forest plan should revert to the objective in the current plan or, at a minimum, provide a thorough explanation for a significant increase in the goal.

EXPORT POLICY

Since 2007, the Regional Forester has annually re-adopted a Limited Export Policy, allowing 50% of spruce and hemlock sawlog volume to be shipped out of Southeast Alaska as round logs with no local processing.[51] The DEIS effectively ratifies this yearly decision as the de facto permanent policy of the Region by making explicit assumptions that the policy will continue indefinitely.[52] The policy has the effect of increasing the volume of timber sold on the Tongass, thereby increasing environmental impacts, while decreasing the number of jobs created per unit of timber cut. As discussed further below, this is a policy with significant environmental impacts that reflects trade-offs between environmental and economic costs and benefits. It has never been subject to NEPA review. Because the proposed plan effectively makes this a de facto permanent policy, the DEIS must consider the environmental effects of the policy and alternatives to it. The failure to do so violates NEPA. We urge the Forest Service to discontinue the Limited Export Policy.

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[46] Big Thorne FEIS Vol. II, App. A at A-13.

[47] *Id.* at A-14, Table A-2.

[48] 2008 Amended Forest Plan at 2-7.

[49] Morse at PDF 24-26.

[50] Draft Forest Plan at 2-5.

[51] DEIS at 3-453 to 3-454.

[52] DEIS at 3-481; Daniels at 10 (noting that the Limited Export Policy was a major development and incorporating it into future demand projections).

I. BACKGROUND.

Due to the combined effects of legal restrictions and unfavorable market conditions, in the mid-2000s, the Forest Service was increasingly concerned that timber sales in the Tongass National Forest were proving less viable than desired.

Applicable law restricted the export of unprocessed timber cut on the Tongass, and simultaneously limited the advertisement of timber sales to those that would appraise positively. Under Federal statute, timber cut from National Forest land "may be exported from the State or Territory where grown if, in the judgment of the Secretary of the department administering the national forests, or the public lands in Alaska, the supply of timber for local use will not be endangered thereby."[53] The statute authorizes agencies to promulgate regulations to this effect.[54] Under Forest Service regulations, "[u]nprocessed timber from National Forest System lands in Alaska may not be exported from the United States or shipped to other States without prior approval of the Regional Forester."[55] The rationale for this regulation is that a restriction on extra-Alaskan export is necessary to provide a volume of timber to sustain "adequate wood processing capacity in Alaska" such that timber from the National Forests in Alaska can be sustained.[56] In 2003, Congress passed a Consolidated Appropriations Resolution providing in relevant part that "[n]o timber sale in Region 10 shall be advertised if the indicated rate is deficit when appraised using a residual value approach."[57] This provision has remained in Congress's subsequent appropriations legislation.[58]

Meanwhile, timber processed in Alaska was proving less competitive in the market. Due to higher transportation costs, and as well as higher processing costs where the export prohibition was applicable, Alaskan processed wood products suffered on the market. As a result, with downstream difficulty in marketing timber, few timber sales in the Tongass could receive a positive appraisal. Given this market situation and the applicable laws, few Tongass timber sales were advertised.

In March 2007, in response to the falling number of Tongass timber sales, Regional Forester Dennis Bschor partially authorized the export of unprocessed Tongass logs by means of what was termed the Limited Export Policy. Specifically, the Regional Forester authorized export of 50 per cent of Sitka spruce and western hemlock sawlogs under 15-inches in diameter at the

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[53] 16 U.S.C. § 616.

[54] *Id.*

[55] 36 C.F.R. § 223.201.

[56] *Id.*

[57] Pub. L. No. 108-7, § 318, 117 Stat. 11, 273 (2003).

[58] *See* DEIS at 3-481; Big Thorne FEIS at 3-32.

small end of a 40-foot log and grade 3 or 4 logs of any diameter.[59] In so authorizing, the Regional Forester incorporated the findings of Randy Coleman, Group Leader of Policy Analysis and Economics, and Dan Castillo, Director of Forest Management, that "Forest Service appraisals of proposed Tongass timber sales would rise if they assumed that a portion of the unprocessed spruce and hemlock logs were shipped to lower 48 markets."[60] Coleman and Castillo's findings concluded that export of 50 per cent of Sitka spruce and western hemlock logs should be approved because it optimally served four objectives: (1) ensuring the continuation of economic timber sales in the Tongass; (2) ensuring the continuation of wood-processing capacity in Alaska; (3) minimizing the shipment of unprocessed logs from Alaska; and (4) maximizing the Tongass timber industry's effects on U.S. employment.[61]

The Limited Export Policy is reviewed annually by the Regional Forester and has evolved over time. In each year since 2007, citing conditions in the domestic timber market, as well as the transitional status of Alaskan timber processors, the Regional Forester has reviewed and approved a continuation of the Limited Export Policy.[62] The 2007 decision to adopt the Limited Export Policy only authorized domestic interstate shipments.[63] In 2008, Regional Forester Bschor approved an expansion of the Limited Export Policy allowing for international export of unprocessed logs.[64] In 2012, the Regional Forester began reviewing case-by-case requests for exports even higher than routinely allowed by the policy.[65] The Regional Forester has reviewed and approved the Limited Export Policy with the international export component in each year

[59] 2008 TLMP AR 603_1064 (D.E. Bschor, Memorandum to Forest Supervisor Re: Limited Interstate Shipments of Unprocessed Sitka Spruce and Western Hemlock Timber (Mar. 14, 2007) (Bschor 2007).

[60] 2008 TLMP AR 603_1777 (R. Coleman & D. Castillo, *Tongass Timber Appraisal Issues* (Feb. 1, 2007)) (Coleman & Castillo).

[61] *Id.* at 3.

[62] *See* D. Bschor, Memorandum to Forest Supervisor Re: Time Limited Shipment of Unprocessed Hemlock and Sitka Spruce (Aug. 8, 2008) (Bschor 2008); D. Bschor, Memorandum to Forest Supervisor Re: Extension of Limited Shipment of Unprocessed Hemlock and Sitka Spruce (Nov. 10, 2009) (Bschor 2009); B. Pendleton, Memorandum to Forest Supervisor Re: Update to R10 Limited Export Policy for hemlock and Spruce (Jan. 7, 2011); B. Pendleton, Memorandum to Forest Supervisor Re: Annual Review and Update to R10 Limited Export Policy (Jan. 11, 2012); B. Pendleton, Memorandum to Forest Supervisor Re: Annual Review and Update to R10 Limited Export Policy (Feb. 20, 2013) (Pendleton 2013); B. Pendleton, Memorandum to Forest Supervisor Re: Annual Review and Update to R10 Limited Export Policy (Feb. 28, 2014); PR 769_05_000351 (B. Pendleton, Memorandum to Forest Supervisor Re: Annual Review and Update to R10 Limited Export Policy (Apr. 21, 2015)) (Pendleton 2015).

[63] Bschor 2007.

[64] *See* Bschor 2008 (authorizing export to foreign markets with a premium of $25/MMBF for hemlock and $65 per MMBF for Sitka spruce).

[65] *See* Pendleton 2015.

since 2008, stating that "challenges continue,"[66] and citing "market conditions" including declining "softwood lumber indices,"[67] declining or "fluctuat[ing]" wood products prices,[68] and then, as "improvements . . . occurred nationally," that "recovery is slow and costly for Alaska markets."[69]

II. THE DEIS FAILS TO ADDRESS ALTERNATIVES IN WHICH THE LIMITED EXPORT POLICY IS NOT CONTINUED INDEFINITELY.

The DEIS fails to consider alternatives in which the Limited Export Policy is not continued unchanged and indefinitely.[70] Variations on the Limited Export Policy are not even included among the "alternatives eliminated from detailed review."[71] No explanation is given as to why these variations were not considered. The omission is improper given that participants in the scoping process specifically requested the Forest Service to discontinue the Limited Export Policy.[72]

Though the Limited Export Policy requires annual approval, the DEIS assumes that it will continue indefinitely, premising its analysis on the "assum[ption]" that "Western hemlock and Sitka spruce volumes . . . [will] be divided equally between domestic production and export in accordance with the current limited export shipment policy."[73]

By excluding variations on the Limited Export Policy, the DEIS excludes reasonable alternatives that fall within the range dictated by the plan amendment's "purpose and need," in violation of

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[66] Pendleton 2013.

[67] Bschor 2009.

[68] U.S. Forest Service, Issue Paper, *Tongass Limited Shipping Policy* (Feb. 2010); U.S. Forest Service, Issue Paper, *Tongass Limited Shipping Policy* (Apr. 2011); U.S. Forest Service, Issue Paper, *Tongass Limited Shipping Policy* (Apr. 2012); U.S. Forest Service, Issue Paper, *Tongass Limited Shipping Policy* (Apr. 2013); U.S. Forest Service, Issue Paper, *Tongass Limited Shipping Policy* (Apr. 2014).

[69] Pendleton 2015; U.S. Forest Service, Issue Paper, *Tongass Limited Export Policy* (Apr. 2015).

[70] DEIS at 2-8 to 2-36.

[71] DEIS at 2-5 to 2-8.

[72] Southeast Alaska Conservation Council *et al.*, Letter to Forrest Cole, Forest Supervisor, Scoping Comments in Response to Notice of Intent to Prepare an Environmental Impact Statement to Support an Amendment to the 2008 Tongass National Forest Plan at 3 (June 26, 2014) ("The outcome of any 'transition' alternative should reward local, value added manufacturing and end existing export and transshipment policies on the Tongass. . . . These policies need to be scrapped because they provide a disincentive for local mills to retool for typically smaller, second-growth trees.").

[73] DEIS at 3-481; *see also id.* at 3-484; Daniels at 10 (incorporating export policy into demand projections)).

NEPA.[74] The DEIS describes the plan amendment having five purposes: to determine land suitability for timber production, to identify the projected timber sale quantity and sustained yield limits for these lands, to establish plan components for second-growth forest management and renewable energy development, to disclose and assess direct and cumulative environment impacts from the amended Plan, and to consolidate modifications made to the Plan since its approval.[75] The Limited Export Policy has a strong effect on the projected timber sale quantity, which is based on the assumption of a continued export policy, and therefore on the environmental impacts of the plan. The annual renewals of the policy have also made it, in practical effect, a modification of the Plan since 2008 being consolidated into the proposed amended plan. For these reasons, the DEIS cannot lawfully ignore alternatives that would eliminate or modify the Limited Export Policy.

Inclusion of alternatives in which the Limited Export Policy does not continue in perpetuity is necessary for the comparative analysis of environmental consequences among reasonable alternatives, required by NEPA.[76] A comparison of alternatives that do and do not continue the Limited Export Policy would highlight important tradeoffs that are currently obscured by the agency's analysis. Allowing more export increases the volume of timber sold, which has corresponding adverse environmental effects and high financial costs to the public of a timber sale program that results in a loss to the treasury. The additional volume adds relatively few jobs, since the exported volume requires no local processing. Reasonable alternatives, therefore, would address a range of possibilities. At one end, with no export, there would be less logging but more jobs per unit of timber logged and greater protection of wildlife, biological diversity, carbon stores and carbon sequestration, the public fisc, subsistence uses, and optimizes the recreation, tourism, and fishing sectors of the economy. At the other end is the current policy, which emphasizes timber production with relatively few jobs and relatively high adverse impacts and costs on all other values. Intermediate options could also be considered. The failure to consider these options in an EIS violates NEPA.

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[74] *City of Carmel-By-The-Sea v. U.S. Dep't of Transp.*, 123 F.3d 1142, 1155 (9th Cir. 1997) ("Project alternatives derive from an Environmental Impact Statement's 'Purpose and Need' section, which briefly defines the underlying purpose and need to which the agency is responding in proposing the alternatives . . . [and which] necessarily dictates the range of reasonable alternatives." (quotation marks omitted)); *Idaho Conservation League v. Mumma*, 956 F.2d 1508, 1519 (9th Cir. 1992) (holding that failure to examine a reasonable alternative renders an EIS inadequate).

[75] DEIS at 1-4 to 1-5.

[76] *Ctr. for Biological Diversity v. U.S. Dep't of Interior*, 623 F.3d 633, 645, 648 (9th Cir. 2010) ("It is black-letter law that NEPA requires a comparative analysis of the environmental consequences of the alternatives before the agency."); *Methow Valley Citizens Council. v. Reg'l Forester*, 833 F.2d 810, 815 (9th Cir. 1987) (holding that an agency must consider a range of alternatives that is "sufficient to permit a reasoned choice"), *rev'd on other grounds, Robertson v. Methow Valley Citizens Council*, 490 U.S. 332 (1989).

III. CONTINUATION OF THE LIMITED EXPORT POLICY UNDER THE PLAN REQUIRES NEPA ANALYSIS.

To date, the agency has not conducted an analysis of the environmental impacts of the Limited Export Policy. However, such an analysis is required under NEPA.

The Regional Forester's implementation of the Limited Export Policy is a major federal action, because it entailed the "[a]doption of formal plans . . . upon which future agency actions will be based."[77] By the agency's own description, the adoption of the Limited Export Policy and its continued application via annual reviews are a "major development."[78] The Forest Service expects the Limited Export Policy "to boost appraised timber values,"[79] and, by its own account, but for this change in policy, far fewer timber sales "would appraise as positive."[80] A major increase in the number of sales appraising as positive—leading ultimately to more logging—was the Policy's raison d'etre.[81] As the adoption of a formal policy on which agency action would occur, the Limited Export Policy was a major federal action.

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As a major federal action, the Regional Forester's implementation of the Limited Export Policy requires NEPA analysis.[82] With respect to those alternatives in the DEIS in which the Limited Export Policy continues, the agency must provide a "full and fair discussion of significant environmental impacts" of the Limited Export Policy, including but not limited to resultant increases in logging, the proportion of the resultant logging that will occur in old-growth stands, and the impacts on ecosystems that will follow from the resultant logging.[83] The DEIS should also include alternatives that do not involve continuation of the Limited Export Policy in order to

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[77] 40 C.F.R. §§ 1508.18(b)(1)-(2); *see also* Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations, 46 Fed. Reg. 18026, 18033 (Mar. 23, 1981) ("[T]he adoption of official policy in the form of rules, regulations and interpretations . . . establishing governmental or agency policy which will substantially alter agency programs [entail major federal actions].").

[78] Daniels at 12.

[79] DEIS at 3-453.

[80] Big Thorne FEIS at 3-32.

[81] *See* Coleman & Castillo at 2-3 ("[L]imited interstate shipments would significantly increase the likelihood that timber sales in parts of the Tongass would have a positive appraisal under current market conditions. . . . [A]llowing some [international] exports of spruce and hemlock logs would have an even more powerful positive effect on appraisals").

[82] 42 U.S.C. § 4332(2)(C) (stating that when a federal agency undertakes "major Federal actions significantly affecting the quality of the human environment," it is required to provide a "detailed statement" analyzing the "environmental impact of the proposed action" and "alternatives to the proposed action").

[83] *See Conservation Cong. v. Finley*, 774 F.3d 611, 616 (9th Cir. 2014).

properly conduct the requisite NEPA analysis. Under NEPA, the agency is required to develop alternatives that would "inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment."[84]

SOCIOECONOMIC COSTS OF LOGGING

While the DEIS acknowledges that the Tongass timber sale program causes significant adverse effects to the environment, it makes no attempt to evaluate the economic costs of those adverse effects. By presenting only the ostensible benefits of logging in the form of jobs, economic activity, and revenue, while ignoring the economic costs, the DEIS presents a seriously skewed and misleading picture in violation of NEPA. These issues are explained in greater detail in the attached comments by Natural Resource Economics, Inc.[85] The undersigned parties hereby attach the Natural Resource Economics analysis in its entirety as our own comments.

The DEIS acknowledges that the Tongass timber sale program envisioned in the forest plan amendment will have significant adverse effects on subsistence uses, sport hunting, sport fishing, and wildlife viewing. There is extensive literature available, but disregarded by the DEIS, that discloses the economic value of these uses and sectors of the economy. For example, detailed information is readily available on the dollars spent for hunting and wildlife viewing trips.[86] The number of jobs from, and the economic value associated with, these activities dwarf those from the timber sale program and thereby reveals a substantial misallocation of resources by the Forest Service.

Perhaps even more significantly, contrary to federal policy, the DEIS makes no attempt even to address the social costs of the carbon dioxide released into the atmosphere as a result of logging. As discussed in Niemi, *Logging Costs* (2015), federal agencies including USDA and the Forest Service have, in other settings, calculated the social costs of carbon from federal land

[84] 40 C.F.R. § 1502.1 (binding NEPA regulations provide that an EIS must "inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment"); *Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 965 (9th Cir. 2005).

[85] E. Niemi, *Socioeconomic Comments: Logging Costs* (Feb. 2015) (Niemi, *Logging Costs*).

[86] *See id.* at PDF 5-8; ECONorthwest, *The economic importance of Alaska's wildlife in 2011: Final report to the Alaska Department of Fish and Game, Division of Wildlife Conservation* (2014).

management actions.[87] A relatively simple estimate based on information in the DEIS and the record suggests that the climate-related costs from the proposed plan would be at least 2-8 times the value of the timber produced, and probably much greater.[88]

In short, the economic costs of the timber sale program vastly exceed its benefits. The failure of the DEIS to address this comparison in a candid way is a serious shortcoming, creating a highly misleading picture and violating NEPA.

PUBLIC COSTS

For Alternative 5 and most other alternatives, the DEIS displays high net revenues to the U.S. Treasury over most time horizons, including the short term.[89] This claim strongly contradicts recent experience of large taxpayer losses from the timber sale program. It is based on a substantial error, now admitted by the Forest Service, and requires significant revision and added explanation. The DEIS misleads readers in violation of NEPA.

In the five fiscal years from 2009 to 2013, the Forest Service spent an average of $22.3 million per year on the Tongass timber sale program and received an average of $1.7 million in revenues. The resulting annual loss to taxpayers was about $20.5 million.[90] Unfortunately, the DEIS contains no information on actual revenues or expenditures on the timber sale program. This is a significant omission that must be corrected.

The DEIS shows that over the same period of time, "Total Tongass-Related Employment" in the timber industry averaged 102 jobs.[91] Thus, each timber industry job created by the Tongass timber sale program cost taxpayers a little over $200,000. That is extremely poor value for the money. It is an issue that should be disclosed thoroughly and candidly in the DEIS, but it is nowhere to be found.

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[87] Niemi, *Logging Costs* at PDF 10-14; *see* Interagency Working Group on the Social Cost of Carbon, *Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis – Under Executive Order 12866* (July 2015 (Revised)) https://www.whitehouse.gov/sites/default/files/omb/inforeg/scc-tsd-final-july-2015.pdf; U.S. Environmental Protection Agency, *EPA Fact Sheet: Social Cost of Carbon* (2015), http://www.epa.gov/climatechange/Downloads/EPAactivities/social-cost-carbon.pdf; U.S. Department of the Interior, Bureau of Land Management, *Draft resource management plan/environmental impact statement: Western Oregon* (2015); U.S. Forest Service, *Rulemaking for Colorado Roadless Areas: Supplemental Draft Environmental Impact Statement* (2015), http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd485194.pdf.

[88] Niemi, *Logging Costs* at PDF 11-12.

[89] DEIS at 3-481 to 3-483.

[90] PR 769_05_000671 at PDF 24 (Headwaters Economics, *The Tongass National Forest and the Transition Framework: A New Path Forward?* (Nov. 2014)) (Headwaters Report); *see also* Taxpayers for Common Sense, *Money-Losing Timber Sales: Tongass National Forest* (March 2015).

[91] *See* DEIS at 3-449, Table 3.22-4.

The DEIS, instead, reports projected "net revenues," both discounted and undiscounted, generated by the Woodstock model.[92] To pick the most immediate and relevant example, these charts show that, in the first five years of plan implementation, the Forest Service projects undiscounted net revenues of about $65 million on old-growth timber—or about $13 million per year—for Alternative 5, the preferred alternative. It shows slightly higher revenues for the no action alternative, which would be a continuation of the status quo.[93] These projections, the DEIS says, are "net of Forest Service costs that would be incurred for National Environmental Policy Act (NEPA) preparation, sale preparation and administration, and engineering support."[94]

Agency staff have now informed the undersigned parties that this statement in the DEIS is false. In reality, "the modeling did not include agency costs…."[95] Rather, the numbers presented as "net revenues" in the tables and figures on pages 3-481 to 3-483 actually represent the value to the *purchaser* (selling value minus costs for logging, transportation, manufacturing, profit, and risk).[96] They disclose nothing about value to the U.S. Treasury. In short, they are not "net," they are not "revenues," and they do not account for public costs at all.

The result of this error is a severely misleading DEIS. As a result of the error in the presentation, the DEIS claims that that the public can expect revenues, net of agency costs, in the range of hundreds of millions of dollars—a benefit to taxpayers if true. In reality, nothing could be farther from the truth. The Forest Service loses about $20 million per year on the timber sale program, and the DEIS offers no reason to believe that would improve under the Draft Forest Plan.

In the final EIS, it will not be sufficient merely to excise the references to agency costs. To correct the severely misleading information in the DEIS, it will be necessary for the final EIS to disclose, fully and frankly, actual past and expected future costs, revenues, and losses associated with the timber sale program.

Moreover, when the so-called "net revenues" are properly understood as value to purchasers, they must either be in error or reveal that Tongass timber sale purchasers are obtaining enormous, unjustified windfalls. The DEIS and the Howle email state that those numbers take into account all of the purchasers' costs plus "normal profit and risk."[97] If this is correct, those numbers reflect the prices the purchasers should be paying for Tongass timber. If they pay less,

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[92] DEIS at 3-481 to 3-483.

[93] DEIS at 3-482, Figure 3.22-17.

[94] DEIS at 3-481; *see also* DEIS App. B at B-19 (explaining that agency costs were used in calculating the net value).

[95] Howle, S., U.S. Forest Service, Email exchange with T. Waldo, Earthjustice, Re: TLMP record (Feb. 17-18, 2016).

[96] *See id.* (quoting DEIS at 3-481).

[97] *Id.*

they are obtaining a windfall above "normal profit and risk;" if they pay more, they are incurring a loss or an inadequate return on investment.

Forest Service records show the former: timber sale purchasers are paying far less than the value of the timber reported in the DEIS. As discussed above, the values described inappropriately as "net revenues," which actually represent value to purchasers, are projected to be, on average, $13 million per year for old-growth in the first five years under Alternative 5 (undiscounted). That alternative projects an annual cut of 37 mmbf old-growth during this five-year period.[98] Values are based on recent "Forest Service Region 10 appraisal rates."[99] Thus, the Forest Service should expect a price of about $351 per mbf old-growth.[100] This is vastly in excess of recent actual revenues, which have run, on average, about $57 per mbf:[101]

Fiscal Year	Value of Sold Timber ($)	Sold Timber (MBF)	$/MBF
2011	1,626,578.87	44,189.73	36.81
2012	1,506,779.60	52,482.61	28.71
2013	266,002.02	15,866.01	16.77
2014	8,151,761.96	105,523.27	77.25
2015	2,072,083.16	22,624.98	91.58
Total	**13,623,205.61**	**240,686.60**	
5-Year Average			**56.60**

This implies either that the numbers are wrong or that Tongass timber sale purchasers have been reaping a windfall worth nearly $300 per mbf. If the numbers are wrong, the Forest Service must correct them. If they are right, and purchasers are obtaining great windfalls, the Forest Service should be charging a great deal more for the timber it sells. In that case, the Limited Export Policy should be discontinued immediately, because there is ample value to require more local processing. In either case, though, the Forest Service needs to better explain its projections. The final EIS must fully and transparently disclose past and projected future revenues, logger costs, agency costs, prices, profit, and risk.

The public is entitled to this information. The fact that the Forest Service no longer preforms the Economic Efficiency analysis required by the 1982 planning rules is irrelevant. The cost to the

[98] DEIS at 2-32.

[99] DEIS at 3-481.

[100] $13 million / 37,000 mbf = $351 per mbf.

[101] *See* U.S. Forest Service, Cut and Sold Reports, FY 2011-2015. The volume numbers reported by the Forest Service do not distinguish between old-growth and second-growth. Since the timber sale program until now has consisted almost exclusively of old-growth, the undersigned parties assume for purpose of these calculations that all of the reported logging volume has been old-growth, recognizing that some small fraction may have been second-growth.

public of the timber sale program is a critical piece of information, and programmatic decisions about the Tongass timber sale program cannot fairly be evaluated without it.

Neither the DEIS nor the record reveals what assumptions the Forest Service used for these values. The DEIS does not disclose or discuss them, displaying only the final model outcomes, and even those are misrepresented as discussed above. The record contains the spreadsheets used in the model runs, but they contain only rows of raw data that are not placed in sufficient context for members of the public to evaluate them. NEPA requires much more.

SUSTAINED YIELD LIMIT

The only hard limit the Draft Forest Plan imposes on logging levels is the "Sustained Yield Limit," which is fixed at 248 mmbf per year in all five alternatives.[102] However, this limit includes logging on lands not suited for timber production. This violates the National Forest Management Act, the Multiple-Use Sustained-Yield Act, and implementing regulations.

The NFMA provides, "The Secretary of Agriculture shall limit the sale of timber from each national forest to a quantity equal to or less than a quantity which *can be removed* from such forest annually in perpetuity on a sustained-yield basis…."[103] In turn, the 2012 planning regulations provide that forest plans must include components to ensure this requirement is met.[104] Those regulations further state, in no uncertain terms, "No timber harvest for the purposes of timber production may occur on lands not suited for timber production."[105] The Chief is required to adopt directives "for estimating the quantity of timber that *can be removed* annually in perpetuity on a sustained-yield basis, and exceptions, consistent with 16 U.S.C. 1611."[106] Thus, the statute and regulations plainly require that the plan must set a sustained yield limit on lands where timber "can be removed" on a sustained-yield basis, which is only those lands that are actually suitable for timber production.

The Draft Forest Plan, however, sets the Sustained Yield Limit based "on lands that *may be suitable* for timber production."[107] This follows the Directive adopted by the Chief, which directs the agency to calculate sustained yield based on "the amount of timber that could be produced on all lands that *may be suitable* for timber production, assuming all of these lands were managed to produce timber without considering other multiple uses or fiscal or

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[102] DEIS at 3-311 to 3-312. The Sustained Yield Limit is not actually mentioned in the Draft Forest Plan, but only in the DEIS. It was apparently intended to be part of the plan, though, and should be added to it as required by 36 C.F.R. § 219.11(d)(6).

[103] 16 U.S.C. § 1611(a) (emphasis added).

[104] 36 C.F.R. § 219.11(d)(6).

[105] *Id.* § 219.11(d)(1).

[106] *Id.* § 219.11(d)(6)(iii) (emphasis added).

[107] DEIS at 3-311 (emphasis in original).

organizational capability."[108] The Directive thus requires calculation of sustained yield assuming logging on lands not suitable for timber production and without regard to multiple use. That violates NFMA's requirement to limit harvest to the sustained yield of timber that "can be removed,"[109] as well as the Multiple-Use Sustained-Yield Act.

The error makes a big difference in the Draft Forest Plan. The proposed plan identifies 942,592 acres that "may be suited for timber production," but only 485,574 acres that are actually suitable.[110] To achieve the Sustained Yield Limit over time would require logging on over 450,000 acres deemed not suited for timber production in order to ensure multiple use as well as ecological and economic sustainability under the 2012 forest planning regulations. The amended forest plan should recalculate the Sustained Yield Limit based only on lands suitable for timber production.

CLIMATE CHANGE AND CARBON STORAGE

The Tongass is America's most important carbon forest. It is the largest single forest-carbon sink in the United States, storing hundreds of millions, if not over a billion, tons of carbon. Within the forest, old-growth stands account for most of the Tongass's net carbon contribution. As such, it should take a specially protected place within the Federal Government's efforts to address climate change. The United States recently joined governments from around the world in Paris for negotiations on a new agreement under the United Nations Framework Convention on Climate Change. The resulting agreement specifically highlighted the role of forest protection in the effort to mitigate climate change. The Paris Agreement is only one instance in which the Federal Government has committed to protect forests to this end. Given these commitments, it is unacceptable for the Service to countenance the continued large-scale destruction of its most carbon-valuable old-growth stands in America's most important carbon forest.

To meet the United States' carbon reduction commitments, the Service should adopt an alternative that minimizes old-growth destruction by transitioning out of old-growth logging rapidly and no later than five years. The destruction of old-growth stands releases the huge stores of carbon currently captured in centuries-old root systems and undisturbed forest soils—a loss that cannot be offset by forest regeneration in the timeframe relevant to climate change. Only by transitioning out of old-growth logging more rapidly than any of the alternatives in the DEIS can the Federal Government act as a leader and exemplar in the global effort to mitigate climate change.

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[108] Forest Service Handbook 1909.12.64.31 (emphasis in original).

[109] 16 U.S.C. § 1611(a).

[110] Draft Forest Plan App. A at A-2, Table A-1.

I. THE DEIS FAILS TO CONTEXTUALIZE TONGASS-SPECIFIC CARBON SEQUESTRATION AND STORAGE WITHIN THE CONSENSUS—RECOGNIZED BY THE FEDERAL GOVERNMENT—THAT FORESTS PLAY A CENTRAL ROLE IN CLIMATE-CHANGE MITIGATION.

The DEIS fails to situate the Draft Forest Plan within a global context in which the United States has taken a leading role in identifying forest protection as a policy goal to mitigate climate change. Forest preservation plays a central role in climate-change mitigation. Global forests' cumulative annual carbon uptake is around 2.3 billion metric tons, and their net effect on the carbon cycle is to function as a sink of around 1.2 billion metric tons of carbon per year (measured between 2000 and 2007).[111] Temperate forests alone, totaling around 767 million hectares, sink around 800 million metric tons of carbon per year.[112] Relative to global CO_2 emissions, in the past few decades forests have absorbed around 30 per cent of anthropogenic CO_2 emissions.[113] Forests have climate benefits beyond the indirect contribution via carbon sequestration and storage. For example, forests may directly mitigate warming by means of their transpiration, which contributes to the formation of clouds that reflect sunlight and thus have a cooling effect.[114]

When a forest is logged, along with opportunity costs from foregone sequestration and storage (as described above), forest carbon stores are released, making the disturbed forest a carbon source.[115] Emissions from deforestation are estimated to total 5.8 gigatonnes of CO_2 annually.[116]

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[111] Y. Pan *et al.*, *A Large and Persistent Carbon Sink in the World's Forests*, 333 SCIENCE 988, 989 (2011) (Pan).

[112] *Id.*

[113] V. Bellassen & S. Luyssaert, *Managing Forests in Uncertain Times*, 506 NATURE 153, 153 (2014).

[114] M. G. Ryan *et al.*, *A Synthesis of the Science on Forests and Carbon for U.S. Forests*, in ISSUES IN ECOLOGY REPORT NUMBER 13, at 5 (Spring 2010) (Ryan); *see also* H. Salwasser, *Introduction: Forests, Carbon and Climate—Continual Change and Many Possibilities*, in FOREST, CARBON AND CLIMATE CHANGE: A SYNTHESIS OF SCIENCE FINDINGS at 4 (C. R. Millar *et al.* eds., 2006) (Salwasser) ("Forests play important roles in climate through other mechanisms in addition to carbon exchange. These mechanisms may be as or more important than that of carbon exchange. The massive amounts of water transpired by forests ultimately change the global distribution of energy in the atmosphere, affecting rainfall patterns, cloudiness, and storms.").

[115] O.N. Krankina & M. E. Harmon, *Forest Management Strategies for Carbon Storage*, in FOREST, CARBON AND CLIMATE CHANGE: A SYNTHESES OF SCIENCE FINDINGS at 83 (2006) ("Disturbance events such as [inter alia] timber harvest have a profound impact on the carbon balance of forest ecosystems. . . . As the carbon uptake by living trees is interrupted and the emissions from decomposition increase, a disturbed forest stand shifts from sink to source of carbon relative to the atmosphere.") (Krankina & Harmon).

By way of comparison, global road transport accounts for about 6.3 gigatonnes of CO_2 emissions per year.[117] "Globally, deforestation (8-15%) and forest degradation (6-13%) contribute significant amounts to the world's annual greenhouse gas pollutants."[118] The carbon release associated with deforestation results from the loss of carbon stored in wood, as well as from heightened release of CO_2 via decomposition of materials that had been under the forest floor.[119] As a document in the Service's record concludes, "the U.S. continues to lose forests to development . . . with projected net losses of up to 23 million acres by 2050. . . . This trend needs to be reversed if forests are to play positive roles in carbon storage and climate."[120]

The Federal executive has acknowledged the central role of forest preservation in the mitigation of climate change. A study led by the Service in 2011, estimated the stock of carbon stored in forests globally to be 861 billion metric tons, with 44% of the carbon stored in soil and 42% in live trees.[121] The EPA estimated that, in 2008, U.S. forests' net carbon flux (excess of uptake over release) was about 792 million metric tons of carbon dioxide equivalent.[122]

The importance of protecting forest thus has been highly prioritized in the executive's efforts to mitigate climate change. As stated in the President's 2013 Climate Action Plan, "America's forests play a critical role in addressing carbon pollution, removing nearly 12 per cent of total U.S. greenhouse gas emissions each year. . . . Conservation and sustainable management can help to ensure that our forests continue to remove carbon from the atmosphere . . ."[123] The crucial role of forests in urgent efforts to mitigate the harmful effects of anthropogenic climate change was also emphasized in the Paris Agreement under the United Nations Framework Convention on Climate Change, which the United States signed. As stated in Article 5(1) of the

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[116] Intergovernmental Panel on Climate Change, CLIMATE CHANGE 2007: MITIGATION. CONTRIBUTION OF WORKING GROUP III TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE at 543 (B. Metz *et al.*, eds, 2007) ("Emissions from deforestation in the 1990s are estimated at 5.8 GtCO2/yr.").

[117] *Id.* at 325.

[118] D. A. DellaSala, *Enlisting the Tongass National Forest in the Historic Global Climate Change Agreements* at 6 (2016).

[119] PR 769_05_000073 (M. E. Harmon *et al.*, *Effects on Carbon Storage of Conversion of Old-Growth Forests to Young Forests*, 247 SCIENCE 699, 700 (1990)) (Harmon).

[120] Salwasser at 13.

[121] Pan at 989.

[122] U.S. Environmental Protection Agency, *Forest Carbon Storage* at 1 (2010), *available at* http://www3.epa.gov/climatechange/wycd/waste/downloads/forest-carbon-storage10-28-10PDF.

[123] Exec. Office of the President, The President's Climate Action Plan at 11 (June 2013), *available at* https://www.whitehouse.gov/sites/default/files/image/president27sclimate actionplanPDF (President's Climate Action Plan).

Agreement, as part of the efforts to mitigate climate change, "Parties should take action to conserve and enhance . . . sinks and reservoirs of greenhouse gases . . . including forests."[124]

Notwithstanding the prevailing scientific consensus, as well as recognition and prioritization by the Federal executive, the DEIS fails to recognize forests' crucial role in global carbon sequestration and storage. In Chapter 3, the DEIS discusses each alternative's impact on the Tongass's ability to sequester carbon dioxide, and thus contribute to the mitigation of harmful effects of anthropogenic climate change. The DEIS's discussion is inadequate because it fails to afford due importance to the climate-change mitigation contributions of forests in general, and of the Tongass in particular. In the FEIS, the Service should situate its evaluation of Plan alternatives within the scientific literature and discussion of the important role of undisturbed forest preservation by other Federal actors, including by the Service itself.

II. THE DEIS FAILS TO SITUATE DISCUSSION OF ALTERNATIVES' CARBON EFFECTS WITHIN THE CONSENSUS THAT THE TONGASS PLAYS AN OUTSIZED ROLE IN FOREST CLIMATE-CHANGE MITIGATION EFFORTS.

The Service must recognize that the Plan stands as the nation's policy choice with respect to its most important carbon forest, and thus is a crucial expression of our country's policy towards climate change generally. Forests of the Western United States, and specifically the Tongass, figure largely in global forests' contribution to climate-change mitigation.[125] In general, rainforests are crucially important to the carbon cycle, but among global rainforests, northern temperate rainforests play a predominant role in rainforest carbon sequestration: "Because the tropical gross deforestation emission is mostly compensated by the [carbon] uptakes in both tropical intact and regrowth forests, the net global forest [carbon] sink [of roughly 1.1 billion metric tons of carbon per year] resides mainly in the temperate and boreal forests."[126] Northern coastal temperate rainforest biomes are "disproportionately important in regional carbon cycling."[127] Forests of the Pacific Northwest and Southeast Alaska store "exceptional levels" of carbon, and "are among the most [carbon] dense ecosystems in the world.[128] Moreover, "[t]he national forests of the Pacific Northwest Region . . . have a higher proportion of forests in old

[124] Paris Agreement under the United Nations Framework Convention on Climate Change art. 5(1) at PDF 22 (opened for signature Apr. 22, 2016).

[125] Ryan at 5-7.

[126] Pan at 992.

[127] PR 769_05_000065 (D. D'Amore & R. Edwards, *Climate and Carbon in Southeast Alaska: Beyond the Threshold of Change in a Dynamic Landscape* (2014)) (D'Amore & Edwards).

[128] O. N. Krankina *et al.*, *High-Biomass Forests of the Pacific Northwest: Who Manages Them and How Much is Protected?*, 54 ENVIRONMENTAL MANAGEMENT 112, 113 (2014); A. N. Gray & T. R. Whittier, *Carbon stocks and Changes on Pacific Northwest National Forests and the Role of Disturbance, Management, and Growth*, 328 FOREST ECOLOGY & MANAGEMENT 167, 168 (2014) ("The national forests of the Pacific Northwest Region attain some of the highest [carbon] densities in the U.S.") (Gray & Whittier).

age classes (>100 years) than other ownerships,"[129] and "Southeast Alaska . . . boasts nearly a third of the world's old-growth temperate rainforest."[130]

The Tongass is the largest single forest carbon sink in the United States, storing hundreds of millions, if not over a billion tons of carbon. As the Service has recognized elsewhere, the Tongass is the largest intact area of coastal temperate rainforest biome remaining globally.[131] According to one study, "[t]he Tongass National Forest stores substantially more forest carbon than any other national forest in the United States."[132] The Tongass annually removes about 2,787 pounds of atmospheric CO_2 per acre per year through growth and recruitment.[133] Looking only at aboveground carbon, one study found that the Tongass stores "about 650 million tons in aboveground tree carbon, equivalent to 2.4 billion tons of CO_2."[134] The study estimated that below-ground carbon pools "could be as large as the aboveground stores."[135] A 2005 study found that aboveground carbon constitutes around 40 percent of total carbon stored in the Tongass, with a conservative estimate that 66 per cent of the total was found in soils and 4 per cent in roots,[136] a distribution consistent with carbon inventories in other ecosystems.[137] Extrapolating from aboveground carbon figures in the Tongass and from its relative supra- versus sub-terrestrial carbon distribution, the total carbon store of the Tongass would around 1.625 billion tons of carbon.

The DEIS's discussion of each alternative's impact on the Tongass's ability to sequester carbon dioxide is inadequate because it ignores the Tongass's outsized role in forest climate-change mitigation. To the extent that the DEIS discusses the Tongass's place in global forests' carbon mitigation, it ignores the Tongass's outsized role. The DEIS recognizes that the Tongass's carbon stock accounts for 8 percent of the total carbon stored in U.S. forests.[138] However, by relying merely on this figure, the Service fails to capture the full importance of the Tongass's

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[129] Gray & Whittier at 168.

[130] D. A. DellaSala *et al*., *Temperate and Boreal Rainforests of the Pacific Coast of North America, in* TEMPERATE AND BOREAL RAINFORESTS OF THE WORLD: ECOLOGY AND CONSERVATION at 42 (D. A. DellaSala ed., 2011) (DellaSala).

[131] U.S. Forest Service, *Carbon Cycle Science: Quantifying the Carbon Cycle and Potential for Carbon Sequestration on the Tongass National Forest* at 1 (2010) (Carbon Cycle Science).

[132] PR 769_05_000062 at 39 (T. M. Barrett, *Storage and Flux of Carbon in Live Trees, Snags, and Logs in the Chugach and Tongass National Forests* (2014)).

[133] *Id.* at 39.

[134] *Id*.

[135] *Id.* at 36.

[136] W. W. Leighty *et al.*, *Effects of Management on Carbon Sequestration in Forest Biomass in Southeast Alaska*, ECOSYSTEMS 1051, 1059 (2006).

[137] *Id.* at 1062.

[138] DEIS at 3-14.

role as a carbon forest within the nation's leadership in global climate change policy, as discussed below. Moreover, even on the numbers, the DEIS is mistaken. The DEIS states that Southeast Alaska as a whole accounts for 0.5 percent of the world's forests,[139] a figure contradicted by the only published global study—supported by GIS and computer modeling—which found that the Tongass alone had an eight-fold larger share of the global total.[140]

In the FEIS, the Service should evaluate Plan alternatives in light of prevailing scientific literature that quantifies the stores of carbon within the Tongass, as well as assesses the Tongass's relative global importance as a forest carbon sink and store.

III. THE DEIS IGNORES THE DIFFERENTIAL ABILITY OF OLD-GROWTH FOREST TO SEQUESTER CARBON DIOXIDE AND STORE CARBON WITHIN THE TIMEFRAME RELEVANT TO CLIMATE CHANGE MITIGATION.

Scientific literature reflects that protection of America's carbon forests necessarily entails protection of old-growth stands. For this reason, the Service must recognize that the unnecessary continuation of old-growth logging would repudiate of the Federal Government's commitment to pursuing forest protection in addressing climate change.

Contrary to previous beliefs, forests continue to sequester carbon for centuries after they have become old-growth.[141] Studies have found that primary forest in the boreal and temperate regions of the northern hemisphere "alone sequester about 1.3 +/- 0.5 gigatonnes of carbon per year."[142] Pacific Northwestern forests were found to increase in biomass even at 300 and 600 years of age.[143] These results demonstrate that, although a tree's rate of carbon absorption might decline beyond 80 years of age, "old-growth forests can continue to accumulate carbon."[144]

Logging an old-growth forest results in a net carbon release; this is true notwithstanding the effects of limited carbon storage in wood products and growth of young forest in its place. As a

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[139] DEIS at 3-13.

[140] D. A. DellaSala *et al*., *Crosscutting Issues and Conservation Strategies, in* TEMPERATE AND BOREAL RAINFORESTS OF THE WORLD: ECOLOGY AND CONSERVATION at 247-49, Table 10-1 (D. A. DellaSala ed., 2011).

[141] *See* K. Lorenz & R. Lal, CARBON SEQUESTRATION IN FOREST ECOSYSTEMS at 120 (2009) ("The [carbon] balance of undisturbed, pristine forests is not in equilibrium as previously hypothesized but these forests continue to sequester carbon. Thus pristine old-growth forests are important components of the global terrestrial [carbon] budget.") (Lorenz & Lal).

[142] S. Luyssaert *et al.*, *Old-growth Forests as Global Carbon Sinks*, 455 NATURE 213 at 213 (2008) (Luyssaert).

[143] Lorenz & Lal at 120.

[144] Luyssaert at 213.

result of disturbing old-growth forest, forest carbon storage is reduced "for at least 250 years."[145] Although young forests grow relatively quickly, "the creation of new forests (whether naturally or by humans) frequently follows disturbance to soil and the previous vegetation, resulting in a decomposition rate of coarse woody debris, litter and soil organic matter (measured as heterotrophic respiration) that exceeds the [net primary productivity] of the regrowth."[146] In other words, when old-growth forest is logged and replaced by young forest, the young trees' capture of CO_2 in aboveground carbon stores is offset by the more rapid and voluminous release of carbon hitherto stored underground.

While recognizing detrimental carbon effects of forest disturbance, specifically from old-growth logging, the DEIS inaccurately suggests that resulting carbon losses are uncertain or could be offset. The DEIS recognizes that "timber harvesting activities . . . can result in the release of greenhouse gases" and "can . . . affect the rate and amount of carbon sequestration that occurs on the National Forest."[147] Specifically, carbon losses are likely to result from old-growth logging, which "creates an initial net release of CO_2 into the atmosphere relative to leaving stands unmanaged, [which] can continue for years as long as logs and snags left after harvest decompose."[148] But, while logging would in some circumstances reduce the Tongass's carbon sequestration, the DEIS hypothesizes that this reduction might be offset by uses of wood products or would vary depending on the timeframe considered.[149]

The DEIS's analysis is inaccurate because it ignores the differential ability of old-growth forest to sequester carbon dioxide and store carbon within the timeframe relevant to climate change mitigation. The DEIS is correct that not only old-growth forests sequester and store carbon: all else equal, forests between the ages of 15 and 800 years usually function as carbon sinks.[150] But old-growth forests store far more carbon than young forests.[151] Old-growth stores entail not only

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[145] Harmon at 700; *see also* PR 769_05_000091 (J. E. Janisch & M. E. Harmon, *Successional changes in live and dead wood carbon stores: implications for net ecosystem productivity*, 22 TREE PHYSIOLOGY 77 (2002)) (Janisch & Harmon). Studies more particularly focused on temperate and boreal rainforests of the Pacific Northwest put the progression to old-growth at 150-400 years. DellaSala at 49.

[146] Luyssaert at 213; Krankina & Harmon at 85 ("Following timber harvest, carbon emissions from decomposing slash usually exceed carbon accumulation in young trees (in spite of their vigorous growth) for about a decade.").

[147] DEIS at 3-19.

[148] *Id*.

[149] *Id*. at 3-20 ("Alternatives that harvest more old-growth forests compared to young-growth and/or have a larger total projected harvest would have a greater effect to the potential carbon sequestration of the Tongass National Forest compares to alternatives that harvest less timber.").

[150] Luyssaert at 213.

carbon stored in the larger mass of trees, but forest soil carbon, which "will move back to the atmosphere if these forests are disturbed."[152] As one study put it, "[a]lternative management schemes never match old-growth when evaluated based on the time integral of total carbon in live and dead organic matter."[153]

The DEIS's positing of a hypothetical offset via storage in wood products contradicts studies on the subject. Even when storage of carbon in wood products is included in models, logging results in a net flux of CO_2 to the atmosphere,[154] because storage of aboveground carbon in wood products suffers inefficiencies in processing. "At least 15% of the wood fiber in a typical harvest is left behind as broken or defective."[155] Subsequent to the logging, "[a]s much as 50% of the harvested material is released to the atmosphere within a few years."[156] Synthesizing data from multiple studies, Ann Ingerson found that "as little as 1% of the carbon present in the standing tree may remain in solid wood products in use after 100 years."[157] Use of wood products might have beneficial effects only when substituting for sufficiently more carbon-intensive concrete or metal products.[158] However, the DEIS has not made—let alone substantiated—any claim that such substitution in fact occurs. Moreover, it has not addressed whether these substitutions would necessarily occur at levels sufficient to ensure that the net carbon effect would constitute climate-change mitigation.

The DEIS's equivocation about relevant timescale is also misleading and contrary to prevailing scientific consensus. The DEIS's analysis is explicitly premised on the treatment of timescale as an undefined variable, the uncertainty of which renders the Plan alternatives' net carbon effects unknowable. As the DEIS explains, "[e]stimating the effects of the proposed alternatives on climate change and carbon sequestration is complex," because, *inter alia*:

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[151] I. Thompson *et al.*, FOREST RESILIENCE, BIODIVERSITY AND CLIMATE CHANGE, A SYNTHESIS OF THE BIODIVERSITY/RESILIENCE/STABILITY RELATIONSHIP IN FOREST ECOSYSTEMS, Secretariat of the Convention on Biological Diversity, Montreal, Technical Series No. 43 at 7, 21, 39, 41 (2009).

[152] Luyssaert at 213.

[153] C. B. Field & J. Kaduk, *The Carbon Balance of an Old-Growth Forest: Building Across Approaches*, 7 ECOSYSTEMS 525, 532 (2004).

[154] Harmon at 699.

[155] *Id.*

[156] Krankina & Harmon at 85.

[157] A. Ingerson, *Wood Products and Carbon Storage: Can Increased Production Help Solve the Climate Crisis?* at 5 (2009).

[158] *See* DEIS at 3-15; PR 769_05_000072 (J. Perez-Garcia *et al.*, *An Assessment of Carbon Pools, Storage, and Wood Products Market Substitution Using Life-Cycle Analysis Results*, 37 WOOD AND FIBER SCIENCE 140 (2005)).

> [S]equestration and carbon release happen at different time scales. . . . [D]ifferent authors have reached widely different conclusions about net sequestration because of different assumptions about [*inter alia*] the timeframe of interest. . . . Each of the harvesting alternatives has the potential to either increase or decrease the amount of stored carbon, depending on the time scale of consideration.[159]

Studies affirm the determinative role timescale plays in assessing the net changes in the carbon cycle,[160] but explicitly state that the relevant timescale is under 100 years—a period shorter than the time required for a forest to reestablish equilibrium after disturbance. The Intergovernmental Panel on Climate Change's analysis indicates that in order to avoid a global average surface temperature increase (relative to pre-industrial levels) of 2°C, the atmospheric concentration of CO_2 in the year 2100 will have to be around 450 ppm.[161] Such a concentration can only be achieved, according to the IPCC, if "substantial cuts in anthropogenic GHG emissions" occur "by mid-century through large-scale changes in energy systems and potentially land use."[162] With regard to the timing of these necessary "large-scale changes," the IPCC found that "[d]elaying mitigation efforts . . . through 2030 is estimated to substantially increase the difficulty of the transition to low longer-term emissions levels and narrow the range of options consistent with maintaining temperature change below 2°C relative to pre-industrial levels."[163] The IPCC's projections are known to be conservative with respect to the estimated pace of global warming, so that it would be reasonable to believe that necessary large-scale changes

[159] DEIS at 3-19 to 3-20.

[160] Janisch & Harmon at 77.

[161] Intergovernmental Panel on Climate Change, *Climate Change 2014: Mitigation of Climate Change*, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change at 10 (O. Edenhofer *et al.* eds, 2014) (Climate Change 2014 Working Group III Report).

[162] *Id.*

[163] *Id.* at 12.

would in fact be needed well before 2030 in order for mitigation to succeed.[164] The relevant timescale of climate-change mitigation measures is thus the next 10 to 15 years.

In the FEIS, the Service must correct the DEIS's mistake of treating timescale as an undefined variable. The DEIS ignores scientific consensus that "large-scale changes" in land use must occur within 10 to 15 years. As the DEIS recognizes, after logging, a forest takes around 200 years to re-establish equilibrium.[165] The re-attainment of similar levels of carbon storage can take even longer.[166] Therefore the timescale to mitigate climate change is shorter—by more than an order of ten—than the period during which a disturbed old-growth stand can return to equivalent levels of carbon storage and sequestration.

IV. THE DEIS'S COMPARISON OF THE TONGASS'S CARBON BALANCE TO THE TOTAL GLOBAL CARBON CYCLE MISREPRESENTS THE CENTRALITY OF THE TONGASS TO THE UNITED STATES'S EFFORTS TO LEAD GLOBAL CLIMATE CHANGE POLICY.

The Federal Government has taken a leadership role in global efforts to mitigate climate change[167] and has recognized forest policy's importance in these efforts. Specifically, the Administration has highlighted the importance of "[c]onservation and sustainable management . . . to ensure our forests continue to remove carbon from the atmosphere while also improving soil and water quality, reducing wildfire risk, and otherwise managing forests to be more resilient in

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[164] K. Brysse, *et al.*, *Climate Change Prediction: Erring on the Side of Least Drama?*, 23 GLOBAL ENVT'L CHANGE 327 (2013); W. R. L. Anderegg *et al.*, *Awareness of Both Type 1 and 2 Errors in Climate Science and Assessment*, 95 BULLETIN OF THE AMERICAN METEOROLOGICAL SOCIETY 1445 (2014); *see also* C. Mooney, *The world's climate change watchdog may be underestimating global warming*, WASHINGTON POST (Oct. 30, 2014) https://www.washingtonpost.com/news/wonk/wp/2014/10/30/climate-scientists-arent-too-alarmist-theyre-too-conservative/ ("According to a number of scientific critics, the scientific consensus represented by the IPCC is a very conservative consensus. IPCC's reports, they say, often *underestimate* the severity of global warming, in a way that may actually confuse policymakers (or worse). . . . [I]n a new study just out in the *Bulletin of the American Meteorological Society*, another group of researchers echoes that point. In scientific parlance, they charge that the IPCC is focused on avoiding . . . false positive[s]—rather than on avoiding . . . false negative[s]. The consequence is that we do not always hear directly from the IPCC about how bad things could be."); G. Scherer, *Climate Science Predictions Prove Too Conservative*, SCIENTIFIC AMERICAN (Dec. 6, 2012) *available at* http://www.scientificamerican.com /article/climate-science-predictions-prove-too-conservative/ ("Across two decades and thousands of pages of reports, the world's most authoritative voice on climate science has consistently understated the rate and intensity of climate change and the danger those impacts represent, say a growing number of studies on the topic.").

[165] DEIS at 3-15; *see also* Janisch & Harmon at 85 ("Our data indicate that regrowth biomass approximates that found in old-growth forests by about 200 years after disturbance.").

[166] Harmon at 700 ("Harvest of old-growth forests reduced C storage for at least 250 years.").

[167] *See* President's Climate Action Plan at 5.

the face of climate change."[168] As part of its prioritization of policy to mitigate climate change, the Council on Environmental Quality (CEQ) has cautioned against agencies using comparisons of emissions from a government action to total global emissions. According to the CEQ's Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts, "these comparisons are not an appropriate method for characterizing the potential impacts associated with a proposed action . . . [because t]his approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make relatively small additions to global atmospheric GHG concentrations that collectively have huge impact."[169]

In this context, the DEIS's comparison of the Tongass's 650 million tons in above-ground carbon stores to the overall magnitude of the carbon cycle, purportedly "83,500,000 billion metric tons,"[170] is misguided for several reasons. First, the DEIS's figure for the overall size of the carbon cycle is orders of magnitude off the mark: according to the Intergovernmental Panel on Climate Change, the total magnitude of the carbon cycle is more like 44,750 billion metric tons.[171] If the Forest Service retains this comparison in the FEIS, it should correct this error.

Second, even as a matter of evaluating the Tongass's quantitative contribution to climate change mitigation, the DEIS's comparison is not illuminating. If a purely quantitative evaluation were sufficient, it would be more relevant to compare the Tongass's sequestration and storage levels and the specific increment of anthropogenic contributions to the carbon cycle that would raise global average temperature over 2°C above pre-industrial levels, i.e. the increment that must be avoided to mitigate the harms of anthropogenic climate change.

Most importantly, however, a quantitative evaluation of the emissions savings or losses attributable to the Plan is insufficient and off-the-mark as a general matter. As the CEQ's draft guidance describes, the DEIS's quantitative evaluation of the Tongass's importance to climate change mitigation is misleading and "does not reveal anything beyond the nature of the climate change challenge itself."[172] Moreover, a purely quantitative account obscures the Plan's impacts on the implementation of the Federal Government's heralded commitment to climate change mitigation. Having recognized that "America's forests play a critical role in addressing carbon pollution,"[173] and that the Tongass is America's most important carbon forest, the Government

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[168] *Id*. at 11.

[169] Council on Environmental Quality, Revised Draft Guidance for Greenhouse Gas Emissions and Climate Change Impacts at 9 (Dec. 18, 2014), *available at* https://www.whitehouse.gov/sites/default/files/docs/nepa_revised_draft_ghg_guidance_searchable.pdf (CEQ Revised Draft Guidance).

[170] DEIS at 3-14.

[171] *See* Intergovernmental Panel on Climate Change, Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change at 515 fig. 7.3 (S. Solomon *et al.* eds, 2007).

[172] *See* CEQ Revised Draft Guidance at 9.

[173] President's Climate Action Plan at 11.

would contradict its pronouncements in practice by adopting a Plan that chooses to unnecessarily prolong old-growth logging in the Tongass—releasing deep stores of above- and below-ground carbon into the atmosphere, and reducing the Tongass's resilience to climate change.

V. THE DEIS FAILS TO ADDRESS HOW BASELINE ESTIMATES OF CARBON STORED IN FORESTS AND WOOD PRODUCTS WILL CHANGE UNDER THE VARIOUS ALTERNATIVES.

The DEIS fails to consider the Forest Service's recent whitepaper, *Baseline Estimates of Carbon Stocks in Forests and Harvested Wood Products for National Forest System Units, Alaska Region.*[174] In this report, the agency provides baseline carbon stocks and trends for seven different forest ecosystem carbon pools: above-ground live tree, below-ground live tree, standing dead, understory, down dead wood, forest floor and soil organic carbon."[175] It also provides estimates of carbon stored in wood products over longer time periods.[176] Inexplicably, the DEIS relies on a similar whitepaper prepared for the Rocky Mountain Region.[177] The FEIS should explain how the various alternatives, including the selected alternative, affect the amount of stored carbon on the Tongass.[178]

In lieu of an explanation, the DEIS simply states that "[e]stimating the effects of the proposed alternatives on climate change and carbon sequestration is complex."[179] The agency acknowledges "there is a substantial amount of recent literature about the effects of forest management on carbon stores," but the DEIS fails to include reference to any of those publications or explain agency's the conclusions regarding those scientific opinions.[180] Instead, it blandly states:

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[174] U.S. Forest Service, Baseline Estimates of Carbon Stocks in Forests and Harvested Wood Products for National Forest System Units; Alaska Region (March 2015), *available at* http://www.fs.fed.us./climatechange/documents/Alaska RegionCarbonAssessment.pdf (USFS Baseline Carbon Stocks).

[175] *Id*. at PDF 6.

[176] *Id*.

[177] *See* DEIS at 6-47.

[178] *See* USFS Baseline Carbon Stocks at PDF 14 (Figure 4).

[179] DEIS at 3-19.

[180] DEIS at 3-19.

> Each of the harvesting alternatives has the potential to either increase or decrease the amount of stored carbon, depending on the time scale of consideration; how much of the wood is removed/harvested from the Forest; how the wood is used; and how much carbon is released in cutting, yarding, transporting, and processing the wood as well as in soil carbon and woody debris decomposition (see discussion above, in the "Affected Environment" section).[181]

NEPA does not allow the Forest Service to avoid analyzing important issues, simply because the agency concludes they are "complex."

At a minimum, when the agency confronts incomplete or unavailable information as part of the environmental review process, NEPA regulations dictate how the agency must address that information.[182] "[T]he agency shall include the information in the environmental impact statement," if the missing information is: (1) "relevant to reasonably foreseeable significant adverse impacts;" (2) "essential to a reasoned choice among alternatives;" and (3) "the overall costs of obtaining it are not exorbitant."[183] The Council on Environmental Quality (CEQ) has explained that "[t]he evaluation of impacts under § 1502.22 is an integral part of an EIS and should be treated in the same manner as those impacts normally analyzed in an EIS."[184]

VI. THE DEIS IGNORES CHANGES TO THE TONGASS'S ABILITY TO SEQUESTER AND STORE CARBON THAT ARE EXPECTED TO RESULT FROM CLIMATE CHANGE.

The DEIS recognizes that "climate change and its projected warming trend may . . . affect subsurface carbon sequestration in Southeast Alaska."[185] However, the DEIS fails to consider specific processes relevant to the Tongass's carbon contribution that could be changed as a result of climate change.

A. The DEIS Fails to Account for Accelerated Decomposition Rates.

Although recognizing the importance of current low decomposition rates to the Tongass's carbon balance, the DEIS neglects the changes to these rates that will result from warming average temperatures. In its description of the Tongass's contributions to carbon storage, the DEIS states that cool conditions in the Tongass inhibit decomposition, and hence slow release of CO_2 to the atmosphere.[186] The DEIS also recognizes that, generally, carbon stored in the soil "may be

[181] DEIS at 3-20.

[182] *See Mont. Wilderness Ass'n v. McAllister*, 666 F.3d 549, 559-561 (9th Cir. 2011).

[183] 40 C.F.R § 1502.22(a).

[184] 51 Fed. Reg. 15,618, 15,621 (Apr. 25, 1986).

[185] DEIS at 3-15.

[186] DEIS at 3-14.

released to the atmosphere in the form of carbon dioxide or methane as the climate warms."[187] However, the DEIS does not address the extent of carbon release that might occur in the Tongass, particularly in instances of old-growth logging, when rising temperatures accelerate decomposition processes. Specifically, the DEIS does not acknowledge the scientific literature's conclusion that the magnitude of carbon release from accelerated decomposition in circumstances of climate change is highly unpredictable, and hence a great risk. Studies indicate "that assumptions of stability are wrong, and a large potential for changes in carbon storage exists," but that, due to the lack of baseline information to inform models, "[t]he impacts of changing soil processing rates and hydrology pose an enormous challenge to scientists and managers."[188] The Forest Service itself has emphasized this lack of stability in other publications.[189]

In its FEIS, the Service should connect the recognition of the decomposition rate's importance in Tongass carbon flux, with the recognition that rising temperature accelerates decomposition. Its assessment of the carbon effects of each plan alternative should take into account the uncertainty of changes in decomposition rates, especially with regard to old-growth logging, which—all else equal—involves more carbon release via decomposition.

B. The DEIS Fails to Address Old-Growth Forest's Differential Resilience to Climate Change.

In addition to failing to fully describe the differential ability of old-growth forest to store and sequester carbon, *see supra* pp. 31-35, the DEIS also fails to describe the difference in resilience to climate change between old-growth and young forest. This difference is significant because it bears upon, *inter alia*, the extent to which the Tongass's carbon flux will persist depending on the plan alternatives' differing preservations of old-growth stands.

Scientific literature indicates that in the face of climate change, old-growth has a relative advantage as compared to young forest. The warming of average temperatures is likely to reduce forests' abilities to store carbon and regenerate following disturbance relative to their abilities before climate change.[190] "Rising temperatures . . . may lead to forests becoming a weaker sink or a net carbon source before the end of the century."[191] In the face of these changes, however, in general "[p]rimary forests tend to be more resilient to climate change and other human-induced environmental changes than secondary forests and plantations."[192] Studies have found

[187] DEIS at 3-15.

[188] D'Amore & Edwards at 1.

[189] Carbon Cycle Science at 1 ("[T]he vast carbon store within [coastal temperate forest] may not be stable under a warming climate").

[190] Ryan at 13.

[191] Climate Change 2014 Working Group III Report at 845.

[192] *Id.* at 846; *see also* B. Mackey *et al*., *Policy Options for the World's Primary Forests in Multilateral Environmental Agreements*, 8 CONSERVATION LETTERS 139, Supp. 14, Table s4 (2015).

that North America's Pacific Coastal Rainforests, especially the Tongass, may be particularly resilient to climate change.[193]

The FEIS should take these studies into account, and, given their findings, evaluate how the Plan alternatives' varying preservation of old-growth stands bears on overall forest resilience, and, *inter alia*, the Tongass's resulting future net carbon flux.

INTEGRITY OF THE CONSERVATION STRATEGY

This section of the comments addresses the consequences of the Forest Service's current transition proposal outlined in the Draft Forest Plan. At this point, the agency appears poised to rely on illusory transition out of industrial-scale old-growth logging that might or might not take place over the next 10, 15, or 20 years (if it ever happens at all). Additionally, the agency is proposing fundamental changes to the bedrock conservation principles that have supported the 1997 Forest Plan and the 2008 Amended Forest Plan by allow logging in OGRs, beach buffers, and riparian areas. If the Forest Service stays the course and adopts an amendment that fails to transition out of industrial-scale old-growth logging quickly and forever compromises the agency's long-held conservation strategy, then, as explained below, such an aggressive and scientifically indefensible position raises a wide-range of NEPA and NFMA infirmities.

If, however, the agency adopted a forest plan amendment that ended industrial-scale old-growth logging in less than five years and respected the scientific underpinnings of the conservation strategy, then the agency could avoid many of the concerns outlined in this section. One thing is clear; the agency's choice has serious implications that strike at the heart of the amendment.

I. THE DRAFT FOREST PLAN COMPROMISES THE CONSERVATION STRATEGY.

In the mid-1990s, the Forest Service confronted the possibility that the dwindling numbers of Alexander Archipelago wolves and Queen Charlotte Goshawks in the Tongass might require that those species be listed for protection under the Endangered Species Act (the ESA). The Forest Service's desire to avoid an ESA listing led the agency to adopt the old-growth forest

[193] D. A. DellaSala *et al.*, *Climate Change May Trigger Broad Shifts in North America's Pacific Coastal Rainforests*, REFERENCE MODULE IN EARTH SYSTEMS AND ENVIRONMENTAL SCIENCES at 9 (2015) ("At broad spatial scales, northern coastal regions and their protected areas (BC, Alaska) may be more resilient to climate change than southern areas that are highly fragmented and more vulnerable to edge effects. . . . That pattern holds true for coastal regions compared to interior drier regions . . . perhaps because of climatic buffering of maritime climates. Our results therefore are important for maintaining ecological integrity and climate resilience in high priority conservation areas from north to south such as the Tongass Rainforest of Alaska . . . . Notably, ecological integrity and climate resilience are emphasized in the 2012 National Forest Planning Rule and climate resilience is emphasized in President Obama's Climate Action Plan (Executive Office of the President, 2013). Thus, the largely intact nature of the Tongass National Forest should provide important opportunities for meeting both policy objectives and for the northward expansion of rainforest communities in the face of climate change.").

conservation strategy as well as specific measures aimed at the conservation of these species and other old-growth dependent species.[194]

In the 2008 FEIS, the Forest Service explained that it developed its "integrated science-based old-growth forest habitat conservation strategy" during the 1997 Forest Plan Revision process.[195] The strategy has two basic components. The first is a forest-wide reserve network that "protects the integrity of the old-growth forest by retaining blocks of intact, largely undisturbed habitat."[196] The Forest Service made it clear that the efficacy of the reserve system "relies on blocks of intact, largely undisturbed habitats," which included but was not limited to old-growth forests.[197] The agency explained that reserves need to be "of the appropriate size, spacing, and composition to meet a desired design that will maintain viable well-distributed populations of one more species."[198] The second component is "management of the matrix, e.g., the lands with LUD allocations where commercial timber harvest may occur."[199] In those areas, "components of the old-growth ecosystem are maintained by standards and guidelines to protect important areas and provide old-growth forest habitat connectivity."[200]

The Draft Forest Plan proposes wholesale changes that detrimentally affect the long-standing wildlife conservation strategy.[201] The DEIS, however, does not acknowledge the broad scope of those changes or analyze the resulting adverse environmental impacts, including the ability to ensure the continued viability of fish and wildlife species.

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[194] *See* 2008 TLMP AR 603_1127 at 1 (Iverson, C., Letter to Mary Friberg Re: Review of Conservation Strategy Review Summary (Mar. 17, 2006)) (explaining that "an overriding motivation for the development of the [1997 Forest Plan's] conservation strategy was to respond to the petitions to list the Queen Charlotte Goshawk and Alexander Archipelago Wolf to incorporate necessary conservation measures such that listing under ESA was not necessary"). The undersigned groups understand that the Forest Service's planning records for the 1997 Tongass Land Management Plan and the 2008 Amended Tongass Land Management Plan are part of the agency's planning record for this plan amendment. Thus, they cite to the document numbers for relevant documents from those decision records where appropriate.

[195] 2008 FEIS at D-2.

[196] 2008 FEIS at D-2.

[197] 2008 FEIS at D-3.

[198] 2008 FEIS at D-3.

[199] 2008 FEIS at D-2.

[200] 2008 FEIS at D-2.

[201] *See generally* W. Smith, Comments on the Wildlife Conservation Strategy as represented in the Proposed Land and Resource Management Plan (Feb. 2016) (Smith Conservation Strategy Comments). The undersigned groups incorporate the Smith Conservation Strategy Comments into this letter in their entirety, including all cited publications.

The agency, moreover, is ignoring relevant science that has developed since the 2008 Amended Forest Plan was adopted, including science that questions many of the assumptions of the conservation strategy itself. The last time the Forest Service amended the forest plan, the agency conducted a conservation strategy review to assess new scientific information arising since 1997.[202] The Forest Service's review explained:

> The conservation strategy was based on careful analysis and integration of the best scientific information available at that time. The 1997 Forest Plan Record of Decision committed the USDA Forest Service to conduct an interagency review of the conservation strategy. The basic approach and central focus for the interagency review of the conservation strategy consists of a structured information assessment. This assessment examines pertinent new information accumulated since 1997, evaluates what it tells us about the conservation strategy, and identifies what additional information may be needed to better understand the strategy's effectiveness. Assessment results may be used to make adjustments to the strategy and to prioritize information needs for future investment.[203]

Yet, in this amendment process the Forest Service has inexplicably abandoned its commitment to basing its decision on "careful analysis and integration of the best scientific information available at that time." As explained below, the agency is deliberately ignoring relevant information.

All of these considerations are exacerbated by the fact that the Draft Forest Plan dramatically changes the agency's approach to resolving conflict between plan provisions. Under the Draft Plan, Chapter 5 would prevail over the rest of the plan in the event of conflict or discrepancies between directions.[204] The specific management prescriptions for each land use designation in Chapter 3 would prevail over the forest-wide standards and guidelines provided in Chapter 4.[205] The DEIS, however, fails to address the consequences of this dramatic change in management.

A. The Length of the Transition Out of Industrial-Scale Old-Growth Logging is Too Long.

As an initial matter, none of the alternatives analyzed in the DEIS contemplates a fast enough transition out of old-growth despite the growing chorus of concern from the nation's preeminent scientists. In 2003, two former Chiefs of the U.S. Forest Service, Jack Ward Thomas and Mike

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[202] *See* PR 769_05_000836 (Tongass National Forest Land and Resource Management Plan, *Interagency Conservation Strategy Review: An Assessment of New Information Since 1997*, Workshop Summary Report (2008).

[203] *Id*. at PDF 3.

[204] Draft Forest Plan at 1-4.

[205] *Id*.

Dombeck, cautioned that "harvest of old-growth from the national forests should come to an end . . . ."[206] In 2014, more than 275 scientists from academia and government urged the Forest Service to end the clear-cutting of the nation's remaining old-growth forests including the Tongass.[207] In January 2015, seven of North America's most prestigious scientific societies (representing a combined membership of over 30,000 scientists and natural resource professionals) called for an end to clear-cut logging of old-growth on the Tongass within the next three years.[208] Yet, the preferred alternative continues old-growth clear-cutting for at least 16 years and likely much longer, but the DEIS fails to examine the consequences of that transition.

The wildlife concerns on the Tongass, which are described below in detail, could be dramatically minimized if the Forest Service adopted a more rapid transition out of old-growth. Indeed, the troubling decline of numerous species could be minimized if the agency adopted a responsible approach to management of the nation's largest national forest. Conserving the Tongass's old-growth, rather than clear-cutting it for another 15, or 20, or 25 years as allowed under the Draft Forest Plan would assure that the Tongass Forest will continue to maintain a diverse forest ecosystem with abundant natural resources for future generations.

B. The Need to Concentrate Logging on Small Isolated Portions of the Tongass Compromises the Conservation Strategy.

The Draft Forest Plan also compromises the conservation strategy because the logging (both old-growth and now second-growth) will be occurring in very concentrated portions of the Tongass. This agency's proposal exacerbates an already troubling situation.

In the 2008 FEIS, the Forest Service analyzed the anticipated economic benefits from logging, which reflect the present value of expected Forest Service revenues from the timber sale program.[209] The agency projected future timber sale revenues using projected logging for each of the various alternatives analyzed in the 2008 FEIS.[210] The Forest Service recognized that:

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[206] M. Dombeck & J. W. Thomas, *P-I Focus: Declare harvest of old-growth forests off-limits and move on*, Seattle P-I Op Ed (Aug. 23, 2003) at PDF 3.

[207] *See* Thomas, J.W. *et al.*, Letter to the President by 78 North American Scientists calling for a national old-growth policy to protect the remaining old-growth on national forest lands throughout the US (June 25, 2014); Wilson, E.O. *et al.*, Letter to Secretary Vilsack from 200+ North American Scientists Re: Scientific support for completion of old-growth logging transition on the Tongass rainforest by the end of the Obama Administration (Oct.15, 2014).

[208] American Fisheries Society *et al.*, Letter to Secretary Vilsack Re: Old-growth logging transition on the Tongass National Forest (Jan. 20, 2015).

[209] 2008 FEIS at 3-546.

[210] *Id*.

> [U]nder current market conditions stumpage values for some stands would be negative . . . In other words, the estimated costs of harvesting and transporting the timber exceed the current value of the timber at the mill . . . and, as a result, the volume from these stands would be unlikely to sell.[211]

In the 2008 planning record, the Forest Service calculated average stumpage values per value comparison unit across the Tongass.[212] The agency considered both old-growth and second-growth. The agency then depicted the average stumpage values per acre on maps of the Tongass.[213]

According to the agency's own analysis, the vast majority of the stands in the Tongass result in negative stumpage value and the isolated areas that reflect positive stumpage values are located in a very concentrated portion of the Tongass. As explained below, these areas are of critical importance to several old-growth dependent species (e.g., wolves, goshawks, etc.). This means the Forest Service knew that it would have to log these areas of important habitat almost exclusively to develop economically profitable timber sales.

In the DEIS, the Forest Service acknowledges that regularly enacted Congressional Appropriation Act provisions prohibit the Tongass National Forest from offering timber sales that do not appraise positively.[214] It also explains "that individual timber sales offered under any of the alternatives in the first 25 years of the planning period will likely need to include a mix of old-growth and young-growth to appraise positive as required by Public Law 112-74, House Report 2055-257, Section 414."[215] Yet the DEIS never discloses the average stumpage values across the Tongass or the location of the only stands that appraise positively.[216] The analysis also does not appear in the planning record.

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[211] *Id*. at 3-547.

[212] *See* 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2451– Summary-OG-only; 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2456– TotalValByVCU-plusSummary-Phase 3; 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2457 – Summary-OG&YG.

[213] *See* 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2445 – TotalValby; 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2447 – TotalValbyVCU-OGonly; 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2448 – NICValbyVCU-OGonly; 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2449 – PositiveValbyVCU; 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2454 – PositiveValbyVCU-OGonly; 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2455 – TotalValbyVCU; 2008 TLMP AR 603_Spectrum_Files\9_4_ROD\9_4_2_Stumpage 2458 – NICValbyVCU.

[214] DEIS at 3-481; *see also* 2008 FEIS at 3-508.

[215] DEIS at 3-481.

[216] *See generally* DEIS at App. B.

Additionally, the agency knows that these same areas of the Tongass have already suffered the most adverse effects from the historical logging operations.[217] For example, Big Thorne is located in an area that historically contained more productive old-growth forest than any other part of the Tongass, but it has also experienced the highest amounts of logging.[218] Indeed, approximately 94 percent of the contiguous high-volume forest already has been logged on northern Prince of Wales Island.[219] As a result, there are approximately 50,261 acres of second-growth trees in the Big Thorne project area, of which 49,594 acres are a result of prior logging of old-growth forest.[220] Almost 40 percent of those young-growth stands (19,227 acres) are 25 years old or younger, in the stand initiation stage; the remaining are older and already in the stem exclusion stage.[221] Because of succession debt,[222] the full impacts of the 40 percent of stands still under 25 years of age have not yet been felt. Habitat quality will worsen as these stands reach stem exclusion. Yet these same areas are the only places on the Tongass the agency will be able provide timber sales that appraise positively.

The DEIS's failure to examine this information is unlawful. The agency knows, but fails to disclose relevant information regarding the overlap of positive timber sales and old-growth habitat. The FEIS must correct this failing and explain the adverse impacts associated with a timber program that can only operate on a handful of islands across the Tongass.

C. Logging in Buffers, Beach Fringe, & OGRs Compromises the Conservation Strategy.

The Forest Service's preferred alternative would allow second-growth logging, including clear-cuts of up to 10 acres, in OGRs, riparian management areas, and beach fringe buffers.[223] These areas comprise some of the most productive lands on the Tongass National Forest and their protection from logging is an essential component of the agency's conservation strategy. Clear-cutting on these protected lands compromises the conservation strategy and risks the viability of

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[217] D. M. Albert & J. W. Schoen, *Use of Historical Logging Patterns to Identify Disproportionately Logged Ecosystems Within Temperate Rainforests of Southeastern Alaska*, CONSERVATION BIOLOGY 27(4): 774-784 at PDF 6 (Table 1) (2013) (Albert & Schoen).

[218] *See* Big Thorne FEIS at 3-103; Albert & Schoen at PDF 7 (Fig. 2(b)); 2008 FEIS at 3-137 to 3-138 (explaining the largest trees in the Tongass, as well as those at lower elevations, were logged disproportionately decades ago due to their high productivity and the ease of access).

[219] Albert & Schoen at PDF 7.

[220] Big Thorne FEIS at 3-105.

[221] *Id*.

[222] *See* 2008 FEIS at 3-266; D. K. Person & T. J. Brinkman, Chapter 6: *Succession Debt and Roads, Short- and Long-Term Effects of Timber Harvest on a Large Mammal Predator-Prey Community in Southeast Alaska*, *in* NORTH PACIFIC TEMPERATE RAINFORESTS at 144, 155-160 (G. Orians & J. Schoen eds, 2013) (explaining consequences for deer and wolf dynamics).

[223] DEIS at 2-31.

many of the Tongass's most at-risk wildlife species. The DEIS entirely fails to analyze the myriad potential effects of this fundamental change in Tongass management. The undersigned groups request that the Forest Service retain current protections for OGRs, riparian management areas, and beach fringe buffers and reject any alternative that allows commercial logging in these areas.

The Tongass conservation strategy relies on a system of old-growth reserves, along with a set of protections for lands outside of the reserves that includes areas set aside as wildlife corridors to connect the reserves. Riparian management areas and beach fringe buffers provide essential connectivity between old-growth reserves for a wide variety of Tongass species. Although this system has not been proven sufficient to protect old-growth-dependent wildlife in the Tongass,[224] it provides a protective floor that should not be compromised. As the Pacific Northwest Research Station cautioned after its independent scientific peer review of the Forest Service's conservation strategy:

> Because of the unusually long time needed for succession to achieve climax in these temperate rain forests, a rotating block design for timber harvesting is not appropriate. Therefore, sufficient biodiversity *reserves must be established, and these must be permanently unavailable for timber harvest*. Otherwise blocks must be allowed to serve as source areas for many years beyond the age at rotation.[225]

The Forest Service has concluded that the "beach fringe was a very key feature of the overall Tongass conservation strategy."[226] Beach and riparian buffers are essential to maintaining viable populations of flying squirrels and other small mammals,[227] eagles, goshawks, deer, marten, otters, bears, shorebirds, waterfowl, bald eagles and other marine-associated species.[228] They also provide essential protections for salmon. According to the 2008 Amended Forest Plan FEIS:

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[224] *See* W. Smith, Proposed Forest Plan Amendment Further Compromises Established Conservation Measures to Sustain Viable Populations of Endemic Small Mammals (Feb. 2016) at PDF 9 (Smith Small Mammals Comments).

[225] 2008 TLMP AR 603_0009 (A. Ross Kiester & C. Eckhardt, *Review of Wildlife Management and Conservation Biology on the Tongass National Forest: A Synthesis with Recommendations* (Mar. 1994)) at 17 (PDF 24) (emphasis added).

[226] 2008 TLMP AR 603_1127 at 2.

[227] Smith Small Mammals Comments at PDF 9.

[228] 2008 Amended Forest Plan at 4-5.

> Beach and estuary fringe, and riparian habitats, have special importance as components of old-growth forests, serving as wildlife travel corridors, providing unique wildlife habitats, and providing a forest interface with marine or riverine influences that may distinguish them as separate ecosystems within the larger old-growth forest ecosystem . . . . In conjunction with riparian areas, which provide connectivity within watersheds, the beach fringe is thought to be a component of the major travel corridor system used by many resident wildlife species . . . . Accordingly, the Forest Plan establishes a Beach and Estuary Fringe Forest-wide Standard and Guideline that prevents timber harvest within 1,000 feet inland from mean high tide…Together, the beach and riparian habitat management features and the mapping of small reserves represented a substantial response to the landscape linkage element of conservation planning and significantly contributed to management of the overall matrix among habitat reserves.[229]

The Draft Forest Plan would allow clear-cutting of second-growth on up to 10-acre blocks. There is no science showing that these protected areas can be logged in economically viable ways without compromising the conservation values of the areas. To the contrary, scientists reviewing the TAC recommendations are highly critical of this strategy. For example, a group of ten independent scientists with significant Tongass experience stated that "we find no empirical data to support the contention that one can log 60-80 year old young-growth in ways that are economically viable *and* achieve desired wildlife benefits."[230] The scientists' letter reviews the current science on second-growth logging[231] and concludes, "[b]ased on the current science, the

[229] 2008 FEIS at D-10 to D-11.

[230] Alaback, P. *et al.*, Letter to Deputy Forest Supervisor Jason Anderson at PDF 2 (May 12, 2015) (Alaback).

[231] Alaback, P.B. and J.C. Tappeiner II, *Response of western hemlock (Tsuga heterophylla) and early huckleberry (Vaccinium ovalifolium) seedlings to forest windthrow*, Can. J. For. Res. 21: 534-539 (1991); 2008 TLMP AR 603_0806 (DellaSala, D.A. et al., *Effects of silvicultural modifications of temperate rainforest on breeding and wintering bird communities, Prince of Wales Island, southeast Alaska*, Condor 98:706-721 (1996)); 2008 TLMP AR 603_0182 (Hanley, T.A., *Potential management of young-growth stands for understory vegetation and wildlife habitat in southeastern Alaska*, Landscape and Urban Planning 72:95-112 (2005)); PR 769_05_000797 (Hanley, T.A. *et al.*, *Precommercial thinning: Implications of early results from the Tongass-Wide Young-Growth Studies experiments for deer habitat in southeast Alaska*, Res. Pap. PNW-RP-593, USDA Forest Service, Pacific Northwest Research Station, Portland, OR (2013)); Matsuoka, S. *et al.*, *Succession of bird communities in young temperate rainforests following thinning*, J. Wildlife Management 76(5):919-931 (2012); Van Horne, B., *Density as a misleading indicator of habitat quality*, The Journal of Wildlife Management, 893-901 (1983); Zaborske, R.R and M.H. McClellan, *Understory vegetation development following commercial thinning in Southeast Alaska: preliminary results from the second-growth management area demonstration project*, *in* Beyond 2001: A Silvicultural odyssey to sustaining terrestrial and

prospects of achieving old-growth forest characteristics by placing small clear-cuts in mature young-growth stands is extremely low. We anticipate these ecologically important areas will be deferred from logging until that science changes." [232] Similarly, in his comments on the TAC recommendations, Matthew Kirchhoff was highly critical of the assertion that the Forest Service could allow 10-acre cuts in protected areas and still maintain their conservation value:

> What you are recognizing is we made a mistake when we clear-cut such ecologically valuable areas in the first place. What you are doing now is sentencing them to an infinite cycle of more logging—out of the misguided notion that calling it restoration makes it good. More logging will create more clear-cuts, which will demand more logging of inevitable second-growth. How and when will these stands be allowed to become old-growth—real old-growth that doesn't need our constant tree-cutting intervention to minimally function?[233]

Mr. Kirchhoff concluded that the Forest Service "should take beach fringe and OGRs off the table, except possibly, in very limited research-oriented applications."[234]

The Forest Service has not properly accounted for the major impacts that would result from relaxing protections for these areas. Given that the Forest Service and independent scientists have concluded that old-growth reserves, beach fringe buffers, and riparian management areas are essential to maintaining the viability of a wide array of wildlife species on the Tongass, the Forest Service must not allow commercial logging in these areas. The DEIS's preferred alternative would compromise the integrity of the Tongass conservation strategy and is therefore not an acceptable alternative.

II. THE FOREST SERVICE HAS NOT PROVIDED ITS ASSESSMENT OF WILDLIFE VIABILITY OR DISCLOSED ITS REASONING AND CONCLUSIONS IN THE DEIS.

The Tongass is the first national forest to amend a plan completed under the 1982 Planning Rule using the 2012 Planning Rule.[235] In so doing, the Forest Service appears to suggest that although Chapters 2, 3, and 4 of the Draft Forest Plan continue to be governed by the 1982 Planning Rule the agency does not have to address the impacts of the planning amendment effort on the ability

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aquatic ecosystems (S. Parker & S. Hummel eds, 2002), Pages 74-82, Proceedings of a workshop in 2001 in Hood River, OR. U.S. Forest Service, Gen. Tech. Rep. PNW-GTR-546.

[232] Alaback at PDF 2.

[233] Kirchoff, M., Comments on Draft Tongass Advisory Committee Recommendations at 9 Cmt. 48 (Apr. 19, 2015).

[234] *Id.* at 2, Cmt. 6.

[235] U.S. Forest Service Proposed Plan Amendment, http://www.fs.usda.gov/detail/tongass/landmanagement/?cid=stelprd3801708 (Feb. 18, 2016).

of the Tongass to maintain viable, well-distributed fish and wildlife populations. To the contrary, given that Chapters 2, 3, and 4 are governed by the 1982 Planning Rule the agency must be adhere to those NFMA requirements.

As the Forest Service acknowledges,"[t]he 2008 [Amended] Forest Plan was developed under the 1982 Planning Rule, but most changes to that Plan are made under the 2012 Planning Rule."[236] The DEIS explains that "[a]ll deletions would be done in Chapters 1 to 4 of the proposed Forest Plan, and any substantial changes or additions to the 2008 [Amended] Forest Plan management direction would be incorporated into Chapter 5 of the proposed Forest Plan."[237] More specifically, the agency is proposing that Chapter 5 will be governed by the 2012 Planning Rule, but that Chapters 2, 3, and 4 will be continue to governed by the 1982 Planning Rule.[238]

The National Forest Management Act requires that the Forest Service provide for the diversity of plants and animals, based on the suitability and capability of each National Forest, as part of meeting overall multiple-use objectives.[239] The Forest Service in turn adopted the 1982 Planning Rule, which provides: "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area."[240] The agency characterizes a viable population, for planning purposes, "as one which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area."[241] This means, with regard to a forest plan, to "insure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area."[242] Stated more directly, "the forest plan must comply with substantive requirements of the Forest Act designed to ensure continued diversity of plant and animal communities and the continued viability of wildlife in the forest, including the requirement that wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area."[243]

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[236] DEIS at 2-10; *see also* Draft Forest Plan at 1-1.

[237] DEIS at 2-10.

[238] Draft Forest Plan at 1-4.

[239] 16 U.S.C. § 1604(g)(3)(B).

[240] 36 C.F.R. § 219.19 (2000).

[241] *Id*.

[242] *Id*.

[243] *Idaho Sporting Cong., Inc. v. Rittenhouse*, 305 F.3d 957, 961 (9th Cir. 2002).

Like the 2008 Amended Forest Plan,[244] the Draft Forest Plan explicitly incorporates these viability obligations.[245] Indeed, the DEIS explains "NFMA directs the Forest to manage wildlife habitat to maintain viable and well distributed populations to ensure continued existence in the planning area."[246] The agency explained that for its analysis, "the evaluation of viability includes considerations of the island archipelago environment as well as the best available science related to each species."[247]

Yet, the DEIS's discussion of direct and indirect species-specific impacts never discusses or describes the environmental effects in terms of impacts on the ability to retain viable, well-distributed fish and wildlife populations.[248] The cumulative impacts analysis offers only one mention of viability: "Activities that occur on other land ownerships within and adjacent to the Tongass have the potential to affect the overall context within which effects of Forest management on wildlife population distribution and viability are considered."[249]

Given the continued emphasis on industrial-scale old-growth logging in the Draft Forest Plan, and the changes to wildlife conservation elements of the plan, the Forest Service must comply with the 1982 Planning Rule and must explain its rationale regarding the ability to manage the Tongass habitat (both old-growth and second-growth) in such a way as to ensure well-distributed, viable populations of existing native and desired non-native vertebrate species. To do otherwise, violates NFMA's requirements.

Additionally, the DEIS fails to examine and disclose impacts on fish and wildlife viability. The DEIS states:

> The scope of this analysis is the individual proposed modifications the contributing elements of the conservation strategy and the associated potential to affect the functioning of the conservation strategy. The proposed Forest Plan amendment does not propose changes to the framework of the conservation strategy or the size or spacing of OGRs (with one exception resulting from land adjustments in the Carl Levin and Howard P. "Buck" Mckeon National Defense Authorization Act for Fiscal Year 2015 [hereafter referred to as the National Defense Authorization Act for Fiscal Year 2015]). The proposed OGR modifications

[244] 2008 Amended Forest Plan at 4-89 ("Provide the abundance and distribution of habitat necessary to maintain viable populations of existing native and desirable introduced species well-distributed in the planning area (i.e., the Tongass National Forest).").

[245] *See* Draft Forest Plan at 4-82.

[246] DEIS at 3-235.

[247] DEIS at 3-235.

[248] *See* DEIS at 3-239- to 3-260.

[249] DEIS at 3-260.

> compensate for portions of individual OGRs that were located on National Forest System (NFS) lands that were conveyed to the Sealaska Native Corporation (see below). Therefore, this analysis is not intended to be a review of the underpinnings of the conservation strategy or its effectiveness as a whole. Such an evaluation is outside the scope of this proposed Forest Plan amendment and would be more appropriately conducted in the context of a Forest Plan revision, which under the 2012 Planning Rule requires an assessment of ecological sustainability and diversity of plant and animal communities.[250]

This statement is incorrect and must be eliminated. Significant portions of the Draft Forest Plan continue to be governed by the 1982 Planning Rule and its viability requirements. As explained throughout these comments, the Forest Service is proposing dramatic changes to the 2008 Amended Forest Plan and the agency's conservation strategy and proposes to continue industrial-scale old-growth logging for more than a decade to come. As a result, the FEIS must examine both the adverse impacts and necessary mitigation measures associated with each alternative's ability to manage habitat in such a manner as to ensure well-distributed, viable wildlife populations on the Tongass.

III. THE FOREST SERVICE CANNOT IGNORE RELEVANT SCIENCE.

A. The Forest Service Has Not Complied With NFMA's Regulatory Requirements to Base its Decision on the Best Available Science.

During the forest planning process, the Forest Service must comply with substantive obligations to base its decision-making on the best available science. Despite these obligations, the Forest Service has, in many instances, ignored relevant science and, in others, attempted to shield itself from those obligations.

Under the 2012 Planning Rule, "[t]he responsible official shall use the best available scientific information to inform the planning process required by this subpart."[251] More specifically, the agency "shall determine what information is the most accurate, reliable, and relevant to the issues being considered."[252] The regulations require the agency to "document how the best available scientific information was used to inform . . . the plan decision . . . ."[253] The agency also "must[] [i]dentify what information was determined to be the best available scientific information, explain the basis for that determination, and explain how the information was applied to the issues considered."[254]

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[250] DEIS at D-3.

[251] 36 C.F.R. § 219.3.

[252] *Id*.

[253] *Id*.

[254] *Id*.

Throughout this comment letter, the undersigned groups have identified numerous instances in which the Forest Service has either ignored or failed to account for the best available science in the manner prescribed by 36 C.F.R. § 219.3. In so doing, the agency has violated its obligations under the 2012 Planning Rule.

B. The DEIS Fails to Include or Address Relevant Science.

Throughout these comments, the undersigned groups have identified numerous scientific publications the Forest Service apparently ignored or failed to consider. In fact, the DEIS acknowledges that numerous scientific publications have raised serious questions regarding the efficacy of the agency's wildlife management, but the agency refuses to consider the science. The DEIS states, for example,

> Since 2008, there have been research publications that address some of these species including goshawks (Smith 2013), wolves (Person and Russell 2008, 2009; Weckworth et al. 2010, 2011; ADF&G 2012; Person and Logan 2012), brown bears (Flynn et al. 2009), marten (Flynn and Schumacher 2009, Pauli et al. 2015), deer (White et al. 2009) and flying squirrels (Flaherty et al.2008, 2010; Pyare et al. 2010; Smith et al. 2011) that may warrant an assessment of the efficacy of the original conservation strategy design criteria. This type of assessment is outside of the scope of the proposed Forest Plan amendment, and would be more appropriately conducted in the context of a Forest Plan revision.[255]

NEPA also does not allow the agency to ignore relevant scientific opinion given the continuing focus on old-growth logging in the Draft Forest Plan. The FEIS must remedy this pervasive problem.

IV. THE FOREST SERVICE MUST EXAMINE THE ADVERSE EFFECTS OF SECOND-GROWTH LOGGING ON THE OVERALL CONSERVATION STRATEGY.

The Draft Forest Plan is predicated on logging second-growth stands on the earliest-logged and highest-productivity sites. Many, but not all, of these sites, are located primarily in the southern Tongass, and are several decades into the transition back to an old-growth state, which if allowed to continue, would eventually provide high habitat value. The Forest Service has not examined how, when, and whether logging particular areas will adversely affect Tongass ecosystems or the agency's conservation strategy.

The Forest Service knew when it adopted the 1997 Forest Plan that the second-growth issues raised important considerations that the agency did not attempt to address at the time. For example, in response to the Interagency Viable Population Committee (VPOP) report, the Pacific Northwest Research Station conducted an independent scientific peer review of the Forest

[255] DEIS at D-4.

Service's conservation strategy.[256] The peer review raised specific concerns regarding second-growth and the reserve system:

> *The amount, kind and spatial distribution of second-growth depends on the patterns of regeneration that occur on the Tongass National Forest.* These patterns of regeneration are only poorly understood at this time and yet will be crucial to any landscape design strategy (see Section 7.4.4). *This is an important point where wildlife considerations interact with other parts of the planning effort.* Silviculture and harvesting methods will dictate much of the future pattern of second-growth.[257]

As the comments provided by NRDC and Geos explain, not all second-growth stands have the same ecological value. The agency must consider and disclose the ecological considerations in deciding whether, how, and when to log second-growth stands. Stated differently, the Forest Service cannot reset the clock on the most productive portions of the Tongass without examining the enormous set-back to the conservation strategy writ-large. The FEIS must examine the environmental impacts of logging these second-growth stands and how those decisions affect the forest ecosystem and the conservation strategy.

FISH & WILDLIFE IMPACTS

Like the preceding section addressing the integrity of the conservation strategy, this section of our comments addresses the consequences of the Forest Service's current transition proposal to rely on an unenforceable—and hence functionally illusory—transition out of industrial-scale old-growth logging and make fundamental changes to the wildlife conservation strategy by allow logging in OGRs, beach buffers, and riparian areas. Many of the fish and wildlife impacts arise because the agency is proposing not to safeguard essential habitat from logging. In so doing, the agency's approach raises a wide-range of NEPA and NFMA infirmities. To avoid most if not all of these problems, the agency should adopt a forest plan amendment that ends industrial-scale old-growth logging in less than five years and respects the scientific underpinnings of the conservation strategy.

I. WOLVES & DEER

To comply with its NFMA obligations, and as is true for other species as well, the Forest Service must explain how and whether it has concluded the Draft Forest Plan will manage habitat in such a way as to ensure the continued presence of a well-distributed, viable population of wolves in the Tongass. To do otherwise, the agency would violate its NFMA obligations. The DEIS fails to supply this explanation and the agency must correct this failing in the FEIS.

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[256] 2008 FEIS at D-3 to D-4.

[257] 2008 TLMP AR 603_0009 (A. Ross Kiester & C. Eckhardt, *Review of Wildlife Management and Conservation Biology on the Tongass National Forest: A Synthesis with Recommendations* (Mar. 1994)) at PDF 23 (emphasis added).

A. Tongass Wolves are in Serious Decline.

Only a concentrated part of the Tongass has ever been capable of supporting permanent wolf populations. There are, for example, no wolves on the northern islands of Admiralty, Baranof, or Chichagof or their associated smaller islands.[258] Only the largest southern islands, "including Prince of Wales, Kuiu, Kupreanof, Mitkof, Etolin, Revillagigedo, Kosciusko, Zarembo, and Dall islands, are thought to support persistent wolf populations."[259]

But the large islands south of Frederick Sound are critical to the future of the wolf not just on the Tongass, but throughout all of Southeast Alaska. They "support approximately 60 to 70 percent of the total wolf population in Southeast Alaska."[260] In fact, in the mid-1990s the wolves on Prince of Wales Island and the smaller surrounding islands alone likely represented almost 40 percent of all of the wolves in Southeast Alaska.[261]

Yet according to the Forest Service, there has been a "[d]ramatic decline of wolf population on Prince of Wales Island."[262] The State of Alaska's most recent 2014 estimate for a study area within Game Management Unit 2 is 9.9 wolves per 1000 square kilometers, which Alaska Fish and Games admits is "significantly lower than the autumn 2013 estimate of 24.5 wolves/1000 km^2."[263] Thus, the most recent estimate by the State of Alaska for Game Management Unit 2 is only 9.9 wolves per 386 square miles or 0.025 wolves per square mile.

[258] 2008 FEIS at 3-284 (Table 3.10-9 n.2).

[259] 2008 FEIS at 3-236 to 3-237 (internal reference omitted); *see also id*. at 1-4 (map showing Prince of Wales, Etolin, Revillagigedo, and Zarembo islands); *id*. at 3-132 (map showing Kuiu, Kupreanof, Miktof, and Dall islands); 2008 TLMP AR 603_0290 at C2-420 (U.S Forest Service, Tongass Land Management Plan Revision, Draft Supplemental Environmental Impact Statement, Roadless Area Evaluation for Wilderness Recommendations, Volume II: Appendix C - Part 2 (May 2002)) (describing location of Kosciusko Island "near the northwest end of Prince of Wales Island"); 2008 TLMP AR 603_1603 (Roadless Area Inventory Map) (showing Kosciusko Island by identifying Roadless Area 515 on the island).

[260] 2008 FEIS at 3-237 (internal references omitted); *see also* Tongass National Forest Land and Resource Management Plan: Land Use Designations (Jan. 2008) (map showing location of Frederick Sound).

[261] PR 769_05_000523 (D. Person, *et al.*, *The Alexander Archipelago Wolf: A Conservation Assessment*, U.S. Forest Service at PDF 20 (Nov. 1996)) (Wolf Conservation Assessment).

[262] U.S. Forest Service Briefing Paper: Dramatic Decline of Wolf Population on Prince of Wales Island, Tongass National Forest at PDF 1 (May 29, 2015).

[263] *See* State of Alaska, Department of Fish and Game Division of Wildlife Conservation, Gretchen Roffler Memorandum to Ryan Scott at PDF 1 (June 16, 2015).

These troubling findings bolster the concerns Dr. David Person expressed when he participated in the Big Thorne environmental review.[264] He cautioned that wolves are "already facing the possibility of extinction on Prince of Wales Island."[265] He noted that Big Thorne logging "will remove the most important remaining deer winter habitat . . . [and] [a]s a result, the predator-prey relationship between wolves and deer on Prince of Wales is likely to collapse."[266] He opined that the "combined effects of Big Thorne and the other logging on wolves within the Prince of Wales Archipelago likely will be the collapse of a sustainable and resilient predator-prey ecological community."[267]

The Forest Service must address this decline in the FEIS. Additionally, it must explain whether and how the Draft Forest Plan fulfills the agency's obligations under NFMA to ensure the viability of the wolf.

B. The Draft Forest Plan and the DEIS Suffer From the Same Infirmities Addressed in *In Re: Big Thorne Project and 2008 Tongass Forest Plan*, No. 15-35244 (9th Circuit).

The Draft Forest Plan directly violates the agency's substantive obligation under the National Forest Management Act to adopt a forest plan that ensures the wolf remains viable in the Tongass. The 2008 Amended Forest Plan's critical mechanism for meeting this requirement is, the agency concedes, discretionary and non-binding and, as a result, the plan does not require the agency to maintain the necessary old-growth habitat to "insure [the wolf's] continued existence."[268] The Draft Forest Plan fails to correct this failing.[269]

Pursuant to the National Forest Management Act regulations, "wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area."[270] "[T]o insure that viable populations will be maintained," a forest plan must manage habitat in such a way as "to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with

[264] *See generally* Statement of David K. Person Regarding the Big Thorne Project, Prince of Wales Island (Aug. 15, 2013) (Person Statement); David K. Person Comments Regarding the Draft Supplemental Information Report for the Big Thorne Project (June 23, 2014).

[265] Person Statement at PDF 15-16.

[266] Person Statement at PDF 16; *see also id*. at PDF 1 (explaining Big Thorne will remove what remains of "the last high quality winter range for deer"); Audubon Alaska, Correction to Big Thorne SIR Comments, Updated USFS Deer Habitat Capability Map (Aug. 7, 2014).

[267] Person Statement at PDF 6.

[268] 36 C.F.R. § 219.19 (2000).

[269] *See* Draft Forest Plan at 4-88.

[270] 36 C.F.R. § 219.19 (2000); *see also* 16 U.S.C. § 1604(g)(3)(B).

others in the planning area." As described above, both the Draft Forest Plan and the 2008 Amended Forest Plan explicitly incorporate these obligations.[271]

In adopting the 2008 Amended Forest Plan, the Forest Service concluded that if the agency managed habitat in such a way that maintained sustainable wolf populations, it would by necessity maintain viable wolf populations. According to the Forest Service, the Wolf Conservation Assessment provided the best available information regarding wolf viability and it concluded that it was not scientifically defensible to identify what minimum wolf population would insure the wolf's continued existence. As a result, the Forest Service accepted its experts' recommendation that the agency meet its viability obligations by minimizing the risk of dropping below that unidentified viability floor by maintaining sufficient old-growth habitat to support the higher level of sustainable wolf populations (which accounts for deer hunting and wolf hunting and trapping). The Forest Service, however, concedes the 2008 Amended Forest Plan does not require the agency to maintain sufficient habitat to support sustainable wolf populations.[272]

Additionally, the DEIS does not examine or disclose how much of the Tongass is not expected to meet its generally recognized level of habitat capability of 18 deer per square mile to support a functioning dynamic between sustainable wolf populations and current human deer hunting as a result of the amount and concentrated location of the logging contemplated by the Draft Forest Plan. The agency does not explained how far below it expects individual wildlife analysis areas, biogeographic provinces, or even larger geographic areas to fall below this level of habitat capability. The DEIS fails to disclose this information or examine the consequences for the wolves and human deer hunters.

The DEIS also never examines the impacts on wolves and human deer hunters given the intersection of limited habitat availability and the fact that the economically viable timber sales are almost certain to come from wolf habitat. The agency knows that 60-70 percent of the wolves in Southeast Alaska inhabit areas that will largely or exclusively have to be logged to achieve the timber goals set out in the Draft Forest Plan. In 2008, the Forest Service provided maps that examined the stumpage values across the Tongass. Here, the agency fails to disclose any of the relevant information regarding the overlap of positive timber sales and wolf habitat. The agency must correct that failing in the FEIS.

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[271] *See supra* pp. 48-51.

[272] *See generally* Forest Plan Appellants' Opening Br. (July 2, 2015) (Doc. 19), Answering Brief of the Federal Defendants (Aug. 20, 2015) (Doc. 37-1), Forest Plan Appellants' Reply Brief (Sept. 8, 2015) (Doc. 45) in *In Re: Big Thorne Project and 2008 Tongass Forest Plan*, No. 15-35244 (9th Circuit). The briefing in this case, including the arguments advanced by the Forest Service, and the supporting record citations are incorporated by reference into this comment letter in their entirety.

C. The USFWS Wolf Finding Raises Important and Unanswered Questions Regarding the Forest Service's Ability to Maintain Viable Well-Distributed Wolves on the Tongass.

The Forest Service also must address the very troubling information from the U.S. Fish and Wildlife Service regarding the status of the wolf on the Tongass.[273] The U.S. Fish and Wildlife Service Service, for example, concluded that Game Management Unit 2 only has 50-159 wolves, representing six percent of range.[274] In 1995, the wolf population in that area was 300-350 animals.[275] Thus, although the U.S. Fish and Wildlife Service ultimately concluded that ESA listing was not warranted (given the overall geographic range of the wolf), it acknowledged that there was reasonable risk that wolves could be significantly reduced, or perhaps even extirpated, from Prince of Wales Island and the smaller surrounding islands as a result of declining prey abundance and increasing density of roads and subsequent human-induced mortality risk to wolves.[276]

As the Forest Service acknowledged in the 2008 FEIS:

> Recent research (*Alexander Archipelago Wolf*, presented at the Tongass Conservation Strategy Review Workshop 2006) has shown that the population on [Prince of Wales] Island is genetically isolated from other Tongass populations, *which presents profound implications for maintaining well-distributed wolf populations* in light of local declines, given that these populations are are [*sic*] more sensitive to human activity and habitat disturbance than wolf populations elsewhere in the state (Schoen and Person 2007).[277]

The Forest Service must explain its viability conclusions in light of the important components of genetic biodiversity the wolves on Prince of Wales and surrounding islands provide to the larger Tongass population. And the FEIS must disclose and explain the agency's assessment of the relevant science and explain its conclusions regarding the impacts to wolves.

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[273] *See generally* 81 Fed. Reg. 435 (Jan. 6, 2016).

[274] *Id*. at 440.

[275] Person Statement at PDF 9.

[276] 81 Fed. Reg. at 440, 452, 455-56, 458.

[277] 2008 FEIS at 3-281 (emphasis added); *see also* 2008 TLMP AR 603_0879 (B.V. Weckworth *et al., A Signal for Independent Coastal and Continental histories among North American wolves*, MOLECULAR ECOLOGY 14: 917-931 (2005)); PR 769_05_000489 (B.V. Weckworth *et al., Phylogeography of wolves (Canis lupus) in the Pacific Northwest*, JOURNAL OF MAMMALOGY, 91(2):363-375 (2010)); B.V. Weckworth *et al., Genetic distinctiveness of Alexander Archipelago wolves (Canis lupus ligoni): Reply to Cronin et al. (2015)*, JOURNAL OF HEREDITY 1-3 (2015); E. A. Lacey, Ph.D. President, American Society of Mammalogists, Letter to Dr. Kimberley Titus, Alaska Department of Fish and Game (Nov. 1, 2015).

Additionally, the amendment process gives the Forest Service the opportunity to strengthen the plan provisions governing wolves. For example, management of road densities to limit hunter and trapper access should be required, rather than recommended, at least in the areas of greatest concern for wolves. The wolf management program should not require unanimous agreement. The U.S. Fish and Wildlife Service, the Forest Service, and others have repeatedly expressed concerns wolf mortality, but no such program has been developed because of the current plan provision.

II. GOSHAWKS

Goshawks are associated with, and well-adapted to, specific forest environments, and the prey that inhabit them. They "have broad short wings and a long tail, which enable rapid acceleration and agile maneuverability . . . ."[278] They "hunt by alternating short flights with a period of watching from a perch. Once prey is spotted, an attack is launched from the perch (Squires and Reynolds 1997). This method of hunting relies on cover to conceal the predator's approach, perches from which to observe and attack, adequate visibility for spotting prey, and adequate space between trees to allow for flying between perches and attacking prey (Reynolds et al. 1992)."[279] Canopy cover also protects goshawks and their nestlings from avian predators such as great horned and barred owls, and bald eagles.[280]

Importantly, in Southeast Alaska, goshawks are associated with a very particular forest type: very highly to moderately productive old-growth (250 years old or older).[281] Nests are "typically located in tall trees, within high-volume forest stands with relatively high canopy cover."[282] They spend significantly less time in low productivity forest (approximately 10 percent)[283] and actively avoid clear-cuts, nonforested areas, and mature sawtimber (approximately 75- to 150-year old stands).[284] "The amount and distribution of productive old-growth forest (especially the moderate to very high volume components), mature sawtimber, and riparian and beach zones are likely to set a limit on goshawk distribution and abundance."[285]

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[278] PR 769_05_000487 (U.S. Fish and Wildlife Service, Alaska Region, Juneau Fish and Wildlife Office, Queen Charlotte Goshawk Status Review) at 35 (Apr. 25, 2007)) (USFWS Goshawk Review).

[279] *Id.* at 64.

[280] *Id.* at 67, 107-08.

[281] *See* 2008 TLMP AR 603_0150 at PDF 43 (G. C. Iverson *et al., Conservation Assessment for the Northern Goshawk in Southeast Alaska* (Nov. 1996)) (finding "a combined 58 percent of all habitat use occurring in these cover types") (Goshawk Conservation Assessment).

[282] The Shipley Group, Goshawk Survey Soule River Watershed Southeast Alaska at 8 (2009).

[283] Goshawk Conservation Assessment at PDF 43 (Table 9).

[284] *Id*. at PDF 42, 40, 43.

[285] *Id*. at PDF 69.

More specifically, as noted goshawk expert, Dr. Winston Smith explains in his comments on the Draft Forest Plan, "three critical spatial components of the nesting home range have been characterized: nest area, post-fledging family area (PFA), and foraging area."[286] Goshawk pairs have multiple nest areas (two to eight) and use nest areas for more than a year, but they can be used intermittently for decades.[287] Experts recommended that each goshawk pair have at least three nest areas, as well as three replacement nest areas.[288] Post-fledging family areas portions of the breeding home ranges used by adults and juveniles after young birds leave the nest.[289] These areas must afford young birds protection from predators and sufficient prey to sustain them as they develop.[290] These areas "should have overstories with at least 50 percent canopy cover and well-developed herb and shrub understories, as well as key habitat features essential to the life histories of the goshawk prey species."[291] Goshawks' foraging habitat must support a variety of prey species, requiring "an uneven-aged silvicultural system, which produces a mosaic of different-aged stands . . . rather than regeneration harvest, such as clear-cuts, that remove the entire canopy and result in a single, uniform and dense canopy for decades following harvest."[292] Goshawks foraging habitat reflects the majority of breeding home range.[293] Each of these three types of habitat "needs to be considered simultaneously in land-use planning or mitigation."[294]

A. A Multitude of Factors Threatens the Viability of Goshawks Throughout Southeast Alaska.

Goshawks in Southeast Alaska are at risk from both natural and anthropogenic factors, described below, that have resulted in extremely large territories and presumed increased risk factors, along with low goshawk numbers as follows.

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[286] W. Smith, Proposed Forest Plan Amendment Further Compromises Established Conservation Measures to Sustain Viable Northern Goshawk Populations at PDF 3 (Feb. 2016) (citing Reynolds et al. 1992) (Smith Goshawk Comments). The undersigned groups incorporate the Smith Goshawk Comments into this letter in their entirety, including all cited publications.

[287] *Id*. at PDF 3 (citing Reynolds et al. 1992).

[288] *Id*. (citing Reynolds et al. 1992).

[289] *Id*. (citing Reynolds et al. 1992).

[290] *Id*.

[291] *Id*. (citing Reynolds et al. 1992).

[292] *Id*. at PDF 4 (citing Nowacki & Kramer 1997).

[293] *Id*. at PDF 6.

[294] *Id*. at PDF 5 (citing Reynolds et al. 2006, Northern Goshawk *Accipiter gentilis laingi* Recovery Team 2008).

1. Goshawks have come to depend upon large territories in the region.

In Southeast Alaska, a combination of factors, including low prey abundance, natural fragmentation (by ice fields, muskeg bogs, steep terrain, and scattered islands), and past "highgrading" (disproportionately cutting down higher volume forest stands) has forced goshawks into larger foraging territories than anywhere else in North America. Breeding-season home ranges average 4,500 hectares (11,120 acres) for females, and 5,900 hectares (14,580 acres) for males.[295] One male breeding season use area was radio-tracked at more than 19,000 hectares (47,000 acres).[296] By contrast, in the rest of North America, breeding-season ranges average between 570 and 3,500 hectares.[297] Year-round use areas in Southeast Alaska are vast, averaging more than 15,000 hectares (up to 67,000 hectares) for males, and more than 50,000 hectares (up to 180,000 hectares) for females.[298]

As the U.S. Fish and Wildlife Service has noted, the energy expenditure associated with having to seek prey over such enormous areas poses a serious threat to goshawks in Southeast Alaska:

> Physiologically, foraging is a trade-off between the energy expended to acquire food and energy derived from its acquisition. The energetic demands of foraging increase with distance traveled. The thresholds for individual survival and for supplying food to nestlings and a brooding mate in this energy balance are unknown, but habitat alteration that decreases foraging efficiency will push individuals and broods toward that threshold.[299]

As foraging ranges increase during the breeding season, the likelihood of reproductive success is adversely affected. "Longer travel distances during foraging increase ... the probability that adults may abandon nests."[300] A Forest Service report concluded more than 15 years ago that "The very large areas used by goshawks in southeast Alaska may lead to high energy expenditure during daily movements. . . . [P]opulations of individuals requiring large ranges may be energetically stressed, have lower reproductive success, and be less resilient to further stress . . . ."[301] Outside of the breeding season, range expansion is associated with increased risk

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[295] 2008 TLMP AR 603_0815 at PDF 30-31 (C. Flatten, *et al.,* Alaska Department of Fish and Game, Northern Goshawk Monitoring, Population Ecology and Diet on the Tongass National Forest (Nov. 2001)) (Flatten).

[296] *Id.* at PDF 31.

[297] USFWS Goshawk Review at 34.

[298] Flatten at PDF 30-31; *see also* Goshawk Conservation Assessment at PDF 37-38 (recording multiple males and females using areas larger than 400,000 acres (162,000 hectares)).

[299] USFWS Goshawk Review at 66.

[300] *Id.*

[301] Goshawk Conservation Assessment at PDF 71.

of death. "Mortality of both male and female adult goshawks in Southeast Alaska was highest in late winter, when food availability is lowest" (and ranges were at their largest).[302]

2. Tongass Goshawks are a small, isolated, and declining population.

A second major threat to goshawks in Southeast Alaska, partially related to the phenomena discussed above, is the fact that they comprise a small, potentially genetically isolated, and almost certainly declining population. As USFWS has noted, Queen Charlotte goshawks exist in an inherently precarious status, highly vulnerable to any further stresses. "Given the small populations, low survival or reproductive rates could not be sustained long before viability of the subspecies would be at risk."[303]

USFWS has estimated that there are only approximately 300 to 400 pairs of goshawks remaining in the region (about the same number as in British Columbia, which USFWS determined to be a distinct population segment and threatened within the meaning of the Endangered Species Act).[304] USFWS has also determined that the Southeast Alaska population is largely isolated, because it appears to be cut off from both the Queen Charlotte Islands to the south (by open ocean), and the British Columbia mainland to the east (by the Coast Range mountains). And the agency has concluded that Tongass birds may be genetically diverse from Canadian specimens as well.[305]

In fact, the USFWS figure likely overstates the number of reproductive pairs in Southeast Alaska, putting local birds in an even worse position than USFWS reports. USFWS based its population estimate on studies done by Schempf and Woods (2000) and Flatten *et al.* (2001).[306] Schempf and Woods estimated that the Tongass National Forest contained between 580 and 747 nesting territories.[307] Flatten *et al.* (2001) used broadcast and telemetry surveys to determine that, on average, approximately 45 percent of nesting territories are occupied in any given year.[308] Applying Flatten's territory occupancy rate to Schempf and Woods' total territories, the USFWS estimated that, as of 2000, there were approximately 261 to 336 breeding pairs in the

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[302] USFWS Goshawk Review at 33, 41; *see also id.* at 55 ("Most adult mortality in Southeast Alaska and on Vancouver Island occurs in late winter (Titus et al. 2002, McClaren 2003a), when prey densities are lowest and snow or other factors may limit prey availability. Dead birds recovered were emaciated or in areas with limited prey, and food stress or starvation was suspected (Titus et al. 2002, McClaren 2003a)").

[303] USFWS Goshawk Review at 8-9.

[304] *See* 77 Fed. Reg. 45870, 45887-88 (Aug. 1, 2012); 72 Fed. Reg. 63123, 63,128 (Nov. 8, 2007).

[305] 72 Fed. Reg at 63,135.

[306] *Id*. at 63,127-28; *see also* P. Schempf & T. Woods, *Summary of Status of Queen Charlotte Goshawk Remand* (Feb. 23, 2000) (Schempf & Woods); Flatten.

[307] 72 Fed. Reg. at 63,127.

[308] 72 Fed. Reg. at 63,127-28.

Tongass National Forest.[309] Though it did not explain its methodology, the USFWS then extrapolated this range to estimate that approximately 300 to 400 pairs of goshawks occupied Southeast Alaska.[310]

However, much of the area that Schempf and Woods categorized as goshawk habitat, very likely would not support breeding birds. They considered hypothetical territories with as little as 20 percent of the land area in old-growth forest as "suitable."[311] In contrast, both the Goshawk Conservation Assessment and Doyle concluded that, to be suitable, at least half of a bird's territory probably needed to be covered in old-growth forest.[312] The Forest Service appears to accept these conclusions in principle.[313]

Thus, applying a more realistic habitat parameter would necessarily have led Schempf and Woods to a much lower estimate of the theoretical maximum number of suitable territories, and the USFWS to a much lower estimate of actual breeding pairs. A lower number would also be more consistent with a recent USFWS estimate for breeding pairs in Canada. In discussing its decision to list Queen Charlotte goshawks in British Columbia as threatened, USFWS estimated that, as of 2008, there were about 352 to 374 pairs of goshawks throughout the British Columbia (B.C.) distinct population segment (DPS).[314] However, the B.C. DPS inhabits twice as much productive old-growth forest (5.7 million ha) as the Southeast Alaska DPS (2.2 million ha).[315] It is not biologically plausible that half as much suitable habitat, in Southeast Alaska, would support as many pairs of the same subspecies as are found in neighboring and ecologically similar B.C. A substantially lower reproductive population would also be more consistent with

[309] 72 Fed. Reg. at 63,127-28.

[310] *Id*.

[311] Schempf & Woods at 6 (explaining that "[c]ells with less than 20 percent of the land area in old-growth forest were excluded," but cells with more than that were counted).

[312] *See* Goshawk Conservation Assessment at PDF 43 ("a strong pattern for selection of very high to moderately productive old-growth forest with a combined 58 percent of all habitat use occurring in these cover types"); F. Doyle, *Breeding Success of the Goshawk (A. g. laingi) on Haida Gwaii/Queen Charlotte Islands: Is the Population Continuing to Decline* at 33 (Mar. 2005) (Doyle) ("[T]here appears to be a requirement for >41% and more typically >60% of the area to be in mature-old-growth forest, before goshawk breeding is detected in a landscape"). Doyle defined "mature" forest as 81-250 years old, and "old" forest as more than 250 years old. Doyle at 7.

[313] *See* Big Thorne FEIS at 3-132 to 3-133.

[314] 77 Fed. Reg. at 45,887.

[315] *See* U.S. Fish & Wildlife Service, Alaska Region, Juneau Fish and Wildlife Office, Updated Appendices Queen Charlotte Goshawk Status Review at 7 Table A-9 (May 2010).

Crocker-Bedford's 1994 estimate that there were at the time 100-200 breeding pairs of goshawks in all of Southeast Alaska.[316]

Further, due to continued logging of old-growth, it is highly probable that the Southeast Alaska population getting smaller. The Tongass National Forest reported having logged 6,996 acres between fiscal years 2007 and 2012.[317] And in addition to federal logging, habitat liquidation on other holdings has been considerable.[318] Compounding this problem, even if all old-growth logging in all of Southeast Alaska stopped today, the goshawk population would probably still continue to decline given lag times in population responses, particularly if a viability threshold has been crossed. As USFWS has explained, "goshawk populations may continue to decline for several years after logging of old-growth forests has ceased and timber harvest is restricted to second-growth stands because it is likely to take several generations for the populations to equilibrate with their modified environments."[319]

B. Goshawks on Prince of Wales Island Are More Vulnerable Than Elsewhere in the Tongass, Because of Natural Lack of Prey, Intensive Logging, Huge Territories, and Low Productivity.

1. Prince of Wales Island lacks important prey species for goshawks.

For a number of reasons, goshawks on Prince of Wales Island are more stressed, more sensitive, and more vulnerable to continued logging of old-growth forest than goshawks anywhere else in Southeast Alaska. Even without logging impacts, Prince of Wales Island and surrounding islands naturally lack important prey species. Red squirrels, which are significant prey for goshawks elsewhere in Southeast Alaska, are absent.[320] There is a species of flying squirrel in the area, but it is nocturnal, and essentially unavailable to goshawks (particularly during critical winter months).[321] Moreover, the long-term viability of flying squirrels themselves is in doubt on Prince of Wales Island, because small habitat reserves are too small to sustain their

[316] D. Crocker-Bedford, Interagency Viable Population Committee for Tongass Land Management Planning, Conservation of the Queen Charlotte Goshawk in Southeast Alaska at 4 (May 5, 1994) (Crocker-Bedford).

[317] *See* U.S. Forest Service, 2012 Annual & Five Year Monitoring and Evaluation Report at 8 (May 2013).

[318] *See, e.g.*, USFWS Goshawk Review at 81 ("Intensive clear-cutting on large areas of corporation land [in Southeast Alaska] has converted many watersheds to very low quality habitat, or non-habitat, for goshawks. Loss of this habitat has likely contributed to at least local declines in goshawk populations").

[319] 72 Fed. Reg. at 63,136.

[320] Goshawk Conservation Assessment at PDF 65; Big Thorne FEIS at 3-133.

[321] USFWS Goshawk Review at 39.

populations in the absence of immigration, and the species' ability to disperse adequately across intervening spaces, whether naturally unforested or logged, is in doubt.[322]

Prince of Wales Island and the surrounding islands also lack sooty (blue) grouse, another key food source for goshawks elsewhere in Southeast Alaska.[323] Although spruce grouse inhabit the area, they are only about half the size of sooty grouse.[324] Further, logging has reduced the availability of spruce grouse to goshawks, because spruce grouse avoid clear-cuts, instead inhabiting 15- to 35-year-old second-growth,[325] where goshawks are at a distinct disadvantage because of the density of the tree stems, which "interfere with flight lines and decrease hunting success."[326] As a result, "[r]esearchers have identified food stress as a limitation for goshawks on Prince of Wales Island and surrounding islands in southern Southeast Alaska . . . ."[327] For example, "[m]ost females that died [of starvation] during Flatten et al.'s (2002) study were from the Prince of Wales area, which lacks red squirrels, hares and sooty grouse to support goshawks during winter (Titus et al. 2002)."[328]

2. Aggressive logging has affected disproportionately Prince of Wales Island.

Goshawks are also particularly at risk on Prince of Wales Island, because its forests have been disproportionately targeted by the timber industry:

[322] *See* W.P. Smith & D. K. Person, *Estimated persistence of northern flying squirrel populations in temperate rain forest fragments of Southeast Alaska,* Biological Conservation 137:626-636 (2007) at PDF 1; *see also* PR 769_05_000465 at PDF 9 (E. Flaherty, *et al., Diet and Food Availability: Implications for Foraging and Dispersal of Prince of Wales Northern Flying Squirrels Across Managed Landscapes,* JOURNAL OF MAMMOLOGY 91(1):79-91 (2010) at PDF 9 ("Our results suggest low availability of potentially critical food items in managed habitats, which may constrain dispersal of [flying squirrels on Prince of Wales Island]").

[323] USFWS Goshawk Review at 39; Goshawk Conservation Assessment at PDF 65.

[324] USFWS Goshawk Review at 39.

[325] *Id.* at 63.

[326] *Id.* at 36.

[327] 72 Fed. Reg. at 63136.

[328] USFWS Goshawk Review at 41.

> Timber harvest has not been evenly distributed across the Tongass NF. There are 21 biogeographic provinces within the Tongass NF (USDA Forest Service 1996a), and several have had little or no harvest (e.g., Admiralty Island and the mainland provinces). Other provinces have had substantial timber harvest activity (e.g., northeast Chichagof and Prince of Wales Islands).[329]

Already by 1995, more than 20 percent of the old-growth forest of northern Prince of Wales Island had been logged.[330] This percentage was almost twice as high as the next most-logged biogeographic provinces.[331] For context, the Goshawk Conservation Assessment concluded that "[h]arvest rates exceeding 13 percent [by 1995] . . . represent[ed] increased risk to long-term goshawk persistence."[332]

Subsequent logging on both federal and non-federal lands has substantially worsened the situation by contributing to cumulative effects. In 2007, the USFWS reported that:

> Threats to the Queen Charlotte goshawk in Southeast Alaska are greatest on Prince of Wales Island and the surrounding smaller islands at the southern end of the DPS. Timber harvest on both the Tongass National Forest and native corporation lands has been intensive in some parts of this area. Approximately 26 percent of the productive forest on Prince of Wales and the surrounding islands has been harvested, including some of the most productive forest lands in Southeast Alaska (Albert and Schoen 2006, pp. 15-18).[333]

3. Goshawks maintain larger territories and experience lower productivity on Prince of Wales Island than anywhere else in Southeast Alaska.

Loss of goshawk habitat and lower prey abundance on Prince of Wales Island (and nearby islands) has had a serious adverse impact on territory size and nesting productivity. USFWS reports that goshawks on Prince of Wales Island experience "comparatively low goshawk nesting

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[329] Goshawk Conservation Assessment at PDF 13; *see also* 2008 FEIS at 3-201 (indicating that North Central Prince of Wales Island has been logged far more heavily than any other Biogeographic Province); 72 Fed. Reg. at 63,131 ("Corporate lands, which cover only 3 percent of the total area of Southeast Alaska but include 7 percent of the region's 6.4 million ac (2.6 million ha) of productive forest, are distributed throughout Southeast Alaska, with concentrations on and near Prince of Wales Island . . .").

[330] Goshawk Conservation Assessment at PDF 80, Table 26.

[331] *Id.*

[332] *Id.*

[333] 72 Fed. Reg. at 63,136.

densities and lower reproductive success than elsewhere in the DPS."[334] Similarly, the Goshawk Conservation Assessment noted that goshawk territories on Prince of Wales Island are larger than elsewhere in Southeast Alaska.[335] Indeed, the very large individual home ranges mentioned above are from Prince of Wales Island.

Loss of habitat, in particular, affects goshawk densities (i.e., territory sizes) and reproductive success through several mechanisms:

> Several factors may contribute to decreased productivity and density in goshawk populations following particular changes in forest structure and composition: (1) increased predation on adults and young goshawks as hiding cover is reduced and potential predator populations increase (e.g., great horned owls); (2) loss of cool thermal conditions at nest sites; (3) reduced prey abundance or availability, or both; (4) increased competition as predators that adapt to more open forest become abundant; and (5) increased disturbance and human-caused mortality due to increased access from the timber harvest road network.[336]

C. The DEIS Does Not Disclose the Precarious State of and Serious Risks to the Viability of Goshawks on the Tongass.

The DEIS wholly fails to disclose or examine the serious risks to goshawks on the Tongass, either the pre-existing risks or the ways in which the various alternatives would aggravate them, in any fashion that would alert the public or decision-makers to them. In fact, it offers only four paragraphs to describe the goshawks' biological and ecological needs.[337] It fails to reference most of the scientific literature discussed in this section of the comment letter.[338] The impacts analysis is a paltry six paragraphs and never even addresses the fundamental changes proposed in the Draft Forest Plan.[339]

For example, the 2008 Amended Forest Plan classifies areas within the beach[340] and estuary fringe[341] "as unsuitable for timber harvest."[342] It establishes several important objectives regarding these areas:

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[334] 72 Fed. Reg. at 63,136-37.

[335] Goshawk Conservation Assessment at PDF 74.

[336] *Id.* at PDF 27.

[337] *See* DEIS at 3-211 to 3-212.

[338] *See id.*

[339] *See id.* at 3-240 to 3-241.

[340] The beach fringe is an area of approximately 1,000 feet slope distance inland from mean high tide around all marine coastlines. 2008 Amended Forest Plan at 4-4.

> 4. To maintain an approximate 1,000-foot-wide beach fringe of mostly unmodified forest to provide important habitats, corridors, and connectivity of habitat for eagles, goshawks, deer, marten, otter, bear, and other wildlife species associated with the maritime-influenced habitat. Old-growth forests are managed for near-natural habitat conditions (including natural disturbances) with little evidence of human-induced influence on the ecosystem.
>
> 5. To maintain an approximate 1,000-foot-wide estuary fringe of mostly undisturbed forest that contributes to maintenance of the ecological integrity of the biologically rich tidal and intertidal estuary zone. Habitats for shorebirds, waterfowl, bald eagles, goshawks, and other marine-associated species are emphasized. Old-growth conifer stands, grasslands, wetlands, and other natural habitats associated with estuary areas above the mean high tide line are managed for near-natural habitat conditions with little evidence of human-induced disturbance.[343]

The Forest Service concluded that the "beach fringe was a very key feature of the overall Tongass conservation strategy," particularly with regard to goshawks.[344] As Chris Iverson, the author of Appendix N to the 1997 FEIS, explained:

> The most compelling argument for this extended beach fringe is that this zone of 1000 feet from the shoreline is a landscape region significantly selected by goshawks, for foraging we presumed, during our habitat selection analysis (see Goshawk [Conservation] Assessment, Figure 9, pages 52-53). When the leadership (Forest Supervisors, RF, IDT Leader) were presented with this graph and statistic -the decision was made to extend the beach fringe to 1000' to provide additional risk reduction and confidence in goshawk conservation to contribute to a not warranted decision by the FWS for the listing petition that they were considering at the time.[345]

The Draft Forest Plan deletes the portions of the standards and guidelines that prevented logging in the beach (and estuary) fringe.[346] In their place, the agency proposes a Forest-wide standard

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[341] The estuary fringe is an area of approximately 1,000 feet slope distance around all identified estuaries. *Id*. at 4-4.

[342] *Id*. at 4-5.

[343] *Id*. at 4-4.

[344] 2008 TLMP 603_1127 at 2.

[345] *Id.*

[346] PR 769_01_000088 (Redlined Version of Draft Forest Plan) at 4-5.

that prevents most old-growth logging in these areas (with several exceptions that do not count towards the projected timber sale quantity),[347] but the proposed plan now allows second-growth logging.[348] The DEIS, however, fails to examine the impacts of this change on the underlying conclusions regarding goshawk viability. In so doing, the agency violates NFMA and NEPA.

The DEIS also never examines how the proposed alternative will adversely affect the "three critical spatial components of the nesting home range:"[349] nest area, post-fledging family area, and foraging area.[350] As Dr. Winston Smith made clear in his comments, it also fails to examine the risks to goshawks in light of more recent science:

> First, spatially explicit analyses of contributions to northern goshawk breeding-season habitat revealed that conservation measures of the Tongass Land and Resource Management Plan contribute about half the secure habitat recommended for post-fledging areas of breeding pairs in the southern portion of this species range (Reynolds et al. 1992) and was less than half the relative amount of habitat documented in nest areas in Southeast Alaska. A similar conclusion was obtained for the broader landscape (21 km2) that surrounded each nest. This is because much of the habitat across the landscape has been clear-cut-logged and half the remaining choice habitat is in the Development land-use designation available for timber harvest.
>
> . . .
>
> Secondly, guidelines developed for northern goshawk populations in the southwestern United States may underestimate habitat needed by breeding pairs in Southeast Alaska.
>
> . . .
>
> In Southeast Alaska, the predominant (frequency and biomass) prey items during the breeding season (Lewis et al. 2006) are bird and mammal species that are most abundant, or occur exclusively, in productive old-growth forests (Iverson et al. 1996,Smith et al. 2001, 2004, 2005). Consider further that the mammal fauna of Southeast Alaska is depauperate (Smith 2005); few mammal species exclusively occur in low-volume or managed forests of Southeast Alaska (Smith et al. 2001, Smith and Nichols 2004); and the structure of dense second-growth stands effectively renders

[347] Draft Forest Plan at 5-17 (S-BEACH-01)

[348] *See* Draft Forest Plan at 5-8.

[349] Smith Goshawk Comments at 3.

[350] *See generally* DEIS at 3-240 to 3-241.

> prey unavailable to foraging goshawks (Reynolds et al 1992, 2006). Avian communities in managed forests include few, if any, additional prey for northern goshawks (Smith et al. 2001). Thus, breeding pairs in managed landscapes of Southeast Alaska likely rely almost entirely on productive old-growth forests as foraging and nesting habitat. That breeding pairs in managed landscapes of Southeast Alaska depend on productive old-growth forests to meet life-history needs was reflected in the findings of compositional analyses and radio-telemetry studies, both of which determined that northern goshawks strongly selected medium- and high-volume old-growth forests, and avoided recently managed or non-forested habitats [Goshawk Conservation Assessment].[351]

These challenges are exacerbated by the Forest Service's choices for second-growth management. "The potential for second-growth stands to become useable habitat over the Tongass planning horizon is limited because unmanaged second-growth typically requires at least 300 years following disturbance to develop old-forest features (Nowacki and Kramer 1998)."[352] Rather than manage second-growth in a way that returns it to old-growth characteristics, the Forest Service is targeting second-growth for commercial purposes in critical old-growth reserves, Beach-Estuary Fringe, and Riparian Management Areas. As explained above, these areas were set aside as reserves because they represented important habitat and they were considered critical to the long-term viability of many wildlife species across the forest, including goshawks.

To the extent the Forest Service suggests that adverse impacts are ameliorated because the clear-cutting of these areas will be in 10-acre or smaller blocks, the position is utterly unsubstantiated. The DEIS offers no scientific support for its suggestion that a ten-acre clear-cut does not set back the ecological structure and function of old-growth in ways that adversely affect not just goshawks, but other old-growth dependent species.[353]

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Further, the DEIS fails to analyze the adverse impacts on goshawks caused by clear-cutting old-growth forests for at least another 16 years and likely much longer. The Forest Service has not evaluated the impacts caused by the loss of habitat quality or taken into account all available information on differential utilization of various forest types and structures, and cumulative effects of past and foreseeable activities affecting habitat. The Forest Service historically based its viability conclusions on the fact that habitat was maintained and viability ensured by forest plan standards and guidelines governing, among other factors, riparian and beach buffers, old-growth reserves, etc. The Draft Forest Plan overturns that paradigm, allowing logging in the very areas that the agency's own experts considered the essential minimums of the agency's

[351] Smith Goshawk Comments at PDF 9.

[352] *Id*. at PDF 9-10 (emphasis omitted).

[353] *See* DEIS at 3-240 to 241.

conservation strategy. To do so without sufficient scientific basis and explanation violates NFMA and its regulatory requirements. To perpetuate such a position in an environmental impact statement would violate NEPA. The Forest Service must correct these fundamental failings and chart a course that ensures the continued viability of goshawks.

III. NORTHERN FLYING SQUIRREL

A. The Tongass is Home to Multiple Subspecies, Including the Endemic Prince of Wales Flying Squirrel.

"The northern flying squirrel itself has multiple subspecies represented in Southeast Alaska, including the endemic Prince of Wales flying squirrel, whose geographic range is limited to Prince of Wales Island and near-shore islands (Prince of Wales Island Biogeographic Province; Smith 2005)."[354]

Even as a single taxon across Southeast Alaska, *G. sabrinus* was ranked second after northern goshawk with respect to concerns over viability.[355] Revised analysis by the VPOP committee ranked northern flying squirrel as a species of concern.[356] Northern flying squirrel was a "design" species for small size old-growth reserves (<10,000 acres [4,050 hectares]) in the 1997 TLMP because of their assumed "dependency on the forested habitats".[357]

The squirrel on Prince of Wales (*G.s. griseifrons*) has been listed as a subspecies of ecological concern in the Tongass National Forest and as potentially endangered in the Status Survey and

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[354] W. Smith, Proposed Forest Plan Amendment Further Compromises Established Conservation Measures to Sustain Viable Populations of Endemic Small Mammals at PDF 2-3 (Feb. 2016) (Smith Small Mammals Comments); *see also* 2008 TLMP AR 603_1419

(Bidlack, A.L. & J.A. Cook, *Reduced genetic variation in insular northern flying squirrels (Glaucomys sabrinus) along the North Pacific coast*, ANIMAL CONSERVATION 4:283-290 (2001)); 2008 TLMP AR 603_1420 (Bidlack, A.L. & J.A. Cook, *A nuclear perspective on endemism in northern flying squirrels (Glaucomys sabrinus) of the Alexander Archipelago, Alaska*, Conservation Genetics 3:247-259 (2002)); 2008 TLMP AR 603_0947 (Demboski, J. R. *et al., Implications of cytochrome b sequence variation for biogeography and conservation of the northern flying squirrels (Glaucomys sabrinus) of the Alexander Archipelago, Alaska*, Can. J. Zool. 46:1771-1777 (1998)). The undersigned groups incorporate the Smith Small Mammals Comments into this letter in their entirety, including all cited publications.

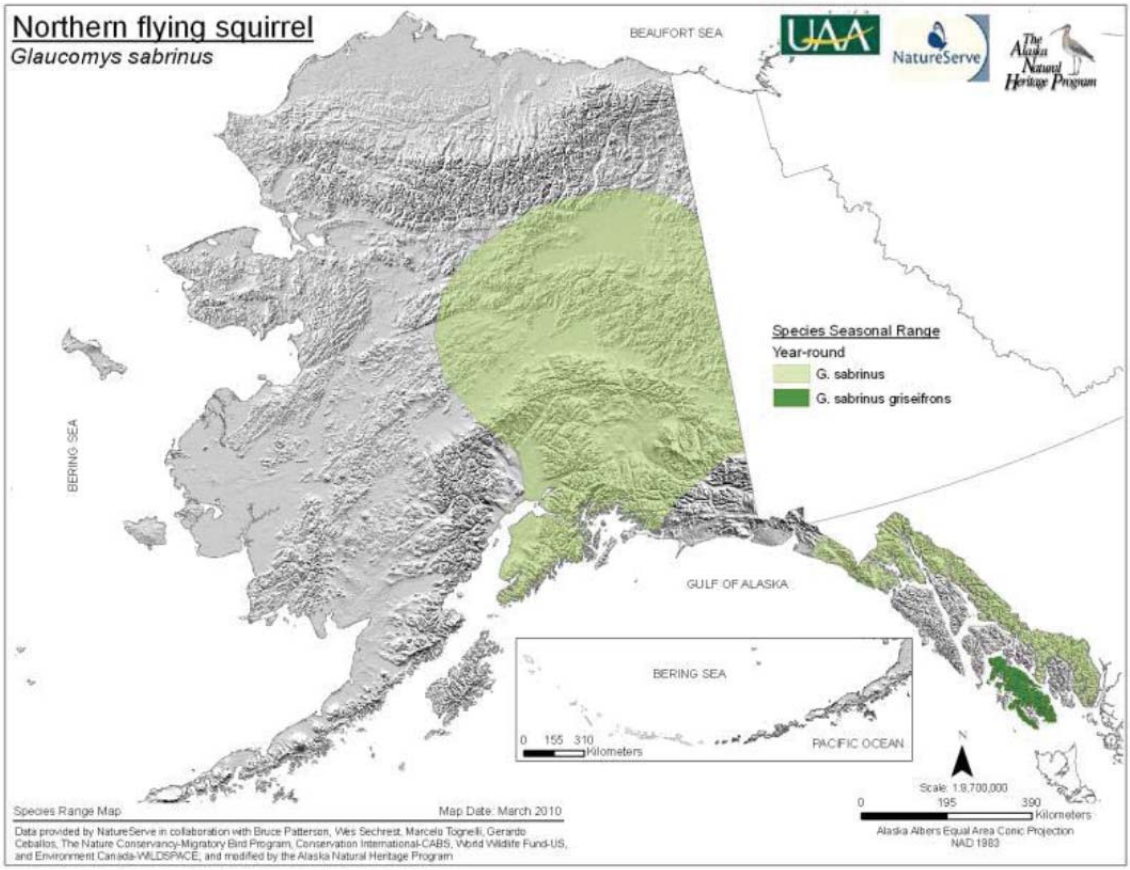
[355] 2008 TLMP AR 603_0008 at PDF 56 (L. Suring *et al., A proposed strategy for maintaining well-distributed, viable populations of wildlife associated with old-growth forest in Southeast Alaska* (1993)) (Suring et al. 1993).

[356] *Id.*

[357] Schoen, J. *et al., Northern Flying Squirrel (Glaucomys sabrinus), in* Southeast Alaska Conservation Assessment (2007) at 2 (citing Suring et al. 1993).

Conservation Action Plan for North American Rodents prepared by the International Union for the Conservation of Nature.[358]

The following map demonstrates the general pattern of isolation of insular flying squirrels in Southeast Alaska:[359]



The northern flying squirrel not only achieves its highest densities in old-growth forest, "it is a sentinel of ecological processes at multiple spatial scales."[360] As Dr. Smith explains:

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[358] *Id.*; *see also* Demboski, J. R. *et al.*, *Glaucomys sabrinus (Shaw 1801), Northern flying squirrel, in* North American Rodents: Status Survey and Conservation Action Plan, IUCN/SSC Rodent Specialist Group 37 (D. J. Hafner et al. eds., 1998) at PDF 7-8; NatureServe, Comprehensive Report Species - Glaucomys sabrinus griseifrons and National, State, and Provincial Conservation Status Rank Definitions, www.natureserve.org at PDF 1, 7 (last visited Feb. 19, 2016).

[359] Walton, K. *et al.*, Alaska Species Ranking System Summary Report - Northern flying squirrel, Prince of Wales (Jan. 1, 2013) at PDF 3.

[360] Smith Small Mammal Comments at PDF 3 (citations omitted).

> [H]ealthy northern flying squirrel populations throughout a watershed indicate a healthy forest ecosystem with functioning ecological communities. In temperate rainforests, northern flying squirrels facilitate an obligate symbiotic relationship between young conifer seedlings and belowground fungi, such as truffles. Young seedlings (and thus the rainforest) depend on truffles for nitrogen-fixing bacteria and other nutrients to develop. Flying squirrels, which forage on truffles, distribute the spores of truffles in their fecal pellets as they glide around through the forest nightly on foraging forays searching for fungal communities. Thus, the northern flying squirrel essentially contributes to the development of its own habitat. In Southeast Alaska, it is important prey for American marten and northern goshawks.[361]

This relationship to the larger overall ecosystem manifests itself in the flying squirrels' demonstrated sensitivity to clear-cut logging.[362] For example, clear-cuts and second-growth adversely affect squirrel orientation.[363] "Dispersing squirrels likely will not venture into managed habitats because logging creates clear-cuts larger than the perceptual range of these mammals." [364] The "[c]ost of quadrupedal locomotion, the mode of transport adopted by squirrels in clear-cut and [seco]nd-growth stands, is higher than expected . . . . Thus, unless flying squirrels are able to replenish their depleted energy stores when dispersing across high-cost managed stands, successful dispersal and viable metapopulations are unlikely (Smith and Person 2007; Smith et al., in press)."[365] As a result, second-growth and clear-cut stands are "energetically expensive habitats."[366]

For these reasons, "[r]estoring old-growth forest structure, especially large trees or snags, is fundamental to sustaining female productivity and overall population density because of the reliance upon cavities as natal dens." [367] Studies by Pyare and Smith have showed that Prince of Wales flying squirrels moved with least resistance "across large expanses of old-growth and old-

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[361] Smith Small Mammal Comments at PDF 3 (citations omitted).

[362] *See, e.g.*, G. Holloway & W. Smith, *A Meta-Analysis of Forest Age and Structure Effects on Northern Flying Squirrel Densities*, Journal of Wildlife Management 75(3): 668-674 (2011) (Holloway & Smith 2011).

[363] *Id.*

[364] PR 769_05_000464 at 1 (Flaherty, E.A. *et al.*, *Experimental trials of the northern flying squirrel (Glaucomys sabrinus) traversing managed rainforest landscapes: perceptual range and fine-scale movements*, Can. J. Zool. 86:1050-1058 (2008)).

[365] PR 769_05_000465 at 1(Flaherty, E. *et al., Diet and Food Availability: Implications for Foraging and Dispersal of Prince of Wales Northern Flying Squirrels Across Managed Landscapes*, JOURNAL OF MAMMOLOGY 91(1):79-91 (2010)) (Flaherty 2010).

[366] Flaherty, *Diet and Food availability*.

[367] PR 769_05_000478 at 9 (Pyare, S. *et al., Den use and selection by northern flying squirrels in fragmented landscapes*, JOURNAL OF MAMMALOGY, 91(4):886-896 (2010)).

growth fragments, followed by second-growth up to 100 meters wide, with the most resistance in regenerating clear-cuts and young second-growth greater than 100 meters wide. Notably, while males appeared to have a high movement potential in fragmented landscapes, females and juveniles did not."[368]

B. The DEIS All But Ignores Impacts to Flying Squirrels.

The DEIS offers a single paragraph to explain the impacts of the proposed changes to the forest plan to flying squirrels.[369] The DEIS ignores virtually all contemporary science regarding flying squirrels. For example, the agency ignores almost every publication Dr. Smith identifies in his comments.

The DEIS also perpetuates the mistaken suggestion that because logging on the Tongass as a whole has taken place at lower levels than those originally contemplated, then wildlife viability must be ensured. To the contrary, as the agency knows, logging on several parts of the Tongass are approaching maximum implementation, including Prince of Wales Island and especially the Big Thorne project area.[370] In fact, "more than 50% of the most productive old-growth forests have been clear-cut logged on [Prince of Wales Island], the majority of which occurred across north central [Prince of Wales], substantially reducing and fragmenting the most productive habitat of the [Prince of Wales] flying squirrel (Smith and Nichols 2003, Smith and Person 2007, Smith et al. 2011)."[371]

To be clear, as the Smith Mammals Comments explain:

> [F]urther loss of old-growth forests and active management of second-growth stands, especially in existing riparian buffers or other conservation elements, will increase the risk to viability of northern flying squirrels and other endemic small mammals. Additional regeneration harvests (i.e., clear-cuts) will set back succession toward suitable breeding habitat and create a barrier to dispersal . . . Therefore, any forest plan amendment or revision that proposes to continue the harvest of old-growth forest or impose clear-cuts in buffers or other conservation elements without including a comprehensive analysis of the Wildlife Conservation Strategy is imprudent and irresponsible as it ignores the best available credible science.[372]

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[368] 2008 TLMP FEIS at 3-222 to 3-323 (citing Pyare and Smith (2005, 2006)).

[369] DEIS at 3-259.

[370] Big Thorne Project Final Supplemental Information Report at PDF 8 (Aug. 2014).

[371] Smith Small Mammals Comments at PDF 5.

[372] Smith Small Mammals Comments at PDF 9.

To the extent the Forest Service continues to pursue a transition alternative that has the agency logging old-growth for another 10 to 15 years or more, the Forest Service must address, for the first time in most instances, the science questioning the efficacy of the agency's flying squirrel management. The Forest Service has not evaluated the impacts caused by the continued loss of habitat quality, especially on Prince of Wales, or taken into account all available information on differential utilization of various forest types and structures, and cumulative effects of past and foreseeable activities affecting habitat and the resulting ability to ensure the continued viability of flying squirrels on the Tongass. To do otherwise and without sufficient scientific basis and explanation, the agency will violate NFMA and its regulatory requirements. To present misleading or incomplete information in an environmental impact statement would violate NEPA.

IV. SALMON

The Draft Forest Plan poses risks to salmon, which depend on intact habitat in the Tongass during much of their lifecycles. Salmon are keystone species in aquatic ecosystems and provide a food base for terrestrial animals.[373] Local communities rely on healthy and abundant populations for commercial, recreational, and subsistence harvests.[374] Given these fishes' importance to Tongass ecosystems, traditional ways of life, and the local economy, it is crucial that the DEIS present a complete picture of potential impacts on salmon.

A. Logging Adversely Affects Salmon Species.

The destruction of forest stands, particularly old-growth, can have immediate and lasting impacts on streams flowing through the Tongass. The Forest Service's preferred alternative would leave some 260,000 acres of old-growth available for timber production and might achieve a transition to predominantly second-growth harvest only after 16 years, but likely much longer.[375] It would also significantly weaken current protections of forested areas along streams and fringes of beaches and estuaries[376]—the areas nearest fish habitat. It is therefore essential that the DEIS fully disclose the harms logging could cause salmon populations.

Old-growth logging near streams may have more-serious long-term impacts on salmon than second-growth logging. A recent study that analyzed data from stream sampling throughout the Tongass over two decades found that juvenile coho salmon were denser in old-growth riparian zones than in new growth zones.[377] It also noted long-term declines of coho salmon in second-

[373] PR 769_05_000051 at PDF 16 (Haufler, J.B. *et al.*, *Climate change: anticipated effects on ecosystem services and potential actions by the Alaska Region*, U.S. Forest Service, Ecosystem Management Research Institute (2010)) (Haufler).

[374] Haufler at PDF 16.

[375] DEIS at 2-32; *id.* at 2-43, Table 2-18.

[376] DEIS at 2-31; *id.* at 2-42, Table 2-17.

[377] PR 769_05_000816 at PDF 5, 14 (Bryant, M.D. & B.E. Wright, *An analysis of juvenile salmonid densities from a diverse long-term data set*, Manuscript)) (Bryant & Wright). Juvenile

growth sites, a trend possibly attributable to reductions in large wood and pools because of riparian logging.[378] The authors acknowledged that their results were based on logging under forest management practices less protective than those in place,[379] and the Forest Service thus downplays the study's results.[380] Yet it raises important questions about the Draft Forest Plan's treatment of riparian zones.

The 2008 Amended Forest Plan includes riparian management areas generally free of logging, designed to protect sensitive ecological functions along both fish streams and fishless headwater streams.[381] Alternative 5, by contrast, would allow patch cuts of up to ten acres and 35 percent of the stand outside a statutorily required 100-foot buffer in riparian management areas and a 200-foot buffer on shorelines.[382] Although the Tongass Timber Reform Act (TTRA) prohibits commercial logging within 100 feet of all Class I streams (habitat for anadromous fish) and Class II streams (habitat for non-anadromous fish) that flow directly into Class I streams, it does not prevent logging immediately adjacent to Class III or Class IV streams that may flow into higher-class waters.[383] Such "[s]mall perennial and intermittent non-fish streams are especially important in routing water, sediment, and nutrients to downstream fish habitats."[384]

1. Logging results in elevated stream temperatures.

One way logging harms salmon is by elevating stream temperatures. The Service recognizes that heating streams lowers dissolved oxygen levels in streams and reduces salmon production and survival.[385] Fry emerge from eggs earlier in warmer water —up to 22 days earlier, even in streams with buffer strips—exposing them to floods in early spring.[386] In turn, premature smolt emigration may reduce adult yield because plankton food sources are less abundant earlier in the

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salmonid communities may also be more diverse in basins subject to a lower percentage of harvest. *See* G. H. Reeves *et al.*, *Fish Communities, in* River Ecology and Management: Lessons from the Pacific Coastal Ecoregion 200 (R. Naiman *et al.* eds., 1998), at PDF 23.

[378] Bryant & Wright at PDF 16.

[379] *Id.* at PDF 20.

[380] DEIS at 3-105.

[381] DEIS at 3-58.

[382] DEIS at 2-31.

[383] *See* 16 U.S.C. § 539d(e); DEIS at 3-50.

[384] PR 769_05_000150 at PDF 78 (Murphy, M.L., *Forestry impacts on freshwater habitat of anadromous salmonids in the Pacific Northwest and Alaska-requirements for protection and restoration*, NOAA Coastal Ocean Program Decision Analysis Series No. 7 (Oct. 1995)) (Murphy 1995).

[385] DEIS at 3-101.

[386] PR 769_05_000243 at PDF 11-12 (Murphy, M.L., & A.M. Milner, *Alaska Timber Harvest and Fish Habitat, in* Freshwaters of Alaska, Ecological Syntheses (A.M. Milner & M.W. Oswood eds,. 1997)) (Murphy 1997).

year.[387] The Service minimizes these potential impacts, citing Southeast Alaska's cool climate.[388] As discussed below, however, the climate is changing; and, even at present, "temperature sensitive" streams in the region can become excessively warm when shade canopy is removed.[389]

Although the DEIS acknowledges that logging can raise water temperatures by reducing streamside shade, it points to an industry study that found that streams in previously logged Tongass watersheds were not significantly warmer than in unlogged areas.[390] It also cites a study suggesting that relatively narrow (10 to 30 meters) riparian buffers may prevent temperature increases.[391] That study notes, however, that the buffers observed may have been especially effective because they shaded north-south streams, and that the results "contrast with those from some other studies, where substantial postharvest warming was observed despite retention of riparian buffers."[392] A review of the literature concluded that loss of canopy density may elevate stream temperatures, especially in summer when stream flow is low and air temperatures high.[393]

The total lack of buffers along Class III and IV streams under Alternative 5 would allow temperature increases in those streams, which may account for more than half of the total channel length in many watersheds in Alaska.[394] In light of the potentially significant increases in water temperatures in downstream salmon habitat, the Forest Service must analyze the impacts of failing to retain or improve existing buffers along all water bodies.

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[387] Murphy 1997 at PDF 16.

[388] DEIS at 3-101.

[389] Murphy 1997 at PDF 11.

[390] DEIS at 3-53; PR 769_05_000136 at PDF 33-35 (Konopacky Environmental, *Water turbidity in streams, related to the installation of road culverts of various diameters for timber harvest activities on the Tongass National forest, Southeast Alaska, during 1994 and 1995*, Presentation Synopsis (Feb. 1996)).

[391] DEIS at 3-53; *see also* Murphy 1995 at PDF 78, 81 (noting that trees about as far from a stream as they are tall provide shade, and that a buffer of about 30 meters may suffice).

[392] PR 769_05_000118 at PDF 8 (Gomi, T. *et al.*, *Headwater stream temperature response to clear-cut harvesting with different riparian treatments, coastal British Columbia, Canada*, Water Resources Research 42:W08437 (2006)).

[393] PR 769_05_000104 at PDF 17 (Belt, G.H. *et al., Design of forest riparian buffer strips for the protection of water quality: Analysis of scientific literature*, Idaho Forest, Wildlife and Range Policy Analysis Group Report No. 8 (June 1992)) (Belt).

[394] Murphy 1995 at PDF 78.

2. Logging increases stream flow, which is detrimental to fish.

High water velocities can overturn streambeds, killing eggs that are incubating there.[395] For this reason, higher peak flows are generally considered detrimental to fish.[396]

Logging elevates peak stream flow by compacting soil and accelerating snowmelt.[397] The results may be long lasting: one study found only minor reductions in increased peak flow caused by timber harvest after 30 years.[398] The DEIS acknowledges that logging could increase peak flows in combination with roads.[399] Yet it offers no estimate of these changes, instead only listing maximum logging acres by alternative under the Draft Forest Plan, which "provides a general indication to assess projected effects on water quantity."[400] It is largely silent on the potential effects of higher peak flow on fishes.[401]

It may be true that stream flows in particular subwatersheds can only be estimated during project planning, given the complex interactions among logging, road construction, and local hydrological characteristics.[402] Nevertheless, given the potentially serious impacts that excessive stream flows may have on salmon, the Forest Service must consider and disclose information on this issue in the FEIS, potentially including modeling of representative watersheds.

3. Logging increases sediment input in streams.

Logging can also degrade salmon habitat by increasing sediment input. Fine sediment reduces egg-to-fry survival, food production, summer rearing area, and winter survival.[403] On a more granular level, sediment covers spawning gravel, smothering eggs or fry, and eliminating suitable rearing habitat and substrates suitable for macroinvertebrates.[404] In extreme cases, it can

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[395] Murphy 1997 at PDF 13.

[396] Murphy 1997 at PDF 13.

[397] Murphy 1997 at PDF 13.

[398] C. A. Troendle & R. M. King, *The Effect of Timber Harvest on the Fool Creek Watershed, 30 Years Later*, 21 Waters Resources Res. 1915 (1985), at PDF 8.

[399] DEIS at 3-62 to 64.

[400] DEIS at 3-64 & Table 3.4-3.

[401] *See* DEIS at 3-101 to 104; *id.* at 3-115 to 116.

[402] *See* DEIS at 3-64 to 65.

[403] Murphy 1995 at PDF 63.

[404] PR 769_05_000213 at PDF 7-8 (Furniss, M.J. *et al.*, *Road Construction and Maintenance*, *in* Influences of Forest Rangeland Management on Salmonid Fishes and Their Habitat, American Fisheries Society Special Publication 19:297-323 (W.R. Meehan ed., 1991)) (Furniss).

reduce egg survival or smolt yield by more than 80 percent.[405] Suspended materials (turbidity) also cause stress and avoidance behavior in salmon, even at low levels.[406] Larger, coarse sediment such as gravel and cobbles can clog stream channels and scour streambeds.[407]

Logging can add sediment to streams through a number of mechanisms. Small landslides triggered on clear-cut slopes—more than four times more frequent after logging[408]—add large quantities of sediment to streams.[409] The DEIS estimates that the alternatives considered may cause an additional 13 landslides over 25 years, compared to the current forest plan.[410] Erosion from felling and yarding along stream banks may also cause significant scour and deposition of sediment in streams.[411] The DEIS admits that "harvest in [riparian management areas] along Class III channels . . . may add sediment to streams that could be transported to fish streams, impacting rearing and spawning habitat," and that "harvest along lakeshores could also contribute to sediment increases, potentially reducing lake fish production."[412]

Scientists have recommended a 100-foot buffer to filter sediment,[413] yet the preferred alternative would allow logging up to the edge of Class III and IV streams that may flow into salmon habitat. It would also allow logging immediately adjacent to lakes.[414] To reduce harmful effects, we urge the Forest Service to retain or improve existing protections in riparian and shoreline areas. Further, although we support a shift away from old-growth logging, the transition should not come at the expense of salmon habitat through ill-considered second-growth logging and resultant landslides.

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[405] Murphy 1995 at PDF 63; *see also* D. W. Jensen *et al.*, *Impact of Fine Sediment on Egg-to-Fry Survival of Pacific Salmon: A Meta-Analysis of Published Studies*, Reviews in Fisheries Sci. 17(3):348 (2009), at PDF 9 (noting a "steep decrease in [egg-to-fry survival of Chinook salmon and steelhead], leveling out at less than 10% when fines were greater than 25%").

[406] D. S. Lloyd, *Turbidity as a Water Quality Standard for Salmonid Habitats in Alaska*, 7 N. Am. J. of Fisheries Mgmt. 34 (1987), at PDF 2-4.

[407] B. J. Hicks, *Gravel Galore: Impacts of Clear-Cut Logging on Salmon and Their Habitats, in* Ghost Runs: The Future of Wild Salmon on North and Central Coasts of British Columbia (B. Harvey & M. MacDuffee eds., 2002), at PDF 106-07.

[408] Murphy 1997at PDF 9.

[409] Murphy 1995 at PDF 60.

[410] DEIS at 3-69.

[411] Murphy 1997 at PDF 9.

[412] DEIS at 3-118.

[413] Murphy 1995 at PDF 81.

[414] DEIS at 3-73.

4. Logging reduces large woody debris.

The DEIS cites numerous studies documenting the various benefits large woody debris provides to fishes.[415] Large woody debris generally enhances fish habitat by providing cover and creating pools where juvenile salmon rear and adult migrating salmon rest.[416] It is especially important to salmon reproduction, as it forms gravel deposits free of fine sediments conducive to spawning.[417]

Logging within a riparian buffer directly reduces recruitment of large woody debris and adds floatable debris that can dislodge debris already present in the stream.[418] It may take 50 years or more for nearby trees to grow large enough to provide an adequate long-term supply of large woody debris.[419] Logging also indirectly removes in-stream large woody debris by increasing water velocities during peak stream flow and flooding.[420] The Service notes that the Tongass has significantly lower large woody debris in streams flowing through previously logged areas than through unlogged areas.[421] It discounts the importance of these findings, however, because "most of these watersheds were intensively logged under conditions that had no buffer strips on streams."[422]

Although the vast majority of large woody debris comes from within 100 feet of the stream, the DEIS suggests that even more-distant trees—perhaps as much as 140 feet away—may contribute and notes that some reduction in debris in stream channels "could occur over time if harvest occurs in [riparian management areas] outside of the TTRA buffer."[423] The Service further acknowledges that Class III streams also require large woody debris to function properly and may contribute to downstream fish habitat.[424]

The 100-foot TTRA buffer will not fully protect Class I streams from loss of large woody debris, and the ineffectual harvest limits along Class III and IV streams would not ensure delivery of this important habitat feature to salmon-bearing streams. Supply of large woody debris is thus another reason to keep existing buffers along water bodies in place, or expand them.

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[415] DEIS at 3-102.

[416] Belt at PDF 18; Murphy 1997 at PDF 14, 24.

[417] Murphy 1997 at PDF 13.

[418] Belt at PDF 18.

[419] Belt at PDF 18.

[420] Murphy 1997 at PDF 14.

[421] DEIS at 3-103.

[422] DEIS at 3-103.

[423] DEIS at 3-72; *see also* Murphy 1995 at PDF 78 (explaining large woody debris is "derived from a distance of about 1 tree height."), 82.

[424] DEIS at 3-115.

The FEIS must examine and account for these considerations.

5. Logging adversely affects food for salmon.

Logging also influences the availability of food to salmon. As streams are exposed to greater sunlight, algae production typically increases and invertebrates become more abundant.[425] In some Southeast Alaska watersheds, though, streams may be nutrient-limited and not respond to logging in this way.[426] Or, increased soil erosion and sedimentation ultimately obliterate such biological responses.[427] Where higher production does occur, after the first 20 years denser second-growth canopy can stifle production for a century.[428]

If lower production results from logging along Class III and IV streams in the Tongass, downstream salmon may suffer from a lack of food. The DEIS recognizes that "[s]mall streams, many of which are not fish-bearing, . . . supply nutrients that contribute substantially to larger streams," and "[s]mall streams in Alaska have . . . been found to substantially contribute food for fish to larger streams through downstream transport of terrestrial and aquatic prey directly and detritus resources indirectly for fish."[429]

Without adequate protection of Class III and IV streams, salmon may find less food in the streams of the Tongass. The Forest Service must protect riparian and shoreline buffers for this reason as well. Additionally, the FEIS must account for these concerns.

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Salmon populations in Southeast Alaska currently appear to be healthy,[430] but continued logging at the scales proposed in the Draft Forest Plan represents an ongoing threat. In addition, opening up shorelines and riparian areas to logging will expose these species to new, potentially significant harms. Alternative 5's already narrow fringe zones, separated from larger tracts of forest, may themselves deteriorate over time.[431] And, somewhat bafflingly, marine shorelines receive greater protection than stream banks even though sediment in marine environments

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[425] Murphy 1997 at PDF 20.

[426] *Id*. at PDF 20.

[427] *Id*. at PDF 23.

[428] *Id*. at PDF 23.

[429] DEIS at 3-104; *see also* PR 769_05_000280 at PDF 10 (M.S. & D.P. Gregovich, *Export of invertebrates and detritus from fishless headwater streams in southeastern Alaska: implications for downstream salmonid production*, Freshwater Biology 47:957-967 (2002) (Wipfli) ("Because fishless headwaters are so abundant in . . . coastal temperate rainforest, they may contribute substantially to the overall energy budgets of the fish-bearing habitats they flow into.").

[430] DEIS at 3-106.

[431] Murphy 1995 at PDF 85.

would be diluted, large woody debris is less important there, and shading is unlikely to affect water temperature.[432] The Forest Service must retain or improve existing protections in both riparian and shoreline areas to ensure the continued population viability of salmon, one of the Tongass' world-class values.

B. Roads Result in Adverse Effects on Salmon.

1. Road construction increases stream temperature.

As noted above, warmer water temperatures often hamper salmon reproduction and survival by decreasing the level of dissolved oxygen in the water and altering the timing of key life events.[433]

Roads constructed adjacent to streams may increase water temperatures, just as logging does.[434]

To the extent that roads are necessary for patch cutting along Class III and IV streams,[435] they will likely contribute to temperature increases in waters that may account for more than half of the total channel length in some watersheds.[436] To safeguard downstream salmon habitat from this detrimental effect, the Forest Service should consider not allowing logging near any water bodies.

2. Road construction increases stream flow.

As the DEIS notes, higher peak flow due to roads may cause channel erosion, bed scour, and streambed and bank instability, which generally degrades fish habitat.[437] Overturning the streambed also destroys fish eggs.[438]

The DEIS cites a substantial body of literature indicating that roads contribute to peak flows in various ways, often compounding the effects of logging.[439] For example, roads compact soil and reduce permeability; they also collect surface runoff in ditches and intercept subsurface flow.[440]

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[432] DEIS at 3-116 to 3-117.

[433] *See supra* notes 385-94 and accompanying text.

[434] DEIS at 3-53.

[435] DEIS at 3-67, Table 3.4-6 (listing miles of new and reconstructed roads in beach and estuary fringe and riparian management areas by alternative).

[436] Murphy 1995 at PDF 78.

[437] DEIS at 3-65.

[438] Murphy 1997 at PDF 13.

[439] DEIS at 3-65.

[440] Murphy 1997 at PDF 13.

When combined with clear-cutting, roads speed the delivery of water to channels during storm events and lead to much greater peak discharges than clear-cutting would by itself.[441]

To avert the harmful impacts of excessive stream flow on salmon, the Forest Service should adopt a plan that would involve fewer miles of newly constructed roads. Additionally, the FEIS must examine the adverse consequences associated with these concerns.

3. Roads increase sediment entering streams.

As discussed above, fine sediment introduced into streams can be particularly damaging to vulnerable salmon eggs and juveniles.[442] Excessive sedimentation or landslides caused by roads may also impede salmon migration.[443]

Roads add sediment to streams in a number of ways. Construction in steep terrain markedly increases soil erosion, and landslides in construction areas can be 300 times more frequent than in undisturbed forest and continue for decades after roads are built.[444] During use, road surfaces add large amounts of fine sediments to streams, with chronic sediment inputs nearly equal to those during construction.[445] The prolonged nature of the inputs and finer particle size can make sediment from surface erosion as harmful to stream biota as inputs from mass soil movements like landslides[446]; and the effects of sediment delivery are long-lasting, cumulative, and often difficult to remedy.[447] Finally, if stream crossings fail, extensive local scour and sediment deposition can occur, especially where stream flow is altered.[448]

The DEIS acknowledges that a 300-foot riparian buffer may be needed to control sediment delivery from roads to water bodies,[449] yet the preferred alternative would only establish a 200-foot buffer.[450] Again, the Forest Service must analyze the consequences of failing to retain or improve current buffers along water bodies to help mitigate the adverse impacts of

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[441] PR 769_05_000130 at PDF 970 (Jones, J.A. & Grant, G.E., *Peak Flow Responses to Clear-cutting and Roads in Small and Large Basins, Western Cascades, Oregon,* Water Resources Journal 32(4):956-974 (Apr. 1996)).

[442] *See supra* notes 403-13 & accompanying text.

[443] Furniss at PDF 7.

[444] Murphy 1995 at PDF 57-58.

[445] Murphy 1995 at PDF 57, 60.

[446] Furniss at PDF 3.

[447] Stephen C. Trombulak & Christopher A. Frissell, *Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities*, 14 Conservation Biology 18 (1999), at PDF 5.

[448] Furniss at PDF 4.

[449] DEIS at 3-55; *see also* Belt at PDF 22.

[450] DEIS at 2-31.

sedimentations from roads on salmon habitat. The Service should consider options that would reduce the number of roads constructed by limiting logging to levels below those proposed. Although the DEIS notes that "current standards and guidelines . . . recommend avoiding building roads on slopes greater than 67 percent," it predicts that each alternative would result in such hazardous construction.[451] The FEIS must account for and examine the environmental consequences of the agency's decisions in this regard.

4. Habitat access and passage must be considered.

By definition, anadromous salmonids migrate over their lifecycles, frequently over long distances.[452] Even resident salmon commonly swim upstream and downstream in search of food and optimal habitat.[453]

The Forest Service recognizes that improperly located, installed, or maintained stream-crossing structures along roads may block fish migration.[454] According to the DEIS, the most common obstacles include vertical barriers, debris blockages, and high water velocities that may prevent smaller or juvenile fish from passing.[455] Additional difficulties include turbulent flow patterns that may disorient fish and a lack of resting pools below culverts.[456] "A single poorly installed culvert can eliminate the fish population of an entire stream."[457]

The DEIS discloses that an assessment of about 90 percent of fish stream road crossings in the Tongass revealed about 35 percent—mostly culverts—did not meet juvenile fish passage criteria.[458] The Forest Service's efforts to identify and remove, replace, or fix these crossing structures are commendable,[459] but the problem persists: only about half of recently installed culverts have been monitored for fish passage suitability.[460] The preferred alternative could lead to the construction of almost 2,000 stream crossings, with more than 400 on Class I streams.[461] Given the current limitations on monitoring, it is only reasonable to expect that many of these new crossings will not be regularly assessed for compliance with fish passage criteria. The

[451] DEIS at 3-69 & tbl. 3.4-7.

[452] Furniss at PDF 17.

[453] Furniss at PDF 17.

[454] DEIS at 3-109.

[455] DEIS at 3-109.

[456] Furniss at PDF 17.

[457] Murphy 1995 at PDF 67.

[458] DEIS at 3-109.

[459] DEIS at 3-109 to 110.

[460] DEIS at 3-109.

[461] DEIS at 3-115, Table 3.6-4.

Forest Service should reduce the number of new stream crossings, by quickly transitioning out of industrial-scale old-growth logging in less than five years.

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The construction, use, and ongoing existence of forest roads can have severe, irremediable impacts on salmon habitat. Moreover, roads are known to compound the effects of the logging they facilitate. Alternative 5 would lead to the construction of 942 new miles of roads.[462] The Forest Service must consider options that would lessen this invasive activity and protect salmon from its serious, varied harms. The FEIS must examine and disclose the agency's rationale regarding its road construction decisions.

C. Hydroelectric Projects Harm Salmon.

Inappropriately designed or located hydroelectric dams may harm salmon at every stage of their lifecycle. Stream flow alterations from the operations can cause adult salmon to abandon their nests, and can kill eggs and larval fish.[463] Smolt migration may be delayed by more than a month where dams slow overall river flow.[464] Hydroelectric dams have been estimated to kill as many as 30 percent of emigrating smolt through direct mortality in turbines and increased predation on stunned fish if there is not adequate spillage.[465] Conversely, when spillage is high, fish may die from supersaturation of water with atmospheric gases.[466] Finally, salmon migrating upstream to spawn frequently have difficulty surmounting dams, even where fishway passages exist.[467]

The Service notes, without substantiation, that hydroelectric projects can affect fishes in several ways, including by: modifying stream flow, temperature, dissolved oxygen, or nutrients; stranding fish, preventing access to habitat, or impeding migration; killing fish when they pass through turbines; and degrading habitat through construction of associated transmission lines and roads.[468]

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[462] DEIS at 3-66, Table 3.4-5.

[463] R. A. Harnish *et al.*, *Effect of Hydroelectric Dam Operations on the Freshwater Productivity of a Columbia River Fall Chinook Salmon Population,* 71 Can. J. of Fisheries & Aquatic Sci. 602 (2013), at PDF 1.

[464] H. L. Raymond, *Effects of Hydroelectric Development and Fisheries Enhancement on Spring and Summer Chinook Salmon and Steelhead in the Columbia River Basin,* 8 N. Am. J. of Fisheries Mgmt. 1 (1988), at PDF 11.

[465] *Id.* at PDF 10-11.

[466] *Id.* at PDF 12.

[467] D. W. Roscoe *et al.*, *Fishway Passage and Post-Passage Mortality of Up-River Migrating Sockeye Salmon in the Seton River, British Columbia,* River Research & Applications (2010), at PDF 0, 8.

[468] DEIS at 3-120.

The DEIS acknowledges that renewable energy projects can already be developed throughout the forest under the current forest plan, and that "Alterntives [*sic*] 2 throught [*sic*] 5 would eliminate 'avoidance areas' which could increase the efficiency and likelyhood [*sic*] of developing these project [*sic*]."[469] The DEIS makes no effort to connect currently proposed renewable projects with possible impacts to salmon, noting only that they are "widely distributed across the Forest," which would "likely reduce cumulative effects of these action [*sic*] on any specific basin area."[470] This limited discussion does not satisfy NEPA's requirements.[471] The FEIS should disclose the potential harms of planned and potential renewable energy projects on salmon in greater detail.

D. The Forest Service Should Consult With the National Marine Fisheries Service on Essential Fish Habitat.

The DEIS notes that streams, lakes, ponds, and wetlands currently or historically accessible to salmon within the Tongass, as well as marine waters adjacent to forest lands, are considered essential fish habitat (EFH) for salmon under the Magnuson-Stevens Fishery Conservation and Management Act.[472] Although the Service completed a comprehensive review of impacts to EFH from non-fishing activities—including timber logging—in Alaska in 2011,[473] the DEIS states that it will not consult with the National Marine Fisheries Service (NMFS) on EFH impacts of the current forest plan revision.[474] Instead, the Service intends to defer consultation until specific actions take place under the plan.[475]

The Magnuson-Stevens Act requires a federal agency to enter into consultation for any action that "may adversely affect any [EFH]."[476] NMFS regulations provide for programmatic consultation for "large-scale planning efforts" that involve "a potentially large number of individual actions that may adversely affect EFH,"[477] and the relevant guidance lists forest

[469] DEIS at 3-120 to 3-121.

[470] DEIS at 3-121.

[471] *See* 40 C.F.R. § 1502.16; *California v. Block*, 690 F.2d 753, 761 (9th Cir. 1982) (noting that an EIS must contain "a reasonably thorough discussion of the significant aspects of the probable environmental consequences" of an action (internal quotation marks and citation omitted)).

[472] DEIS at 3-111 to 3-112.

[473] PR 769_05_000248 at PDF 13-15 (National Marine Fisheries Service, *Impacts to Essential Fish Habitat from Non-fishing Activities in Alaska* (Nov. 2011)).

[474] DEIS at 3-125.

[475] DEIS at 3-125.

[476] *See* 16 U.S.C. § 1855(b)(2); 50 C.F.R. § 600.920(a)(1); *Souza v. Cal. Dep't of Transp.*, No. C 13-4407 PJH, 2014 WL 793644, at *2 (N.D. Cal. Feb. 26, 2014).

[477] 50 C.F.R. 600.920(j)(1).

planning as one type of action for which programmatic consultation may be appropriate.[478] Given the wide-ranging and potentially serious impacts to salmon habitat that may occur under the revised plan, the Forest Service should consult with NMFS on EFH before deciding it will not transition out of industrial-scale old-growth logging in less than five years and instead continuing this destructive and controversial practice for another decade or more.

E. Salmon Are Already Suffering Adverse Effects From Climate Change.

The Draft Forest Plan's impacts on salmon would be more keenly felt by fishes already struggling with the physiological and environmental changes caused by cumulative climate change effects. Without a comprehensive understanding of potential effects of climate change on salmon's lifecycles, any assessment of a plan's impacts remains inadequate.

The Forest Service's 2010 assessment of climate change in Alaska observed that ambient warming could increase stream temperatures,[479] and the DEIS largely reiterates that expectation.[480] Yet the range of potential impacts of higher water temperatures goes beyond the limited discussion in the DEIS.[481] For example, Chinook salmon swim far upstream to spawn —into the interior of Canada—and higher temperatures will increase metabolic costs during migration.[482] They may also abandon a strategy of remaining upstream for several years after hatching, which could decrease their chances of surviving in the ocean.[483] The DEIS states that higher lake temperatures "may . . . be of benefit for lake-rearing species because growth may increase in these systems, perhaps most noticeable in sockeye salmon."[484] Yet it omits the fact that juveniles' faster growth rates may cause greater food needs to go unmet, and that higher water temperatures can stress adults.[485]

As temperatures increase and more precipitation falls as rain than snow, stream flows will increase in fall and winter and decrease in the summer, especially in snowmelt- and rain-fed basins.[486] These changes could help or harm salmon, according to the DEIS, by increasing overwinter habitat or decreasing summer-rearing habitat, as well as causing egg scour during

[478] National Marine Fisheries Service, Essential Fish Habitat Consultation Guidance at PDF 28 (Apr. 2004).

[479] Haufler at PDF 16.

[480] DEIS at 3-128.

[481] DEIS at 3-128 to 3-129.

[482] PR 769_05_000200 at PDF 10 (Bryant, M.D, *Global Climate Change and Potential Effects on Pacific Salmonids in Freshwater Ecosystems of Southeast Alaska*, Climate Change (2009) (Bryant).

[483] Bryant at PDF 11.

[484] DEIS at 3-129.

[485] Bryant at PDF 9.

[486] DEIS at 3-128.

peak flows in the fall and winter.[487] Yet low flow may harm salmon in several other ways, as well: sockeye salmon may be unable to access lakes and spawning streams;[488] juvenile coho salmon may find fewer invertebrates to eat;[489] and adult salmon may encounter barriers to migration during the summer.[490]

The DEIS also does not adequately address how warming's effects on snowpack and glaciers may influence the quality of salmon habitat. While the DEIS notes that peak flows will likely increase in fall and winter and decrease in summer, primarily in snowmelt-fed basins, it does not discuss how melting earlier in the spring may interfere with salmon lifecycles.[491] Similarly, although it recognizes that climate change will likely accelerate the melting of glaciers, it does not explain how that process would affect stream flows and temperatures in the short and long terms.[492] Melting glaciers will eventually disappear, decreasing stream flows and potentially exacerbating the effects of logging, road construction, and hydroelectric projects on salmon habitat.[493]

In addition, the DEIS acknowledges that sea level rise may affect fishes by inundating estuarine rearing areas but omits other potential impacts from this phenomenon.[494] For example, seawater may intrude into lakes at lower elevations, decreasing their productivity and harming sockeye salmon.[495] Pink and chum salmon that spawn in the intertidal or lower reaches of rivers and streams may be displaced by shifting sediment deposition zones.[496] These species "will be susceptible to changes in sea level and tidal influence even with relatively small changes."[497] Coho and other salmon species use similar habitat, which may be affected by less than one meter of sea level rise.[498] Thus, the possibility that land mass rise will partially offset dramatic sea level rise in Southeast Alaska[499] provides little assurance that pink and chum salmon will not be harmed.

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[487] DEIS at 3-128.

[488] Bryant at PDF 9.

[489] Bryant at PDF 13.

[490] Bryant at PDF 13.

[491] DEIS at 3-128 to 129.

[492] DEIS at 3-128.

[493] Haufler at PDF 16.

[494] *See* DEIS at 3-129.

[495] Bryant at PDF 10.

[496] Bryant at PDF 9.

[497] Bryant at PDF 9.

[498] Bryant at PDF 13.

[499] DEIS at 3-129.

Finally, climate change will likely increase the frequency of high-intensity precipitation events that could cause landslides, debris avalanches, and mass soil movement.[500] These natural disasters can wreak havoc on salmon eggs and embryos in streambeds through scour and deposition of fine sediment.[501] They may also affect the rearing habitat of sockeye and coho salmon in lakes and streams where sediment may settle.[502]

The FEIS must address these climate impacts, which do not receive mention in the DEIS. Climate change poses a serious threat to salmon and could exacerbate the impacts of the Draft Forest Plan, discussed above, particularly in light of the agency's emphasis on logging in OGRs, beach fringe, and provision of smaller stream buffers. The FEIS must disclose in detail the full range potential climate harms associated with continuing industrial-scale old-growth logging.

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Although salmon populations in Southeast Alaska are currently doing well, ecologists emphasize that their continued success depends on maintaining intact watersheds.[503] The proposed streamside and shoreline buffers would not adequately protect riparian function, especially along lakes and Class III and IV streams. And even a single improperly constructed culvert or poorly operated dam can drastically reduce salmon habitat and survival. The Forest Service must retain or expand existing buffers along all water bodies in the Tongass; end industrial-scale old-growth logging in less than five years; fully disclose the potential impacts of renewable energy projects on salmon; consult with the National Marine Fisheries Service on the effects of the Draft Forest Plan to essential fish habitat; and present a fuller picture of the threats climate change poses for salmon. Salmon are an integral part of Tongass ecosystems, traditional ways of life, and Southeast Alaska's economy. The Forest Service must have a complete understanding of the plan's possible impacts on salmon to make an informed decision—and it should ultimately select an alternative that will secure their future.

V. AMPHIBIANS

Amphibians, though frequently inconspicuous, often account for the greatest amount of vertebrate biomass in a forest[504] and support other vertebrates by converting small invertebrates into larger prey.[505] They also serve as indicators of local ecosystem health, as they are exposed to both aquatic and terrestrial environments and confine themselves to small areas of the

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[500] Bryant at PDF 8-9.

[501] Bryant at PDF 9, 13.

[502] Bryant at PDF 9, 13.

[503] Bryant at PDF 16.

[504] 2008 TLMP AR 603_1944 at PDF 11 (Carey, A. B., *Active Intentional Management (AIM) for Biodiversity and Other Forest Values*, *in* International Workshop on Balancing Ecosystem Values - Innovative Experiments for Sustainable Forestry Proceedings (1998)) (Carey).

[505] *Id.* at PDF 11.

forest.[506] Amphibians are sensitive to changes in the environment[507] and susceptible to a wide array of stressors, putting them at greater risk of extinction than other species in many regions.[508] It is therefore critical that the Forest Service consider impacts to amphibians in light of its proposal to weaken riparian area protections and continuing old-growth logging for an extended period.

Eight amphibian species are known to occur in Southeast Alaska, including two that have been introduced by humans[509]:

- The northwestern salamander (*Ambystoma gracile*) has been observed on Mary Island and Chichagof Island and appears to prefer habitat in old-growth forests.[510] Its distribution and status in Alaska are unknown.[511]

- The long-toed salamander (*Ambystoma macrodactylum*) has been found in the Stikine and Taku watersheds, as well as on several islands.[512] Although it is common in most of its range, in Southeast Alaska its distribution is limited and its status unknown.[513]

- The roughskin newt (*Taricha granulosa*) is the most common tailed amphibian in Southeast Alaska and occurs in much of the Alexander Archipelago.[514] They are probably most dense in mature and old-growth forests.[515]

[506] *Id.* at PDF 11; *see also id.* at PDF 42; PR 769_05_000460 (MacDonald, S.O. & J.A. Cook, *Mammals and Amphibians of Southeast Alaska*, Special Publication No. 8, Museum of Southwestern Biology (2008) (MacDonald 2008)), at PDF 155 ("Amphibians, in particular, seem to be excellent sentinels of ecosystem health.").

[507] Carey at PDF 42.

[508] A. R. Blaustein *et al.*, *Direct and Indirect Effects of Climate Change on Amphibian Populations*, 2 Diversity 281 (2010), at PDF 2 (Blaustein).

[509] MacDonald 2008 at PDF 131-32.

[510] *Id.* at PDF 133.

[511] *Id.* at PDF 133

[512] *Id.* at PDF 134.

[513] *Id.* at PDF 134

[514] *Id.* at PDF 135-36.

[515] *Id.* at PDF 136.

- The western toad (*Bufo boreas*) is found throughout the Alexander Archipelago and on the coast as far north as Prince William Sound.[516] Southeast Alaska residents have reported sharp declines in the toad's numbers, and in recent years it has been considered near-threatened.[517]

- The Columbia spotted frog (*Rana luteiventris*) occurs primarily on mainland Southeast Alaska from the Salmon River near Hyder to the Taku River, but has also has been documented on Vank and Mitkof Islands.[518] Populations are likely declining in the region.[519]

- The wood frog (*Rana sylvatica*) is widespread in Southeast Alaska, mostly on the mainland.[520] Its range extends into central Alaska as well.[521]

- The Pacific chorus frog (*Pseudacris regilla*) is an exotic species that naturally ranges from southern British Columbia to Baja California but has been observed near Ward Lake on Revillagigedo Island in the Alexander Archipelago.[522] There it may compete with the western toad and roughskin newt, although native species have bred successfully in the same pond as the chorus frog.[523]

- The red-legged frog (*Rana aurora*) is another introduced species, which is native to western North America but has established populations on Chichagof Island and may be rapidly expanding.[524] Populations in California and Oregon, by contrast, have declined or disappeared, and in recent years the species has been considered near-threatened.[525]

The DEIS mentions amphibians only to note that their endemism to Southeast Alaska is in question[526] and that the effects of the two invasive species on native amphibians are either

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[516] *Id.* at PDF 137-38.

[517] *Id.* at PDF 137; *see also* Alaska Dep't of Fish & Game, Western Toad (*Bufo boreas*): Species Profile (ADFG, Western Toad), at PDF 2.

[518] MacDonald 2008 at PDF 141.

[519] Alaska Dep't of Fish & Game, Columbia Spotted Frog (*Rana luteiventris*): Species Profile (ADFG, Columbia Spotted Frog), at PDF 3.

[520] MacDonald 2008 at PDF 143.

[521] *Id.* at PDF 142-43.

[522] *Id.* at PDF 139.

[523] *Id.* at PDF 139.

[524] *Id.* at PDF 140.

[525] *Id.* at PDF 140.

[526] DEIS at 3-231.

unknown or minimal.[527] The Forest Service must include in the FEIS a more thorough analysis of potential impacts from its proposed continued industrial-scale old-growth logging to amphibians.

A. Logging Adversely Affects Amphibians.

1. Logging impairs and fragments habitat.

Studies have documented significantly lower abundances of amphibians in logged areas of the forest than in non-logged areas.[528] The primary causes of these declines are likely increased temperatures and rapid water loss,[529] and community recovery following clear cutting may take up to 50 years.[530] Logging also alters the hydrology, temperature, and substrate characteristics of amphibians' aquatic habitat, which may interfere with reproduction and foraging.[531] One study found that logging reduced fecundity and altered reproductive demographics.[532] Pristine old-growth forest, by contrast, may promote the abundance of amphibians and species diversity.[533]

Logging also harms amphibians through habitat fragmentation, "one of the key issues in the conservation" of these species.[534] Juvenile amphibians avoid clear cut areas to a greater degree than adults,[535] and these individuals play an especially important role in dispersal and population connectivity.[536] In Alaska, clear-cut logging destroys the terrestrial habitat and migration

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[527] *Id.* at 3-235; *see also* Blaustein at PDF 10 (noting that some frogs avoid clear cut areas when precipitation is low).

[528] Carey at PDF 15; *see also* B.D. Todd *et al.*, *Effects of Timber Harvesting on Terrestrial Survival of Pond-Breeding Amphibians*, 313 Forest Ecology & Mgmt. 123 (2014), at PDF 129 (observing that partial cutting harms juvenile salamanders just as much as clear cutting).

[529] R. D. Semlitsch *et al.*, *Effects of Timber Harvest on Amphibian Populations: Understanding Mechanisms from Forest Experiments*, 59(10) BioScience 853 (2009), at PDF 5-6.

[530] *See* at W. Mark Ford *et al.*, *Stand Age and Habitat Influences on Salamanders in Appalachian Cove Hardwood Forests*, 155 Forest Ecology & Mgmt. 131 (2002), at PDF 8 (Ford).

[531] U.S. Forest Service, *Forest Ecosystem Management: An Ecological, Economic, and Social Assessment*, U.S. Government Printing Office, 1993-793-071 (July 1993), at PDF 445, 563.

[532] Jessica A. Homyack & Carola A. Haas, *Long-Term Effects of Experimental Forest Harvesting on Abundance and Reproductive Demography of Terrestrial Salamanders*, 142 Biological Conservation 110 (2009), at PDF 119.

[533] *See* Ford at PDF 8.

[534] Samuel A. Cushman, *Effects of Habitat Loss and Fragmentation on Amphibians: A Review and Prospectus*, 128 Biological Conservation 231 (2006), at PDF 2 (Cushman).

[535] D. A. Patrick, *et al.*, *Effects of Experimental Forestry Treatments on a Maine Amphibian Community*, 234 Forest Ecology & Mgmt. 323 (2006), at PDF 330.

[536] Cushman at PDF 3.

corridors of the roughskin newt[537] and the habitat of the northwestern salamander.[538] Outside the Tongass, wood frogs have been observed to avoid clear-cut areas when migrating.[539]

The DEIS does not discuss the impacts of logging on amphibians specifically. It simply states that logging on wetland sites could lead to "reductions in available wildlife habitat."[540] The Forest Service must move more rapidly away from old-growth logging, but to the extent it continues framing the alternatives in terms of allowing old-growth logging for a decade or more to come, then the FEIS must assess the potentially destructive consequences of continued industrial-scale old-growth logging for amphibians. Indeed, some have recommend that logging that removes more than 40 percent of the canopy should be prohibited in areas in which amphibian diversity is known to be high.[541]

2. Logging results in direct mortality of amphibians.

Where amphibians are unable to disperse out of logged areas, they are especially vulnerable logging activities. The effect is more pronounced for this group than for other animals because amphibians are unable to move out of the way of logging equipment.[542]

The DEIS does not mention this potential impact of logging on amphibians, which stands as yet another reason to limit old-growth logging. The FEIS must correct this inadequacy.

3. Amphibians are especially susceptible to air pollution.

Because amphibians' skin is permeable, they are especially susceptible to the harmful effects of air pollution.[543] Atmospheric contaminants such as acidic compounds may also be deposited in aquatic ecosystems where amphibians live.[544] In Southeast Alaska, air pollution from local or global sources may be contributing to a decline in amphibians' numbers.[545]

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[537] MacDonald 2008 at PDF 136.

[538] S. O. MacDonald, THE AMPHIBIANS AND REPTILES OF ALASKA: A FIELD HANDBOOK (2010), at PDF 17 (MacDonald 2010).

[539] Tracy A. G. Rittenhouse & Raymond D. Semlitsch, *Behavioral Response of Migrating Wood Frogs to Experimental Timber Harvest Surrounding Wetlands*, 87 Can. J. Zoology 618 (2009), at PDF 6.

[540] DEIS at 3-86.

[541] R. D. Semlitsch *et al.*, *Effects of Timber Harvest on Amphibian Populations: Understanding Mechanisms from Forest Experiments*, BioScience 59(10): 853 (2009), at PDF 8.

[542] *See* Z. Burivalova *et al.*, *Thresholds of Logging Intensity to Maintain Tropical Forest Biodiversity*, 24 Current Biology 1 (2014), at PDF 3.

[543] 2008 TLMP AR 603_0690 (B.P. Kelly *et al.*, *Climate Change, Predicted Impacts on Juneau, Scientific Panel on Climate Change City and Borough of Juneau* (Apr. 2007) (Kelly), at PDF 60.

[544] Blaustein at PDF 19.

[545] Kelly at PDF 60.

The DEIS predicts that "direct effects on air quality from forest management activities would be temporary and limited in nature" and may include emissions from industrial processing sites and firewood burning.[546] It also notes that, cumulatively, air pollution from wood processing could "increase somewhat if more wood is burned to produce energy."[547] The Forest Service should consider the potential consequences of worsened air quality for amphibians in the FEIS, in light of their sensitivity to this kind of pollution.

B. Roads Adversely Affect Amphibians.

1. Roads impair and fragment habitat.

Roads add sediment to streams, potentially degrading habitat for amphibians[548] such as the Columbia spotted frog that depends on permanent water and various riparian habitats for breeding, foraging, and overwintering.[549] Roads may also contribute chemical contaminants to habitat, which may cause skeletal abnormalities in wood frogs—although introduction of predators, parasites, or pathogens by roads could also explain this phenomenon.[550] In areas immediately adjacent to roads, amphibians suffer from "edge effects," including drier, warmer soils, and increased light and wind.[551] The construction of roads can also destroy habitat outright: in Southeast Alaska, loss of wetland habitat threatens the Columbia spotted frog and the long-toed salamander.[552]

Apart from degrading habitat, roads can fragment habitat, and thus populations, by forming travel barriers for amphibians. Studies have shown that salamanders avoid forest roads, and that even a single road can reduce their movement by more than 50 percent.[553] Multiple roads could

[546] DEIS at 3-18 to 3-19.

[547] *Id.*at 3-20 to 3-21.

[548] J. MacNeil *et al.*, Forest Management for Reptiles and Amphibians (2013), at PDF 8 (citing C. E. Moorman, *et al.*, *Reptile and Amphibian Response to Hardwood Forest Management and Early Successional Habitats, in* Sustaining Young Forest Communities: Ecology and Management of Early Successional Habitats in the Central Hardwood Region, USA (C. H. Greenberg, *et al*., eds., 2011)).

[549] MacDonald 2010 at PDF 25; ADFG, Columbia Spotted Frog at PDF at 3.

[550] *See* M. K. Reeves *et al., Road Proximity Increases Risk of Skeletal Abnormalities in Wood Frogs from National Wildlife Refuges in Alaska*, Envtl. Health Perspectives 116(8): 1009 (2008), at PDF 5.

[551] *See, e.g.*, D. M. Marsh & N. G. Beckman, *Effects of Forest Roads on the Abundance and Activity of Terrestrial Salamanders*, Ecological Applications 14(6): 1882 (2004), at PDF 1-2.

[552] ADFG, Columbia Spotted Frog at PDF 3; Alaska Dep't of Fish & Game, Long-Toed Salamander (ADFG, Long-Toed Salamander), at PDF 2; MacDonald 2008 at PDF 134.

[553] D. M. Marsh *et al.*, *Forest Roads as Partial Barriers to Terrestrial Salamander Movement*, Conservation Biology 19(6): 2004 (2004), at PDF 3-4.

impede movement even more dramatically, potentially decreasing gene flow enough to cause a population to go extinct.[554] In Alaska, road construction can fragment terrestrial habitat and ponds where long-toed salamanders breed.[555]

The DEIS acknowledges that crossing wetlands with roads could lead to sedimentation or changes in hydrologic patterns and connectivity, but it does not connect these consequences to amphibians or discuss the fragmentation of their habitat.[556] The Forest Service should consider these impacts before selecting an alternative that continues industrial-scale old-growth logging for years to come.

2. Road result in direct mortality of amphibians.

The Forest Service has previously recognized that roads pose a greater threat to amphibians than other animals because amphibians are small and slow-moving and often migrate across roads.[557] Even narrow forest roads present a hazard,[558] and entire populations may be placed at risk.[559] Mortality rates vary by species, but slight variations in traffic can have significant impacts.[560]

As with other effects on amphibians, the DEIS omits any mention of the threat of road traffic to local populations. The Service should disclose and weigh these impacts in choosing a forest plan alternative.

C. Amphibians are Already Suffering From the Adverse Effects of Climate Change.

Because climate change could exacerbate many of the harms discussed above, it is essential that the Service understand and disclose the possible impacts of a warming environment on amphibians in conjunction with any continuing old-growth logging.

The effects of climate change on amphibians in Southeast Alaska are affecting amphibians in a variety of ways.[561] For example, prolonged dry weather in Southeast Alaska in the spring of 2003 dewatered some ponds and delayed or prevented western toads from spawning in them.[562]

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[554] *Id.* at PDF 4.

[555] ADFG, Long-Toed Salamander, at PDF 2.

[556] *See* DEIS at 3-87 to 3-88.

[557] U.S. Forest Service, *Forest Roads: A Synthesis of Scientific Information*, Pacific Northwest Research Station, General Technical Report PNW-GTR-509 (May 2001) at PDF 8, 48.

[558] *Id.* at PDF 48.

[559] *Id.* at PDF 47, 113.

[560] *See* M. J. Mazerolle, *Amphibian Road Mortality in Response to Nightly Variations in Traffic Intensity*, Herpetologica 60(1): 45 (2004), at PDF 7.

[561] Kelly at PDF 60.

[562] ADFG, Western Toad at PDF 3.

If the Tongass follows patterns observed in other rainforests, mist could rise, making low-lying habitat less suitable for amphibians.[563] Meanwhile, decreased snow depths in warming winters may expose toads to freezing conditions.[564]

Sea level rise could also harm the Tongass's amphibians. The Forest Service acknowledges that this phenomenon might occur in Southeast Alaska and inundate estuaries where young fish rear.[565] It could have similar effects on amphibian habitat by causing storm-related saltwater intrusion of coastal wetlands,[566] and it may introduce predators such as fishes into these habitats.[567]

It is possible that climate change will shift cooler waters toward the thermal optimum for chytridiomycosis — "an unusual fungal infection caused by a parasitic water mold that attacks keratin in amphibian skin"[568] — and cause outbreaks of this fungal disease in amphibian populations.[569] An extensive survey of amphibian habitat use in Southeast Alaska suggests that declines in toad populations are attributable to the disease and may be exacerbated by climate change.[570] Apart from creating conditions conducive to the fungus that causes it, warming can also make amphibians more vulnerable to it by decreasing their immune function.[571]

Amphibians are susceptible to changes in temperature because it controls many physiological processes, including "oxygen uptake, heart rate, locomotion, water balance, digestion, developmental rate, sex determination, and immune function.[572] Warming, as well as the resultant lower levels of dissolved oxygen in water, can harm developing embryos and larvae.[573] Higher temperatures in winter may decrease body size, number of eggs laid, and survival of

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[563] Kelly at PDF 61.

[564] ADFG, Western Toad at PDF 3.

[565] DEIS at 3-129.

[566] Blaustein at PDF 12.

[567] *Id.*

[568] R. Carstensen *et al., Habitat Use of Amphibians in Northern Southeast Alaska* (2003) (Carstensen), at PDF 5.

[569] *Id.* at PDF 17.

[570] Carstensen at PDF 5; *see also id.* at 68 (fungus is a "potential cause of widespread declines [of toads] in Southeast Alaska"); MacDonald 2010 at PDF 23 (noting that five out of nine toads in the Dyea area tested positive for the fungus in 2005).

[571] Blaustein at PDF 6, 7, 15, 18.

[572] *Id.* at PDF 6.

[573] *Id.* at PDF 6-9.

female toads.[574] And sex ratios can become skewed as populations are masculinized or feminized, depending on the species.[575]

At the level of the individual, changes in ambient temperature alter amphibian behavior, including the timing of their breeding, hibernation, and foraging.[576] When temperatures rise, amphibians seek refugia and spend less time on activities such as foraging.[577] Warming may also lessen dispersal distances, which can reduce gene flow between populations and expose isolated populations to increased extinction risks.[578]

The above discussion offers only a glimpse of the numerous, acute threats climate change poses to amphibians. These harms and others could compound the impacts of old-growth logging and other development under the Draft Forest Plan on amphibians. The DEIS outlines possible climate effects for fishes, but not for amphibians.[579] The Service must consider and disclose these effects before selecting an alternative that continues industrial-scale old-growth logging.

* * *

Amphibians are an integral component of the forest ecosystem in Southeast Alaska and provide an important indicator of forest integrity. Several indigenous species are currently declining, and all face serious threats from a warming climate. If the agency is intent on adopting a forest plan amendment, based on continuing industrial-scale old-growth for another decade or more, the FEIS must carefully weigh—and disclose to the public—the potential impacts that logging, road construction, and renewable energy projects could have on these sensitive forest inhabitants. It also must examine and explain whether such a plan would ensure the continued viability of amphibians on the Tongass. To do otherwise, would run afoul of NFMA's requirements

VI. PRINCE OF WALES SPRUCE GROUSE

The Prince of Wales spruce grouse (*Falcipennis canadensis isleibi*) is a subspecies of spruce grouse endemic to the Alexander Archipelago that serves as an important prey species for the Queen Charlotte goshawk. The Prince of Wales spruce grouse possesses a variety of unique biological characteristics that make it especially vulnerable to old-growth logging, and its entire range is within parts of the Tongass that have been disproportionately altered by past logging. The DEIS fails to grapple with the potentially serious effects on the grouse of continued old-growth logging and weakening of the conservation strategy under the Draft Forest Plan.

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[574] *Id.* at PDF 7.

[575] *Id.* at PDF 9.

[576] *Id.* at PDF 5.

[577] *Id.* at PDF 10.

[578] *Id.*

[579] *See* DEIS at 3-128 to 129.

A. Prince of Wales Spruce Grouses' Unique Biological Characteristics Make Them Vulnerable to Extinction.

The Prince of Wales spruce grouse (*F. c. isleibi*) is endemic to the Alexander Archipelago in Southeast Alaska.[580] It has a known distribution only on Prince of Wales Island, Heceta, Suemez, Warren, Kosciusko, Zarembo, and Mitkof Island.[581] Conversely, "[t]he northern and eastern islands in the [Alexander] archipelago, the Queen Charlotte Islands, and the adjacent mainland all appear to be void of spruce grouse."[582] Prince of Wales spruce grouse are "geographically disjunct,"[583] or "isolated from spruce grouse elsewhere in North America, [and] appear morphologically and behaviorally distinct."[584] Prince of Wales spruce grouse is not only genetically divergent from other spruce grouse, but even the populations on Prince of Wales and Zarembo islands have "high levels of allele frequency divergence" [585] and "may be reproductively isolated from each other or could be in the near future."[586] According to Barry and Tallmon (2010), the genetic divergence between islands is likely attributable to geographic isolation: "In order for individuals to disperse from [Prince of Wales] to [Zarembo Island], they would have to travel ~3.2km through a series of small islands. Although it is not inconceivable that gene flow occurs, at least in a stepping-stone fashion, the ability of these small islands to sustain populations of Spruce Grouse is unknown, and our results suggest that any influence of dispersal is extremely low."[587]

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[580] S.J. Williamson *et al.*, *Spruce Grouse Continental Conservation Plan*, Association of Fish & Wildlife Agencies (2008) at 7 (Williamson); 769_05_000540 (U.S. Fish & Wildlife Service, Species Assessment and Listing Priority Assignment Form [*F. c. isleibi*] (2010)) (USFWS 2010), at 5; DEIS at 3-231 (Table 3.10-7), 3-233.

[581] DEIS at 3-231 (Table 3.10-7), 3-233. *See also* B.D. Barry & Tallmon, D.A., *Genetic Differentiation of a Subspecies of Spruce Grouse (Falcipennis canadensis) in an Endemism Hotspot*, Auk 127(3):617-625 (Barry & Tallmon), at 622 (listing eight islands, including San Fernando) (citing Dickerman & Gustafson 1996). According to U.S. Fish and Wildlife Service, there are "records" of spruce grouse on 11 islands, including Dall, Grindall, and Tuxecan. USFWS 2010 at 10. For a map of these islands, *see* USFWS 2010 at 11, Fig. 3.

[582] Williamson at 27.

[583] A.L. Russell, *Habitat relationships of spruce grouse in Southeast Alaska*, Texas Tech University, M.S. thesis (1999) at vii (Russell).

[584] Williamson at 26. *See also* R.W. Dickerman & J. Gustafson 1996, *The Prince of Wales Spruce Grouse: A New Subspecies From Southeastern Alaska*, Western Birds 27:41-47 (1996) at 46 (*F. c. isleibi* differs from other subspecies of *F. canadensis* (plumage) and from *F. c. franklinii* (size & plumage); USFWS 2010 at 2-3 & Fig. 1.

[585] Barry & Tallmon at 622.

[586] USFWS 2010 at 5.

[587] Barry & Tallmon at 622-23.

Prince of Wales spruce grouse likely occur at low densities,[588] and are considered rare.[589] Their density has been estimated at 2.5 birds "per 100 ha of potentially occupied habitat"[590] or 10,500 total spruce grouse."[591] Williamson et al. (2008), however, concluded that the "accuracy of this estimate is unknown but, at first appearance, seems high,"[592] and therefore assumed the Prince of Wales spruce grouse population to be less than 8,300 birds.[593]

Spruce grouse have very limited dispersal capabilities. They are sedentary birds with a preference for walking rather than flying.[594] They are poor long-distance flyers.[595] They exhibit limited seasonal migratory movement, typically less than a mile.[596] "Where diverse stand compositions (e.g., horizontal diversity) are present, seasonal movements may not be necessary (Bouta 1991)."[597] They are reluctant to disperse or move freely across open areas or thorough areas of unsuitable habitat.[598]

Prince of Wales spruce grouse are old-growth dependent. They are associated with muskegs, complex, high-volume old-growth, and mixed conifers (scrub).[599] They "appear most associated with Sitka spruce, western hemlock, and shore pine in an area with annual precipitation of up to 5 m."[600] Russell (1999) found Prince of Wales spruce grouse to prefer forest and muskegs, to use scrub and second-growth as available, and to avoid clear-cuts.[601] Spruce grouse frequently use old-growth for foraging, and mid-canopy also offers good concealment from avian predators.[602]

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[588] Williamson at 11.

[589] Russell at 13; USFWS 2010 at 12; A. R. Nelson, *Ecology of Prince of Wales Spruce Grouse*, Master of Science Thesis, University of Alaska Fairbanks (2010) (Nelson), at 7 (spruce grouce are infrequently observed on Prince of Wales Island).

[590] Williamson at 17, 20 Table 5 (citing Russell 1999).

[591] *Id.* at 27.

[592] *Id. See also* Barry & Tallmon at 623 (population sizes are considered low) (citing Storch 2007); USFWS 2010 at 13 (accuracy of estimates is unknown).

[593] USFWS 2010 at 13.

[594] DEIS at 3-233.

[595] *Id.*

[596] *Id.* (citing Dickerman & Gustafson 1996; Boag & Schroeder 1992; Williamson et al. 2008).

[597] Russell at 40.

[598] USFWS 2010 at 9.

[599] Williamson at 9 (citing Russell 1999); Russell at vii, 34; USFWS 2010 at 7.

[600] Williamson at 26. *See also* USFWS 2010 at 7.

[601] Russell at 26-42. *See also* USFWS 2010 at 7.

[602] Russell at 39.

B. Further Logging in Spruce Grouse Habitat Threatens the Species' Viability.

Further old-growth logging on the Tongass threatens the viability of Prince of Wales spruce grouse because clear-cuts and roads create barriers to dispersal and further isolate this already small and isolated population. The problem is compounded by the fact that the Prince of Wales spruce grouse's habitat has already been disproportionately logged.

Clear-cut forests are mostly unsuitable for spruce grouse for more than 100 years.[603] Clear-cuts create travel and dispersal barriers for Prince of Wales spruce grouse; the birds move "around rather than through" clear-cuts.[604] Clear-cuts inhibit spruce grouse movement (logging debris or slash), increase exposure to predators, and do not provide food.[605] "Timber harvest and associated fragmentation may lead to population declines if open areas are too large or forested patches are spread too far apart to enable spruce grouse to move between them (greater than 1 mile). Clear-cuts may also present a dispersal barrier to this species due to the thick logging debris often present which could inhibit walking, this species preferred method of movement (Russell 1999)."[606] Moreover, "fragmentation due to timber harvest can result in the isolation of local spruce grouse populations (i.e., if open areas are too large or forested patches are spread too far apart to enable spruce grouse to move between them)."[607] Forest connectivity may be especially important to juvenile spruce grouse. Juveniles "living in, and dispersing from, the low connectivity sites had significantly lower survival rates due to increased predation risk from raptors. Modelling these empirical data revealed that . . . further loss of high connectivity in the study area would lead to population decline."[608] In fragmented forest, both juveniles and adults make larger movements and have poorer survival (Whitcomb et. al. 1996a, Harrison 2001). "The poorer survival appears to be due to fragmentation rather than longer movements of individuals."[609] As a result, "[c]onnectivity of scrub and high-volume old-growth forest within the matrix of managed forest stands may be an important factor in minimizing negative effects to spruce grouse populations in southeast Alaska."[610]

Logging-associated roads also create dispersal barriers and lead to a high proportion of grouse mortality. For radio-marked Prince of Wales spruce grouse, 42-44% of mortalities were road-

[603] *Id.* at 41

[604] *Id.* at 34.

[605] *Id.* at 35; DEIS at 3-233, 3-259 to 3-260.

[606] DEIS at 3-233.

[607] *Id.* at 3-260

[608] I. Storch, *Grouse: Status Survey and Conservation Action Plan 2006-2010*, IUCN, Gland, Switzerland, and Cambridge, United Kingdom, and World Pheasant Association, Fordingbridge, United Kingdom (2007) at 26.

[609] Williamson at 8.

[610] Russell at 34.

related.[611] Of these mortalities, about half were from road strikes and half were from hunting.[612] Spruce grouse are "particularly vulnerable to hunting along road systems, and thus are susceptible to overexploitation near roads and human populations (Williamson et al. 2008; Rabe 2009)."[613]

Threats to spruce grouse from logging on the Tongass are compounded by the fact that the Prince of Wales spruce grouse's range has already been disproportionately logged and roaded:

> Within Southeast Alaska, timber harvest has occurred disproportionately in the range of the [Prince of Wales] spruce grouse. On [Prince of Wales Island], in particular, there has been extensive and intensive, broad-scale clear-cutting, fragmenting the island into a patchwork of uniform-aged, forest stands less than 50 years old and a widespread road system. Between 1954 and 2005, approximately 20% of the total land area and 25% of the original productive old-growth on [Prince of Wales] and surrounding islands was logged (Brinkman et al. 2009). The majority (32%) of old-growth was taken from northern [Prince of Wales] Island compared to a smaller portion (10%) taken from southern [Prince of Wales] Island (Albert and Schoen 2007). Although this geographic distinction is not biologically meaningful to the [Prince of Wales] spruce grouse, logging did not occur uniformly across the island and therefore, any impacts from logging would be more prevalent in the northern part of the island. Similar logging practices have occurred on surrounding islands where [Prince of Wales] spruce grouse are known or expected to occur (productive old-growth logged: 20% on the Dall Island complex, 13% on the Outside Islands (Kosciusko, Warren, Heceta, Tuxekan, San Fernando, and Suemez Islands), and 16% on Etolin and Zarembo Islands; Fig. 3; Albert and Schoen 2007).[614]

Moreover, the amount of roads on Prince of Wales and surrounding islands, within Prince of Wales spruce grouse range, is estimated to be around 2,500 miles, most of which are open to public.[615]

Because Prince of Wales spruce grouse are isolated and have limited dispersal ability, clear-cuts significantly increase their risk of extinction. Further, the "lower genetic variation observed in both [Prince of Wales] and [Zarembo Island] compared with mainland populations reflects small

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[611] USFWS 2010 at 16; Nelson at 6.

[612] USFWS 2010 at 17.

[613] DEIS at 3-233.

[614] *Id.* at 15.

[615] *Id.* at 16.

effective population sizes, which could diminish their capacity to respond to a changing environment. The potentially low level of dispersal into these insular populations indicates that there may be little opportunity for the demographic rescue that many mainland grouse populations rely on to persist (Storch 2007)."[616] All these factors have led scientists to conclude that the viability of Prince of Wales spruce grouse is a high conservation concern.[617]

The Forest Service must explain and the FEIS must disclose whether and how the Draft Forest Plan will ensure the continued viability of Prince of Wales spruce grouse. The agency would violate the law if it did otherwise.

C. The DEIS Does Not Disclose the Draft Forest Plan's Risks to the Spruce Grouse.

The DEIS dedicates about one page to Prince of Wales spruce grouse and does not attempt to grapple with how the various alternatives could affect this key Tongass species.[618] Although the DEIS briefly mentions that continued old-growth logging and increased road densities could adversely affect spruce grouse, it dismisses these concerns by asserting that, "[l]ocalized increases in road densities would be managed through road closures and storage or decommissioning which would minimize the potential for increased harvest risk for spruce grouse over the long term," and "[t]he Forest Plan Conservation Strategy would continue to suitable [*sic*.] habitat and provide landscape connectivity for these species."[619] This is inadequate. The Forest Service must disclose and grapple with the consequences to Prince of Wales spruce grouse of continued old-growth logging over the next 16 years. Moreover, it may not rely on the conservation strategy to avoid such analysis, as the Draft Forest Plan significantly weakens the conservation strategy. *See supra* pp. 40-53.

VII. MARTEN

The marten is an important carnivore that is associated with old-growth forests. Currently, the best available science on the taxonomic status of marten (*Martes spp*.) in southeast Alaska indicates the presence of two distinct species: the Pacific marten (*Martes caurina*) and the American marten (*Martes Americana*).[620] These two species have discrepancies in their range overlap, with the American marten occurring primarily on coastal mainland sites and nearshore islands in the Alexander Archipelago.[621] The Pacific marten is a coastal species with a restricted

[616] Barry & Tallmon at 623.

[617] *See* Suring et al. 1993.

[618] DEIS at 3-233, 3-259-60.

[619] *Id*. at 260.

[620] N.G. Dawson & J.A. Cook, J. A. Cook, *Behind the Genes: Diversification of North American Martens (Martes americana and M. caurina), in* Biology and Conservation of Martens, Sables, and Fishers: A New Synthesis (K.B. Aubry *et al.* eds., 2012).

[621] Alaska Dep't of Fish & Game, American Marten (*Martes americana*): Species Profile, at PDF 2.

range on Kuiu Island and Admiralty Island.[622] Kuiu Island is particularly significant because it maintains a hybridization region for these two species of marten. Research on hybridization events indicates these can be areas of incredible biodiversity value.[623] The continental form occurs elsewhere in the species' range.[624]

As an initial matter, the Forest Service needs to address the status of the Pacific marten and explain how the Draft Forest Plan affects its viability in the Tongass. It has an extremely restricted known range of only two islands in southeast Alaska, and on Kuiu Island its population is thought to be in decline.[625]

The Forest Service also needs to address martens' varying habitat needs. "American martens are strongly associated with late successional forests of a variety of vegetation types, as long as the forests contain sufficient vertical diversity and structure."[626]

"American martens have been reported to prefer riparian areas (Anthony et al. 2003, Buskirk et al. 1989, Martin 1987) and sites close to water (Bull et al. 2005, Hargis and McCullough 1984, Simon 1980, Spencer et al. 1983)."[627] Indeed, the DEIS acknowledges that "[c]oastal habitats (beach fringe) and riparian areas have the highest habitat value for marten. . . ."[628] It also explains that "OGRs and other non-development LUDs provide refugia for marten from trapping pressure."[629] "Legacy Forest Structure standards and guidelines, in combination with the beach fringe and riparian buffers, aid in providing habitat and connectivity for marten on National Forest System (NFS) lands (USDA Forest Service 2008a)."[630] Yet, the DEIS fails to examine in any meaningful way the impacts associated with the Draft Forest Plan's proposal to log in OGRs, beach fringe, and riparian buffers. The agency also fails to examine the ability to ensure the viability of the marten given these changes.

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[622] Alaska Dep't of Fish & Game, Pacific Marten (*Martes caurina*): Species Profile, at PDF 2.

[623] B.M, Fitzpatrick, *et al.*, *Hybridization and the species problem in conservation*, Current Zoology 61: 206-216, 207 (2015).

[624] Small at 90 fig. 1.

[625] *See* Federal Subsistence Board, News Release, Federal Subsistence Board Closes Marten Trapping on Federal Lands on Kuiu Island (Dec. 16, 2013).

[626] M. Goldstein *et al*., Chp. 10 - Developing a Habitat Monitoring Program: Three Examples from National Forest Planning, IN A TECHNICAL GUIDE FOR MONITORING WILDLIFE HABITAT at PDF 23 (2013) (Goldstein).

[627] *Id*.

[628] DEIS at 3-220.

[629] DEIS at 3-222.

[630] DEIS at 3-222.

Goldstein identified "six landscape attributes and two site attributes that would be important to monitor to ensure that habitat of American martens is maintained. . . ."[631] Goldstein then translated the habitat attributes into measureable metrics.[632] The Forest Service should consider this analysis in deciding how to amend the forest plan.

VIII. CROSSBILLS

Crossbills are small birds belonging to the finch family whose bills are specially adapted to extract seeds from conifer cones.[633] Both white-winged crossbills (*Loxia leucoptera*) and red crossbills (*Loxia curvirostra*) live in Southeast Alaska; however, statewide, red crossbills' numbers have been estimated to be less than half of those of white-winged crossbills.[634] The red crossbill can also be found throughout coastal Southeast Alaska, whereas the white-winged species is largely restricted to the mainland.[635] For these reasons, the red crossbill is of greater concern on the Tongass.

The red crossbill complex in North America is divided into several groups or "call types" with different vocalizations,[636] morphology, ecology, and foraging habits.[637] Though various call types may nest in the same area, for the most part they remain reproductively isolated.[638] This lack of interbreeding may result from cultural evolution of distinctive vocalizations and positive

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[631] Goldstein at PDF 26-27.

[632] *Id*. at 27.

[633] Audubon, White-Winged Crossbill: *Loxia leucoptera*, Audubon Field Guide at PDF 1; Audubon, Red Crossbill: *Loxia curvirostra* (Audubon, Red Crossbill) Audubon Field Guide, at PDF 1; U.S. Forest Service, Birds: Red Crossbill (USFS, Red Crossbill).

[634] *Compare* K. Walton *et al.*, Alaska Species Ranking System Summary Report – Red Crossbill (2013) (Walton, Red Crossbill), at PDF 1 (statewide population of red crossbill is estimated at 809,300), *with* K. Walton *et al.*, Alaska Species Ranking System Summary Report – White-winged Crossbill (2013) (Walton White-winged Crossbill) (statewide population of white-winged crossbill is estimated at 2,340,000).

[635] *Compare* Walton, Red Crossbill at PDF 1, *with* Walton White-winged Crossbill.

[636] K. Irwin, *A New and Cryptic Call Type of the Red Crossbill*, 41 Western Birds 10 (2010), at PDF 10 (Irvin). Some consider them to be separate biological species. *Id.*; C.W. Benkman, *Logging, Conifers, and the Conservation of Crossbills*, Conservation Biology 7(3):473 (1993) (Benkman), at PDF 1; *see also* U.S. Forest Service, Birds: Red Crossbill (USFS, Red Crossbill), at PDF 1.

[637] Benkman at PDF 1.

[638] *See, e.g.*, Commission on the Status of Endangered Wildlife in Canada, COSEWIC Assessment and Status Report on the Red Crossbill (*Percna*) in Canada 2004 (2012), at PDF 2; Benkman at PDF 1.

assortative mating between individuals of the same vocal type.[639] Two call types can be found in the Tongass: the western hemlock crossbill (*L. c. minor*) and the Sitka spruce crossbill (*L. c. sitkensis*).[640]

Red crossbills are a "Species of Greatest Conservation Need" and have a category II (red) conservation ranking in Alaska.[641] While the statewide population is estimated to comprise 809,300 individuals,[642] the "actual status of nomadic crossbill populations is difficult to assess and large declines may go undetected."[643] Moreover, because red crossbills' sole food source (conifer seeds) intermittently fails, they are considered "extinction prone"; populations elsewhere have been pushed to the brink of extinction by logging.[644]

A. Red Crossbills Depend on Old-Growth in the Tongass for Their Continued Survival.

Red crossbills are specially adapted to remove seeds from the cones of the trees in the area where they live. The western hemlock crossbill, for example, has a palatal groove perfectly sized to extract seeds from the cone of the hemlock tree.[645] Given annual variations in the seed production capacity of the forests they depend on, red crossbills are limited to only a small amount of their range at any given time.[646] They typically move from forest to forest as "nomadic" populations, seeking out abundant conifer seeds.[647]

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[639] *See* Galis, F. & J. J. M. van Alphen, *How Fast Do Crossbills Speciate? On Assortative Mating and Vocalizations*, Trends In Ecology & Evolution 15(9): 356 (2000), at PDF 2; *see also* L. K. Snowberg & C. W. Benkman, *Mate Choice Based on a Key Ecological Performance Trait*, 22 J. Evolutionary Biology 762 (2009), at PDF 1 (noting a study in which 99 percent of individual crossbills paired assortatively by call type).

[640] M. Young, North American Red Crossbill Types: Status and Flight Call Identification, eBird (2012), at PDF 6-7, 11-12; *see also* Irwin at PDF 11; USFS, Red Crossbill at PDF 1.

[641] Walton, Red Crossbill at PDF 1.

[642] *Id.*

[643] Benkman at PDF 2.

[644] W. C. Holimon *et al.*, *The Importance of Mature Conifers to Red Crossbills in Southeast Alaska*, 102 Forest Ecology & Mgmt. 167 (1998) (Holimon), at PDF 1 (internal quotation marks omitted).

[645] USFS, Red Crossbill at PDF 1.

[646] Benkman at PDF 3.

[647] Audubon, Red Crossbill at PDF 2; *see also* W. C. Holimon, *et al.*, *The Importance of Mature Conifers to Red Crossbills in Southeast Alaska*, 102 Forest Ecology & Mgmt. 167 (1998), at PDF 1 ("Crossbills wander nomadically to exploit spatiotemporally varying confer seed crops.") (citations omitted).

"Dependency on a single resource makes crossbills extremely vulnerable to habitat loss and alteration."[648] Additionally, "protecting nomadic species such as crossbills represents a . . . formidable challenge because critical habitats are more difficult to recognize since they may be used only once every several years, with different areas crucial during different years."[649]

The two call types of red crossbills in Southeast Alaska feed primarily on the seeds of western hemlock and Sitka spruce.[650] They selectively forage in mature stands where cone production is higher than in young stands, in part to save energy on travel and in part to maximize both size of crop and seeds per cone.[651] Indeed:

> During a year of poor cone production, red crossbills did not forage in young stands. Within mature stands, crossbills tended to forage preferentially on trees with large cone crops. These favored trees were also the larger and older trees because cone production increases with tree size. The avoidance of young stands is especially pronounced during poor seed years and may be related to the absence of mature trees containing numerous cones with many seeds. . . . [M]ature stands [may be] critical for maintaining crossbill populations.[652]

It is therefore unsurprising that older forests "tend to support more crossbills than do younger forests, and as the proportion of the landscape containing older forests declines, crossbills decrease disproportionately in abundance."[653]

Red crossbills in the Tongass, being nomadic populations, also require large swaths of mature forest. In any given year they may find cones only within a small area, as Sitka spruce and western hemlocks can go eight years between good cone productions.[654]

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[648] Benkman at PDF 2.

[649] *Id.* at PDF 4.

[650] USFS, Red Crossbill; Holimon at PDF 1.

[651] Holimon at PDF 4.

[652] *Id.* at PDF 1.

[653] Benkman at PDF 4. One Forest Service survey associated Tongass red crossbills with closed-canopy forest dominated by large-diameter hemlock or spruce associations and a 20-year seral stage. *See* 2008 TLMP AR 603_0466 (W. P. Smith *et al.*, Bird, Mammal, and Vegetation Community Surveys of Research Natural Areas in the Tongass National Forest (2001)) at PDF 27, Table 11.

[654] USFS, Red Crossbill at PDF 1.

B. Logging in the Tongass Could Have Serious Impacts on Red Crossbills.

Logging that replaces mature or old-growth forests with younger forests harms red crossbill populations by reducing cone and seed production. Conifers generally do not bear cones until they are several decades old, and even then younger conifers are less productive than older conifers.[655] Sitka spruce may not produce cones before 40 years of age, and it produces sizeable cone crops only when it is older.[656] Some trees, such as western hemlock, are underrepresented in second-growth, so an old-growth stand may produce more than 200 times the number of seeds that the trees in a second-growth stand would.[657] Mature forests also produce cones more consistently over longer periods than regularly logged forests.[658]

This forest ecology means that logging in old-growth disproportionately affects cone production and has more severe effects on red crossbills than second-growth logging.[659] Logging may also target forests at lower elevations that produce more seeds than forests higher up and on steeper slopes.[660] When forests do not produce enough cones for crossbills to meet minimum energy requirements, "cone failures" occur.[661] And, even where cone failures do not decimate a population, smaller cone crops reduce breeding in crossbills and slow a population's recovery.[662]

As noted, crossbills follow a nomadic life strategy because they must find areas of abundant cones to survive, and because cone production varies annually. Years of prolific cone production in an area are often followed by years of little to no cone production, and "even the most regular cone-producing conifers have occasional cone failures."[663] Entire regions may fail to produce seeds for several years in a row.[664] Crossbills respond by moving out of these areas and concentrating where food is more plentiful.[665] As a result, "only a fraction of the total potential range can support crossbills," and "a reserve or system of reserves encompassing only a restricted geographic area would be inadequate to support nomadic populations of crossbills continuously."[666]

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[655] Benkman at PDF 2.

[656] USFS, Red Crossbill at PDF 1.

[657] Benkman at PDF 3.

[658] *Id.* at PDF 2-3.

[659] *See id.*; *see also id.* at PDF 4 (noting that one study in Finland found that, as old-growth forests diminished by 27 percent from clear cutting, red crossbills declined by 75 percent).

[660] *See id.* at PDF 3-4.

[661] *Id.* at PDF 3.

[662] *Id.*

[663] *Id.*

[664] *Id.*

[665] *Id.*

[666] *Id.*

Crossbills' nomadic nature also exposes them to habitat fragmentation, as suitable patches of forest become less and less available for local populations to colonize.[667] "Because a nomadic crossbill may need to colonize many patches during its lifetime, even slight declines in colonization rates can be important."[668] As local individual populations vanish, the species or metapopulation moves closer to extinction.[669]

Climate change can complicate matters for crossbills further by synchronizing cone failures, perhaps even in mountainous regions where stands would ordinarily produce at different times.[670] Spruce bark beetle infestations—which the DEIS notes will likely increase with warming[671]—may also eliminate a food source and reduce crossbill populations.[672] Thus, climate change will likely compound the harmful effects of logging on the red crossbill.

C. The DEIS Does Not Adequately Address the Consequences of the Draft Forest Plan for Red Crossbills.

The DEIS mentions crossbills only in passing, grouping it with a handful of other species that "use hemlock/spruce/cedar forest (both old-growth and young-growth)" as habitat.[673] It does not recognize the designation of the red crossbill as a "Species of Greatest Conservation Need" [674] or otherwise identify it as deserving special attention. Nor does it specifically assess the potential impacts of the Draft Forest Plan on red crossbill habitat.[675]

In the general discussion of environmental consequences on wildlife resources, the DEIS notes that the preferred alternative would open up the most productive old-growth forest to logging over 100 years of any of the action alternatives.[676] It also observes that the cumulative effect of road construction associated with logging "has the potential to impact wildlife species through habitat fragmentation (especially migratory birds and other interior-forest associated species)."[677] Finally, it predicts that climate change will "result in changes to vegetation and thus, the

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[667] *Id.* at PDF 4.

[668] *Id.*

[669] *Id.*

[670] *See id.* at PDF 3.

[671] DEIS at 3-162.

[672] Walton, Red Crossbill at PDF 2.

[673] DEIS at 3-228.

[674] Walton, Red Crossbill at PDF 1.

[675] *See* DEIS at 3-257 ("All of the alternatives would result in a reduction of perching, foraging, and potential nesting habitat and the increase in fragmentation associated with timber harvest and road building;").

[676] *Id.* at 3-235 to 3-236 & Table 3.10-8.

[677] *Id.* at 3-262.

suitability of wildlife habitat, among other impacts," including "insect infestations."[678] It does not attempt to connect these impacts to the red crossbill. Given the species' precarious status and vulnerable natural history, the Forest Service must include a more detailed discussion of the possible harms red crossbills could suffer from logging and other activities.

The Service also should consider the needs of the red crossbill as a factor in deciding whether to continue industrial-scale old-growth logging for decade or more to come. The Forest Service should adopt a forest plan that ends such logging in less than five years and establishes reserves in productive forests located in varied climatological regions, to avoid synchronous cone failures and other catastrophes for crossbills.[679] Only meaningful conservation efforts and thoughtful planning can ensure the red crossbill's continued existence in the Tongass. If the agency is intent on continuing industrial-scale old-growth logging in the manner contemplated by the Draft Forest Plan, then the agency must then explain how its chosen plan will ensure the continued viability of the red crossbill.

IX. BATS

There are five species of bats in the Alexander Archipelago, all of which may be vulnerable to logging on the Tongass National Forest. One of these bat species, the Keen's myotis (*Myotis keenii*), has an extremely restricted range and it roosts in old-growth trees, which means management decisions that affect its habitat on the Tongass can have long-term population-level consequences for the species. The DEIS does not disclose the Draft Forest Plan's effects on the Keen's myotis or other bat species and is therefore deficient.

A. The Tongass is Home to Five Bat Species, Including Keen's Myotis.

Five species of bat have been documented in Southeast Alaska: little brown myotis (*Myotis lucifugus*), California myotis (*M. californicus*), long-legged myotis (*M. volans*), Keen's myotis (*M. keenii*), and the silver-haired bat (*Lasionycteris noctivagans*).[680] Southeast Alaska is thought to be the northern distributional limit for each of these species except the little brown myotis, which occurs in the interior of Alaska.[681]

Among these, the Keen's myotis may have the most restricted range of any species of bat in North America and occurs within a narrow strip of coastal coniferous rain forest from Juneau in

[678] *Id.* at 3-262.

[679] Benkman at PDF 4-5.

[680] D. I. Parker *et al., Distributional limits of bats in Alaska,* Arctic (1997): 256-265; J. L. Boland et al., *Survey of bats in Southeast Alaska with emphasis on Keen's Myotis (Myotis keenii),* Northwest Science 83.3: 169-179 (2009) (Boland et al. 2009a).

[681] *Id*.

Southeast Alaska through southwestern British Columbia and into northwestern Washington.[682] Its population in Alaska is unknown, but it is considered small and rare.[683]

Although there is not enough data to conclusively determine habitat associations for all of the bat species in Southeast Alaska, many of them are primarily associated with forested habitats in other parts of their range.[684] The long-legged myotis and Keen's myotis are primarily associated with coniferous forests.[685] Keen's Myotis are also generally associated with cool, wet, coastal montane forests and karst features.[686] In Alaska, female Keen's myotis on Prince of Wales Island appear to primarily select day roost sites in old-growth forests.[687] The Keen's bat's "small size, low wing-loading ratio, and very low intensity echolocation call makes it well adapted for flying and foraging within structurally complex old forest."[688]

B. Keen's Myotis and Other Bat Species are Vulnerable to Logging Impacts.

Keen's myotis and other bat species are vulnerable to logging impacts. Because Keen's myotis preferentially roost in large diameter trees in old-growth forests, scientists have concluded that old-growth logging poses a threat to the species:

> Removal of large-diameter trees during timber harvest can reduce the number of potential roosts available to bats, and harvesting forests under short rotations can inhibit the development of suitable roosts over time. Our findings suggest that maintaining coniferous forests with a diversity of decay stages and high proportions of large diameter trees with defects in close proximity to riparian habitats provides critical roosting habitat for female Keen's myotis on Prince of Wales Island.[689]

In fact, studies show that all five species of bats in Southeast Alaska prefer unlogged old-growth forests and riparian zones and avoid clear-cuts and second-growth:

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[682] Boland et al. 2009a.

[683] U.S. Forest Service, *2009 Forest Service Alaska Region Sensitive Species List: Assessment and Proposed Revisions to the 2002 List* (2009) (USFS 2009), PDF 32-34.

[684] *Id*.

[685] *Id*.

[686] USFS 2009 at PDF 32-34.

[687] Boland, J.L. *et al*., *Selection of day-roosts by Keen's Myotis (Myotis keenii) at multiple spatial scales*, Journal of Mammalogy 90.1: 222-234 (2009) (Boland et al. 2009b) at PDF 1, 10.

[688] USFS 2009 at PDF 33.

[689] Boland et al. 2009b at PDF 10.

> Our study suggests that old-growth forests and riparian areas provide roosting and foraging habitat for the five bat species in southeastern Alaska. . . . Our data also indicate that clear-cuts are not important bat habitat, perhaps because clear-cuts do not provide roosting structure. . . . . Closed-canopy second-growth is not used by bats in southeastern Alaska.[690]

In addition to their preference for old-growth habitat, bats in Southeast Alaska possess biological traits that increase their vulnerability to logging: "[m]any factors contribute to species declines and risk of extinction. Intrinsic biological and ecological factors such as low reproductive rate and rarity may exacerbate consequences of extrinsic factors such as habitat loss."[691] In particular, "Keen's Myotis are long-lived with low reproductive rates. Low densities in conjunction with these life history traits may make populations of forest-dwelling bats in Southeast Alaska vulnerable to decline due to habitat perturbations, climate change, or a combination of factors."[692]

For all of these reasons, NatureServe ranks Keen's myotis globally as vulnerable, and ranks the species in Alaska as critically endangered to vulnerable.[693] Keen's myotis are managed as a sensitive species on national forests in Washington, and are listed as a candidate species for the state's threatened, endangered or sensitive classification. In the Forest Service's 2009 Alaska Sensitive Species Assessment, the Service did not recommend Keen's myotis for listing, primarily because of a lack of data, but it recommended that the species be closely monitored and re-evaluated when new information becomes available.[694]

C. The DEIS Fails to Consider or Disclose Impacts on Keen's Myotis and Other Bat Species.

The Forest Service must consider how the Draft Forest Plan will affect Keen's myotis and other bat species on the Tongass National Forest. Its own 2009 Alaska Sensitive Species Assessment relied in part on the 2008 Amended Forest Plan to decline listing, indicating that management of the forest drives the bat's status.[695] Moreover, scientists who study bats in the Tongass have warned that current and future logging threatens the species:

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[690] D. I. Parker *et al*., *Effects of timber harvest on bat activity in southeastern Alaska's temperate rainforests,* Bats and Forests Symposium, British Columbia Ministry of Forests, Victoria, BC, Canada (1996).

[691] Boland et al. 2009a at PDF 10.

[692] USFS 2009 at PDF 10.

[693] *See* NatureServe, *Comprehensive Report Species - Myotis keenii* and *National, State, and Provincial Conservation Status Rank Definitions,* www.natureserve.org (last visited Feb. 19, 2016).

[694] USFS 2009 at PDF 33-34.

[695] *Id*. at PDF 34.

> Extensive past and future harvesting in southeastern Alaska suggests a significant impact on these species. . . . Old-growth characteristics that provide suitable roost sites for bats do not develop until at least 150 years after harvesting. . . . Although questions remain about how habitat modification in southeastern Alaska affects bat populations, this study strongly suggests that present levels of timber harvesting will have a detrimental effect on these bat populations.[696]

Rather than addressing how the Draft Forest Plan affects bats, the Forest Service has entirely omitted them from consideration in the DEIS. The Forest Service must confront how an additional 15 years of old-growth logging will affect Keen's myotis and other bats in the Tongass National Forest. Moreover, because bats rely heavily on riparian areas in old-growth forests, the Forest Service must analyze how the Draft Forest Plan's weakening of protections for riparian management areas will affect the viability of the species.

TRANSPORTATION

This section of our comments addresses the Draft Forest Plan's changes to the transportation regime on the Tongass. The 2008 Amended Forest Plan places varying levels of restriction on road projects. This section describes the existing restrictions and their justifications. It then explains how the Forest Service must clarify the Draft Forest Plan so as to avoid the conclusion that the plan is a radical and unjustified departure from the status quo.

I. IN THE 2008 AMENDED FOREST PLAN, ROADS ARE PROHIBITED OR RESTRICTED IN MANY LUDS.

In the 2008 Amended Forest Plan, there are many LUDs in which roads are prohibited or seriously restricted. For planning purposes, the 2008 Forest Plan distinguishes between: 1) significant transportation projects designed to meet public transportation needs, and 2) all other roads. The first of these are categorized as "Transportation and Utility Systems," also called TUS, for which there is a special overlay LUD as well as management prescriptions specific to each regular LUD.[697] Transportation and Utility Systems include "state and federal highways, railroads, public hydroelectric power projects and associated facilities, powerlines 66kV or greater, and pipelines 10 inches or greater in diameter."[698] "For planning purposes, potential and proposed [Transportation and Utility Systems] corridors are depicted on the Plan map to show approximate corridor routes and widths."[699] Other roads are a broader group including all

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[696] Parker 1996.

[697] *See* 2008 Amended Forest Plan at 7-44 (definition); *id.* at 3-2 (LUD allocations); *id.* at 3-129 (TUS LUD); *id.* at 3-59 (TUS management prescriptions in Old-Growth Habitat LUD).

[698] *Id.* at 3-128.

[699] *Id.* at 7-6.

"motor vehicle route[s] over 50 inches wide, unless identified and managed as a trail."[700] They are not governed by their own LUD, but by management prescriptions for each regular LUD.

A. Thirteen LUDs Comprising 62 Percent of the Forest are "Avoidance Areas" for Transportation and Utility Systems.

The management prescription standards and guidelines for each LUD, which are the highest priority directions in the 2008 Forest Plan, classify it as either a Transportation and Utility Systems "avoidance area" or "window."[701] Transportation and Utility Systems can only be located in avoidance area LUDs if the Service determines there is no other feasible[702] route that would avoid the LUD.[703] A Transportation and Utility Systems window, by contrast, is "[a]n area potentially available for the location of transportation or utility corridors and sites."[704] In the 2008 Amended Forest Plan, there are thirteen avoidance area LUDs covering 10,379,771 acres, or 62% of the Tongass.[705]

B. When Transportation and Utility Systems are Constructed, an Overlay LUD is Activated That Includes Certain Environmental Protections.

In the 2008 Amended Forest Plan, there is a special Transportation and Utility Systems "overlay" LUD on the entire Tongass.[706] The overlay LUD takes effect after the location of a Transportation or Utility System is approved, when construction begins.[707] At that time its management prescriptions replace those of the underlying LUD in the applicable Transportation or Utility System corridor.[708] It describes how Transportation and Utility Systems should be designed and managed.[709]

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[700] *Id.* at 7-34.

[701] *Id.* at 1-3, 4-32; *see also, e.g., id.* at 3-111 (designating the Modified Landscape LUD as a "window"); *id.* at 3-59 (designating the Old-growth Habitat LUD as an "avoidance area").

[702] "Feasible" means "[c]apable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, technical, and safety factors." *Id.* at 7-12.

[703] *Id.* at 7-44 to 7-45; *see also, e.g., id.* at 3-59.

[704] *Id.* at 7-45; *see also, e.g., id.* at 3-111.

[705] *See* DEIS at 3-281 to 3-282, Table 3.12b-2.

[706] *See* 2008 Amended Forest Plan at 3-2 n.2 & n.5; *id.* at 3-128.

[707] *Id.* at 3-128.

[708] *Id.*

[709] *See generally id.* at 3-128 to 3-133.

The overlay LUD includes certain environmental protections. For example, the Forest Service will "[r]educe impacts to wildlife habitat and populations to the maximum extent feasible" within a Transportation and Utility Systems corridor.[710] It will also "[e]stablish a baseline [wildlife habitat] inventory . . . preceding or coinciding with Transportation Utility Systems development."[711]

C. Ten of the Thirteen "Avoidance Area" LUDs Also Prohibit or Seriously Restrict Other Kinds of Road Construction.

Roads that are not Transportation and Utility Systems are either allowed, restricted, or prohibited by the management prescription standards and guidelines for each regular LUD.[712] Of the thirteen LUDs that are "avoidance areas" for Transportation and Utility Systems, ten also prohibit or severely restrict construction of other kinds of roads. The management prescription standards and guidelines for the Research Natural Area, Wild River, Non-wilderness National Monument, Remote Recreation, Wilderness, and Wilderness National Monument Wilderness LUDs generally prohibit road construction.[713] They typically state that "new roads are not permitted," with specified exceptions such as when necessary to access valid mining claims.[714] The management prescription standards and guidelines for the Municipal Watershed, Special Interest Area, Land Use Designation II, and Old-growth Habitat LUDs seriously restrict roads.[715] They typically allow roads only under limited circumstances or "if no feasible alternative is available."[716]

D. The 2008 Amended Forest Plan's Restrictions on Roads Protect Wildlife and Other Forest Values.

In general, Transportation and Utility Systems avoidance areas "represent LUD's [sic] where . . . a [transportation or utility corridor] designation would not be desirable."[717] Other types of roads

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[710] *Id.* at 3-133.

[711] *Id.*

[712] *See generally id.*, Chapter 3.

[713] *See id.* at 3-34, 3-36 to 3-37, 3-38 (Research Natural Area); *id.* at 3-80 (Wild River); *id.* at 3-33 (Nonwilderness National Monument); *id.* at 3-49 (Remote Recreation); *id.* at 3-22 (Wilderness and National Monument Wilderness).

[714] *E.g., id.* at 3-33.

[715] *See id.* at 3-51, 3-56 (Municipal Watershed); *id.* at 3-40, 3-44 (Special Interest Area); *id.* at 3-69, 3-73 (Land Use Designation II); *id.* at 3-57, 3-61 (Old-growth Habitat).

[716] *E.g,, id.* at 3-61.

[717] 1997 FEIS at 3-88; *accord* DEIS at 3-21 ("A TUS 'avoidance area' is an area where the establishment and use of transportation or utility corridors and sites is not desirable given the LUD emphasis.").

are similarly undesirable in most of the avoidance area LUDs.[718] The assumption that roads generally will not be built in non-development LUDs is a basic component of the agency's conservation strategy:

> The framework of the old-growth conservation strategy relative to wildlife viability is now further described as two basic components: 1) the reserve system in terms of its ability to effectively maintain the integrity of the old-growth forest ecosystem through non-development LUDs such as Wilderness Areas, Research Natural Areas, Remote and Semi-Remote Recreation, and Old- Growth Habitat, among others, and 2) matrix lands where development, such as timber harvest and *road building*, is permitted that will alter the old-growth forest ecosystem on a portion of the lands.[719]

That is, when the 2008 Amended Forest Plan describes the conservation strategy, non-development LUDs are contrasted with areas where road building is permitted.

Although not fully adequate, the road-limiting measures in the 2008 Amended Forest Plan do provide some level of protection for wildlife and other forest values through the avoidance area safeguard and individual LUD restrictions. "[R]oads are one of the greatest risk factors to fish habitat, water quality, and to some wildlife species."[720] Through habitat degradation and fragmentation, "[r]oads pose *the* greatest risk to fish resources on the Tongass."[721] For species such as the brown bear, black bear, wolf, spruce grouse, mountain goat, and marten, roads increase the risk of excessive hunting and trapping by improving human access.[722] To illustrate this point, there is a direct positive relationship between roads and brown bear mortality.[723]

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[718] *See, e.g.*, 2008 Amended Forest Plan at 3-61 ("New road construction is generally inconsistent with Old-growth Habitat LUD objectives . . . ."); *id.* at 3-69 (listing as a goal for LUD II, to "[m]anage these areas in a roadless state to retain their wildland character"); *id.* at 3-34 (listing as an objective for the Research Natural Area LUD, to "[m]aintain the natural, undisturbed character of each area by . . . [p]ermitting no permanent facilities, and no roads or trails except for research purposes or as otherwise provided by law"); 1997 FEIS at L-160; *id.* at L-161.

[719] 2008 FEIS at 3-256 (emphasis added).

[720] 1997 FEIS at L-157.

[721] 2003 FEIS, Vol. I at 3-25 (emphasis added); 1997 FEIS at 3-64 ("The greatest risk to the fish resource is caused by roads."); *see also* DEIS at 3-114; 1997 FEIS at 3-65.

[722] *See* 2008 FEIS at 3-280 to 3-281 (brown bear); *id.* at 3-237 to 3-238, 3-384 (wolf); *id.* at 3-243 (spruce grouse); 3-268 (black bear); *id.* at 3-278 (marten).

[723] 1997 FEIS at 3-416.

II. THE FOREST SERVICE MUST CLARIFY THE DRAFT FOREST PLAN'S CHANGES TO TRANSPORTATION TO PREVENT POTENTIAL MAJOR ADVERSE IMPACTS TO FOREST RESOURCES.

The Draft Forest Plan and DEIS describe significant changes to the current forest plan that could, depending on how they are interpreted, result in fundamental changes that substantially weaken resource protection standards on the Tongass. To eliminate this problem, in the FEIS and adopted plan, there are three points that the Forest Service must make clear as to the scope and effect of the transportation-related changes included in this amendment. First, the Forest Service must specify that the Chapter 5 Transportation Systems Corridors direction in the Draft Forest Plan only applies to major roads, just like the 2008 Forest Plan's Transportation and Utility Systems LUD that the Draft Forest Plan deletes, to eliminate any suggestion that under the amended plan the LUD restrictions for roads to not fully apply to logging and other forest management roads. Second, the Service must ensure that in the absence of the 2008 Forest Plan's "avoidance area" protections, the Chapter 3 LUD restrictions for ordinary roads apply to major roads. Third, the Service must give a detailed account of the circumstances under which Chapter 5's Transportation Systems Corridors direction could supersede Chapter 3 LUD road restrictions, specifically addressing a scenario in which the LUD road restrictions would prohibit a major road. These clarifications are needed to ensure that the amendment does not unjustifiably reduce environmental protections governing roads.

A. The Forest Service Should Clarify that the New "Transportation Systems Corridors Direction" Only Applies to Major Roads.

The Draft Forest Plan's new Transportation Systems Corridors direction replaces the 2008 Forest Plan's Transportation and Utility Systems LUD direction as it applies to major roads. The Transportation and Utility Systems LUD in the 2008 Forest Plan governs both public energy projects and major roads.[724] The Forest Service deletes this LUD from the Draft Forest Plan and replaces its direction as to public energy projects with new direction on renewable energy,[725] which was one of the four significant issues the Forest Service identified during scoping.[726] Although the Forest Service has not identified a similar need for new direction as to major roads,[727] deletion of the Transportation and Utility Systems LUD leaves a gap in that major public roads would otherwise receive special consideration under the 2008 Forest Plan. The Draft Forest Plan fills this gap with new Transportation Systems Corridors direction. Like the 2008 Transportation and Utility Systems LUD, the new Transportation Systems Corridors direction is meant to "facilitate the development of[] existing and future major public Transportation . . . Systems."[728]

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[724] *See* 2008 Forest Plan at 3-129 (TUS LUD).

[725] DEIS at 3-21.

[726] DEIS at 1-9.

[727] *See supra* p. 9.

[728] 2008 Forest Plan at 3-128 (emphasis added); *accord* Draft Forest Plan at 5-13 (the purpose of the Transportation Systems Corridors direction "is to facilitate . . . existing and future transportation systems").

Unfortunately, the DEIS and Draft Forest Plan describe the scope of this change quite differently and with potentially much different effects. The DEIS explains that these "[Transportation Systems Corridor] plan components apply *only* to major road systems such as state and federal highways, railroads, and those identified by the State of Alaska in the current version of the SATP and applicable laws (for example, Section 4407 of Public Law 109-59, Title XI of the Alaska National Interest Lands Conservation Act, Public Law 96-487)."[729] Yet, due to drafting defects in the Draft Forest Plan, it is possible to conclude that the new Transportation Systems Corridors direction applies to roads of all types, including logging roads. In the glossary, "Transportation Systems Corridor" is defined as "[e]xisting and future transportation systems . . . ."[730] The term "transportation system" appears in the glossary, but its entry reads "[s]ee forest transportation system."[731] "Forest transportation system" is in turn defined as "[t]he system of National Forest System (NFS) roads, trails, and airfields on NFS lands."[732] Therefore, "transportation systems corridor" could erroneously be equated with "road," with the result that the Draft Forest Plan revises the direction for all roads.[733]

The Forest Service has not analyzed, justified, or even disclosed in the DEIS that it is rewriting the direction for all roads on the forest. Nor has it determined whether such a sweeping change would comport with its NFMA obligations. As discussed below, if the Draft Forest Plan's Transportation Systems Corridors direction applied to all roads, a further ambiguity in that direction could lead to the absurd conclusion that the entire forest is being opened to roads of any kind, including logging roads.

The Forest Service should clarify, in both the FEIS and the plan it adopts, that any new transportation direction such as the Transportation Systems Corridors direction in Chapter 5 of the Draft Forest Plan applies only to major roads.

B. The Forest Service Should Clarify that Chapter 3 LUD Road Restrictions Apply to Major Roads In Place of Former "Avoidance Area" Protections.

Even with the clarification that the new transportation direction in Chapter 5 applies only to new major public highways and not to logging or other Forest Service roads, the Draft Forest Plan does not clearly indicate how the new direction for major roads is to be applied with other LUD restrictions governing roads. The Forest Service should make clear that in the absence of "avoidance area" designations, the road restrictions for individual LUDs apply to major roads. Under the 2008 Forest Plan, major roads and utility projects could not be built in the majority of

[729] DEIS at 3-277.

[730] *Id.* at 7-74.

[731] *Id.* at 7-74.

[732] *Id.* at 7-24.

[733] *See also* Draft Forest Plan at 5-13 (explaining that the purpose of Chapter 5 transportation direction is to facilitate "existing and future transportation systems *such as*" major roads, without limiting its applicability to major roads (emphasis added)).

the Tongass unless there was no feasible alternative in a Transportation and Utility Systems "window."[734] The Draft Forest Plan deletes "avoidance area" and "window" designations from the management prescriptions for each underlying LUD.[735] The DEIS repeatedly acknowledges that deleting avoidance areas will make it easier to build renewable energy projects.[736] The DEIS does not contain similar acknowledgements about major roads—nor would they be accurate as to major roads, because as explained above, most avoidance area LUDs still prohibit or seriously restrict roads even after the avoidance area direction is removed.[737] However, because under the 2008 Forest Plan major roads receive special treatment and therefore are not subject to Chapter 3 LUD restrictions for regular roads, the fact that under the Draft Forest Plan they *are* subject to the Chapter 3 LUD road restrictions is less than ideally clear. The Forest Service should make it explicit that major roads are subject to Chapter 3 road restrictions for individual LUDs in the Draft Forest Plan.

If, instead, the Forest Service intends that Chapter 3 LUD road restrictions should not apply to major roads, then deleting avoidance area status eliminates a protective barrier to siting major roads on the majority of the Tongass. The DEIS does not disclose such a sweeping change,[738] let alone analyze its significant environmental effects or compliance with NFMA.

C. The Forest Service Should Clearly Describe What, If Anything, the Transportation System Corridors Direction Will Supersede.

In addition to clarifying that the new direction is limited to major roads and that major roads are subject to Chapter 3 LUD road restrictions, the Forest Service must make the new transportation direction itself clearer. Specifically, the transportation direction in Chapter 5 will supersede direction in Chapters 3 and 4 "[s]hould a conflict or discrepancy in direction occur."[739] The Forest Service must thoroughly explain what will constitute a conflict in this context, providing examples of the circumstances under which Chapter 5 direction would or would not supersede Chapters 3 and 4.

On the one hand, no provision of the new transportation direction in Chapter 5 directly conflicts with the limitations on road construction in the LUDs found in Chapters 3 and 4, and thus the best interpretation of the changes may be that the Forest Service is to apply all of the standards

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[734] *See supra* pp. 111-12.

[735] Draft Forest Plan at 5-3, 5-13.

[736] DEIS at 3-92, 3-119, 3-120 to 3-121, 3-145, 3-148, 3-149, 3-151, 3-152, 3-155, 3-156, 3-485.

[737] *See supra* p. 113.

[738] *Cf.* DEIS at 3-92, 3-119, 3-120 to 3-121, 3-145, 3-148, 3-149, 3-151, 3-152, 3-155, 3-156, 3-485 (admitting that renewable energy projects will be easier to build under the Draft Forest Plan).

[739] Draft Forest Plan at 1-4; *id.* at 5-1; DEIS at 3-277 ("TSC plan components, e.g., standards and guidelines to the Forest Plan, would take precedence over other forest-wide and LUD-specific standards and guidelines (subject to applicable laws) where TSC are proposed or exist.").

and guidelines consistently. But there is language in the new direction that could be interpreted differently and could signal a major change in the restrictions governing even major roads. If, for example, Chapter 3 LUD road restrictions were interpreted to conflict with the Chapter 5 transportation direction because the purpose of that new direction is to "facilitate the availability of" Tongass land for major roads, then the Draft Forest Plan could be read to emasculate all major road restrictions outside of Chapter 5.[740] That would undoubtedly have significant environmental effects, as the DEIS is replete with descriptions of how roads harm species.[741] But the Forest Service has not said that the Draft Forest Plan makes it easier to build major roads on the Tongass, let alone that it potentially guts all Chapter 3 LUD road restrictions. The DEIS does not analyze or disclose this result.

In the FEIS and adopted plan, the Forest Service must describe and cabin the extent of potential conflicts between the Draft Forest Plan's Chapter 5 transportation direction and Chapter 3 LUD road restrictions. To name just one example, the Service must clarify that in the Old Growth Habitat LUD from which Chapter 3 precludes roads unless there is no feasible alternative,[742] Chapter 5 will not enable the Forest Service to build a road for which there is a feasible alternative.[743] If the Forest Service intends otherwise, it has failed to discharge its obligations under NEPA and NFMA with respect to the transportation changes.

RENEWABLE ENERGY

Commenters commend the Forest Service for proposing, in the Draft Forest Plan, a policy that promotes renewable energy on the Tongass. The Forest Service is right to encourage renewable energy projects because of their comparatively beneficial effects on climate and the environment, and because they may provide more affordable energy. Nonetheless, the new renewable energy direction in the Draft Forest Plan needs revision in two respects. First, it inappropriately removes and trumps environmentally protective management prescriptions in the 2008 Forest Plan, leading to unnecessary risks and putting the plan in tension with applicable laws. Second, it promotes biomass energy, which accelerates climate change and is harmful to the environment and human health.

I. THE DRAFT FOREST PLAN LIBERALIZES RENEWABLE ENERGY SITE PLACEMENT AND DIRECTS THE FOREST SERVICE TO ENCOURAGE RENEWABLE ENERGY PROJECTS.

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[740] And if Chapter 5 is not limited to major roads as it should be, *see supra* pp. 115-16, the Draft Forest Plan could open the entire forest to all roads, including logging roads. The DEIS does not even hint at this extreme result, which the Forest Service certainly has not justified or evaluated.

[741] *See* DEIS at 3-114 (admitting that "[r]oads pose the greatest risk to fish resources on the Tongass"); *id.* at 3-246 to 3-247 (explaining the adverse effects of road access on mountain goats); *id.* at 3-247 to 3-248 (black bears); *id.* at 3-251 (marten); *id.* at 3-252 (brown bear and wolf); *id.* at 3-260 (spruce grouse); 3-257 (migratory birds).

[742] Draft Forest Plan at 3-60.

[743] *See also supra* p. 113.

The Draft Forest Plan makes renewable energy a high priority. It includes a broad new objective to "encourage renewable energy production."[744] For purposes of the objective, the plan does not discriminate between types of renewable energy, except to prioritize energy that would be used locally over energy that would be exported.[745] The Draft Forest Plan makes the entire forest available: "[a]ll [National Forest System] lands may be suitable for renewable energy sites on a case-by-case basis in consideration of the LUD, ecological and social values, and benefit to Southeast Alaska communities."[746] In case of a conflict, the new renewable energy direction will take precedence over both management prescriptions for individual LUDs and forest-wide standards and guidelines.[747] The "avoidance area" designation in the 2008 Amended Forest Plan is removed.[748]

II. ALTHOUGH THE FOREST SERVICE SHOULD ENCOURAGE RENEWABLE ENERGY, IT SHOULD NOT DO SO AT THE EXPENSE OF ESSENTIAL ENVIRONMENTAL PROTECTIONS.

The Forest Service deserves praise for emphasizing renewable energy and for incorporating a goal to encourage renewable energy into the Draft Forest Plan. However, the Draft Forest Plan takes this policy too far to the extreme by ignoring its prior determination that 62% of the forest should be off limits to hydroelectric projects unless there is no feasible alternative location and by prioritizing the new renewable energy plan components such that they may override legally required and essential environmentally protective measures.

Even a renewable technology like hydroelectric energy that has the potential to yield net benefits when well-planned can be disastrous to salmon or other resources in the wrong place, at the wrong scale, or in the absence of protective standards and guidelines.[749] The Forest Service already made judgments in the 2008 Forest Plan about what are generally the wrong places to put hydroelectric facilities, establishing 62% of the forest as "avoidance areas" off limits to new hydroelectric facilities unless there is no feasible alternative location.[750] And even if there is no feasible alternative, transportation and utility systems LUD protections take effect that aim to minimize the project's environmental impact.[751]

In the Draft Forest Plan, by contrast, none of the forest is off limits to hydroelectric projects, and many of the transportation and utility systems LUD protections that currently apply to

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[744] Draft Forest Plan at 5-12.

[745] *See id.*

[746] *Id.*; *accord id.* ("Beach and estuary fringe is suitable for renewable energy sites.").

[747] *Id.* at 5-12.

[748] *Id.* at 5-3.

[749] *See supra* pp. 84-85.

[750] *See supra* pp. 111-12.

[751] *See* 2008 Forest Plan at 3-128 to 3-133.

hydroelectric projects have simply been deleted, with no corollary included in the new management direction.[752] Regardless of site-specific environmental review, these changes dramatically weaken the Draft Forest Plan's restrictions on hydroelectric power in a way that compromises important salmon habitat and other environmental values.

In addition, there are several places in the Draft Forest Plan where protective management prescriptions for individual LUDs could potentially conflict with, and therefore be overridden by, the new renewable energy direction's unqualified objective to encourage renewable energy and universal suitability determination.

One example of a possible conflict is between the new renewable energy direction and the management prescriptions for the Wild, Scenic, and Recreational Rivers LUDs. In these LUDs, the Draft Forest Plan requires that the Forest Service "not authorize development of hydroelectric power facilities" for projects on rivers designated under the National Wild and Scenic Rivers Act, as that Act requires.[753] A second potential conflict is between the new direction and management prescriptions designed to protect native species as required by the National Forest Management Act.[754] These prescriptions include everything from the general prescription that the Forest Service "[m]aintain contiguous blocks of old-growth forest habitat in a forest-wide system of old-growth reserves"[755] to the specific, such as "[a]void the placement of facilities near the Pike Lakes that would increase harvest pressure to the point where the viability of [the Northern Pike] is affected."[756]

That the Draft Forest Plan's current priority of direction might override important environmentally protective plan provisions, whether or not they are required by law, counsels against its adoption. Especially so, given that neither the DEIS nor Draft Forest Plan even attempts to justify in its current form the priority of direction with respect to renewable energy. These documents do not, for example, suggest that the proposed priority is needed to fulfill renewable energy goals at the expense of other important resource protection needs.

The Forest Service also has not explained why it is necessary to locate renewable energy sites in what are currently "avoidance" areas, let alone highly sensitive areas like beach and estuary fringe.[757] These and other vulnerable locations should be not be opened to development of

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[752] *Compare* Draft Forest Plan at 5-12 to 5-13 *with* 2008 Forest Plan at 3-128 to 3-133.

[753] Draft Forest Plan at 3-77, 3-83 to 3-84, 3-90 to 3-91; 16 U.S.C. § 1278 (providing *inter alia* that "no department or agency of the United States shall assist by loan, grant, license, or otherwise in the construction of any water resources project that would have a direct and adverse effect on the values for which such [designated national wild and scenic] river was established").

[754] *See* 16 U.S.C. § 1604(g)(3)(B); 36 C.F.R. § 219.9(b)(1).

[755] Draft Forest Plan at 3-61.

[756] *Id.* at 4-13; *see also id.* at 4-89 (for mountain goats, "[l]ocate facilities and concentrated human activities as far from important wintering and kidding habitat as feasible").

[757] Draft Forest Plan at 5-12.

renewable energy wholesale, and certainly not while the Draft Forest Plan includes destructive technologies in its broad definition of "renewable energy."[758]

The DEIS does not disclose the potential environmental impacts of opening the entire forest to renewable energy sites while encouraging renewable energy. It is not even internally consistent about whether the new direction will result in more renewable energy projects, saying variously that "the new components are likely to result in more energy project development over the long term"[759] and "the new Renewable Energy Plan Components . . . would simplify the process for projects, but would not necessarily result in an increase in the number of projects developed."[760] Nor is it consistent in describing the priority of direction that will apply under the Draft Forest Plan, saying both that "[c]onsistent with the 2008 Forest Plan, renewable energy projects need to be consistent with the standards and guidelines for the respective LUDs affected by energy development"[761] and that "should there be a conflict in direction, the proposed plan components in Chapter 5 would take priority over forest-wide and LUD-specific standards and guidelines (subject to applicable laws)."[762] Despite this confusion in the DEIS, the clear result of making it easier to build renewable energy projects is that more of such projects may be built. And the clear priority of direction in the Draft Forest Plan is that in case of a conflict, Chapter 5 governs, such that protections for individual LUDs that would otherwise apply could be overruled.[763] The DEIS's brief, vague and conclusory statements about how the renewable energy direction in the Draft Forest Plan will affect the risks to forest resources do not satisfy NEPA.[764]

The pursuit of renewable energy, while important, should not trump other provisions essential for environmental protection. The Forest Service should adopt a forest plan in which the management direction for renewable energy is subject to protective forest-wide standards and guidelines and management prescriptions for individual LUDs, not the other way around.

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[758] *See infra* pp. 122-23.

[759] DEIS at 3-379.

[760] *Id.* at 3-289; *see also id.* at 3-509 ("[t]he revised components may affect the timing and rate that new projects are proposed and developed on National Forest System (NFS) lands"); *id.* at 3-119 ("the proposed new direction under Alterntives [*sic*] 2 throught [*sic*] 5 would eliminate 'avoidance areas' which could increase the efficiency and likelihood [*sic*] of developing these project [*sic*]").

[761] *Id.* at 3-289.

[762] *Id.* at 3-288.

[763] Draft Forest Plan at 1-4.

[764] *See, e.g.*, DEIS at 3-145 (the renewable energy changes "could result in greater impacts to sensitive and rare plant species"); *id.* at 3-148 ("would result in increased risk of potential adverse effects to moosewort fern and its habitat from renewable energy development"); *id.* at 3-149 ("may result in a slightly increased risk of potential adverse effects to Macoun's thistle and its habitat"); *id.* at 3-121 ("would likely have little additional adverse effects to fish resources relative to current conditions").

III. THE FOREST SERVICE SHOULD NOT PROMOTE OR LIBERALIZE THE MOST DAMAGING RENEWABLE TECHNOLOGIES.

The Forest Service is right to encourage most kinds of renewable energy, but its encouragement should not extend indiscriminately to all renewable energy technologies, regardless of their environmental effects. For example, as explained above, poorly designed and located hydropower projects can adversely affect salmon, which are critical to the Southeast Alaskan way of life. *See supra* pp. 84-85.

Not all energy that is technically renewable is also worth what it costs the government, local communities and the forest. For that matter, the Draft Forest plan's definition of renewable energy is so broad as to be useless. It includes any energy resource that is "naturally replenishing but . . . limited in the amount of energy available per unit of time."[765] That definition is not helpful for two reasons. First, it does not differentiate between energy resources whose use will force climate change, such as biomass, and those whose use is essentially climate-neutral or even climate beneficial, such as wave action. Second, it does not exclude resources that replenish too slowly to matter for purposes of human civilization. As a result, old-growth forests that may take hundreds or thousands of years to replenish, if they can ever truly be replenished, are absurdly classified as "renewable energy." On a long enough timescale, even some fossil fuels might be replenished, but that does not mean the Forest Service should encourage their exploitation. The Forest Service should encourage renewable energy technologies for their climate, environmental, social, and economic benefits—not simply because they exploit resources that will be replenished at some point in the future. The Forest Service should discard its overbroad definition and adopt one that focuses on beneficial technologies.

If "renewable energy" was appropriately defined along those lines, it would not include biomass energy, or the burning of wood and wood-based products to produce energy.[766] Far from encouraging biomass energy, the Forest Service should eschew it. This technology's effect on climate change, its potential demands on forest resources that far exceed the demands of other renewable energies, its harmful emissions, and the fact that Tongass biofuels are not competitive in the market all make this form of energy a mistake to pursue. Moreover, the Forest Service has not considered these issues in the DEIS, despite the fact that they are integral to understanding the environmental effects of the Draft Forest Plan's new renewable energy direction.

There is no question that logging old-growth forest has a net climate forcing effect because of the superlative climate-protective functions of this kind of forest.[767] If old-growth forest is logged and then burned for energy, the net effect on the climate will only be worse than the already extremely detrimental effect of converting old-growth into wood products. But the Draft Forest Plan directs the Forest Service to encourage biomass without any limitation on the kinds of wood

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[765] Draft Forest Plan at 7-55.

[766] It is possible to generate biomass energy with materials other than wood, *see id.* at 7-6, but these comments focus on wood-based energy.

[767] *See supra* pp. 31-35.

that can be burned, and so could result in destroying centuries-old forest in the name of "renewable energy." Doing so would unequivocally advance climate change, and the Forest Service should not adopt any plan that could conceivably require the agency to encourage it.

However, even if only second-growth is burned, biomass is likely to be climate forcing. Even if no old-growth trees are burned for biomass, the use of second-growth trees and other Tongass wood for biomass could drive carbon-releasing increases in old-growth logging by making it more economical. The Forest Service appears to acknowledge this, projecting in the DEIS that developing biomass would generate demand for low- and utility-grade logs without specifying their origin.[768] And young growth and slash have their own climate protective effects that would be negated by burning, albeit less impressive than those of old growth.[769]

Ultimately, though, the climate risks of using Tongass second growth for biomass are demonstrated by the widespread scientific consensus that replenishing carbon stores by growing new trees in the place of those that are logged can take tens or hundreds of years in *any* forest, delaying biomass's alleged carbon neutrality until well past the time when carbon reductions are essential to prevent catastrophic climate change.[770] For natural forests like the Tongass as opposed to plantation forests, it is estimated to take thousands of years.[771] Some scientists even conclude that when modeled realistically as a series of logging events rather than just a one-off, biomass never achieves carbon neutrality.[772] And carbon recapture is all the more drawn-out in

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[768] DEIS at G-5 to G-6; *id.* at 3-459.

[769] A. Repo *et al.* concluded that in a young growth forest with a constant logging rotation, removing just forest residues for biomass energy would have a warming impact on climate for 62 years. *Can we produce carbon and climate neutral forest bioenergy?*, 7 GCB BIOENERGY 253, 253, 255, 257 (2015) (removing "branches, unmercantable tops and stumps . . . decreases the carbon input to dead wood, litter and soil carbon pools, and consequently decreases forest carbon stock").

[770] For example, T. Buchholz *et al.* found that among 123 peer-reviewed studies that calculated the "payback period," or length of time necessary to resequester the carbon released through burning for biomass, the average payback period regardless of forest type was estimated at 300 years. *A global meta-analysis of forest bioenergy greenhouse gas emission accounting studies*, 8 GCB BIOENERGY 281, 285, Fig. 3 (2015) (Buchholz 2015); *see also* J. S. Gunn *et al., Biogenic vs. geologic carbon emissions and forest biomass energy production*, 4 GCB BIOENERGY 239, 240 (2012) (Gunn) ("If alternatives to fossil fuels include use of forests where C is emitted and resides in the atmosphere for long periods of time (e.g. decades or longer), a reduction of atmospheric concentrations of CO2 (e.g. to 350 ppm) will be difficult to achieve and may contribute to some degree of irreversible climate change." (citations omitted))

[771] Buchholz 2015 at 284 (payback periods in natural forests averaged 2,495 years and ranged up to 4,500 years).

[772] B. Holtsmark, *The outcome is in the assumptions: analyzing the effects on atmospheric CO2 levels of increased use of bioenergy from forest biomass*, 5 GCB BIOENERGY 467 (2013).

the Tongass because its trees are slow-growing.[773] Meanwhile, biomass generation spews carbon into the atmosphere at a higher rate per unit of energy than fossil fuel technologies.[774]

Under no circumstances does it make sense to burn any Tongass trees for the sake of the climate. "Close examination shows that the reverse is true: logging and burning trees will produce a near-term surge in carbon releases – greater than from burning coal – while eroding for decades the forests' ability to recapture those emissions."[775] Not surprisingly, the Forest Service does not cite any evidence in the DEIS or Draft Forest Plan that biomass energy will yield climate benefits if used on the Tongass, although a Forest Service employee whose jobs is to develop biomass energy asserts, without support, that biomass's carbon emissions compare favorably to those of fossil fuels.[776] For all the reasons explained above, that is incorrect.

Biomass energy also has harmful non-climate environmental effects. Unlike other renewable energy technologies, it requires more than a static area of the forest. By burning wood and increasing the demand for timber, it consumes an ever-larger portion of land, at growing costs to wildlife habitat and other non-timber uses.[777] And burning biomass emits air pollutants such as carbon monoxide, fine particulate matter, nitrogen dioxide, sulfur dioxide and volatile organic compounds that can increase the risk of cancer, cardiovascular disease, and adverse reproductive effects.[778] Because "the combustion of wood . . . poses a significant threat to human health," the American Lung Association opposes biomass, grouping it with coal and oil as a technology policymakers should transition away from "to cleaner alternatives."[779]

Biomass energy fuel products, or biofuels, such as wood pellets are a poor investment on the Tongass. There is currently little demand for Tongass biofuels and only one wood pellet producer in the forest.[780] Tongass biofuels are not economically competitive because wood

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[773] DEIS at 3-19 (noting that sequestration potential in the Tongass is limited by the fact that most stands have a relatively low growth rate).

[774] M.S. Booth & R. Wiles, *Clear cut Disaster: Carbon Loophole Threatens U.S. Forests* at 9 (2010); Gunn at 239 ("switching from fossil fuels to wood energy could actually result in increased levels of atmospheric GHGs, at least over a period of decades" (citations omitted)).

[775] Booth 2010 at 1.

[776] 769_05_000349 at PDF 1.

[777] *See* DEIS at 3-459.

[778] J. Lewtas, *Air pollution combustion emissions: Characterization of causative agents and mechanisms associated with cancer, reproductive, and cardiovascular effects,* 636 MUTATION RESEARCH 95 (2007); T. Jayarathne *et al., Emissions of Fine Particle Fluoride from Biomass Burning,* 48 Envtl. Sci. & Tech. 12,636 (2014); H. Wang *et al., Source Profiles of Volatile Organic Compounds from Biomass Burning in Yangtze River Delta, China,* 14 AEROSOL AND AIR QUALITY RESEARCH 818 (2014).

[779] Am. Lung Ass'n, Public Policy Position at 4, 5, 6 (June 25, 2015).

[780] AK Ctr. for Energy & Power, *A Review of Commercial-Scale Wood Pellet Boilers in Southeast Alaska* at 9-10 (2013).

pellets from Southeast Alaska are both more expensive and lower quality than wood pellets from British Columbia and Washington State.[781] As for biomass energy generation, the Forest Service cites no analysis suggesting that it can outperform other energy sources from an economic perspective. The Forest Service should not waste resources that could be invested in clean renewable energy to develop dirty, potentially climate forcing biomass energy and uneconomic biofuels.

Finally, the Forest Service has not considered the environmental effects of promoting biomass energy as NEPA requires. The DEIS says little about the climate effects of biomass energy, except to note that burning low-value logs for energy would reduce carbon storage compared to using these logs for lumber or building materials.[782] As to the non-climate environmental and health effects of Tongass biomass for energy and the odds that Tongass biomass energy products could become economically competitive, the DEIS is silent.[783] The Forest Service must consider all of these issues before it adopts forest plan components that promote biomass energy, such as those in the Draft Forest Plan.

In sum, the Forest Service should except biomass from its otherwise laudable goal of promoting renewable energy because it is a poor investment with serious detrimental environmental effects that the Forest Service has not adequately considered or disclosed. The DEIS mentions a Forest Service goal of converting 30% of fuel oil heating to biomass.[784] No such goal is incorporated into the Draft Forest Plan.[785] Nor should it be part of the plan, for all of the above reasons. To avoid confusion, the Forest Service should remove references to this goal from the FEIS.

KARST

The DEIS does not adequately disclose the effects of changes to the degree and methods of logging permitted in karst lands as between the Draft Forest Plan and 2008 Amended Forest Plan. These changes are substantial. The 2008 Amended Forest Plan permits thinning on medium and low vulnerability karst only within specific guidelines "when the karst management objectives can be met."[786] In contrast, the Draft Forest Plan allows even-aged management in low vulnerability karst and limited clear-cutting in medium vulnerability karst.[787] Other restrictions on second-growth logging in karst lands are removed.[788] Overall, the Draft Forest

[781] *Id.*

[782] DEIS at 3-20.

[783] Although the DEIS discloses environmental effects of logging, it does not explain how the increased demand for timber due to biomass energy development could amplify those effects.

[784] DEIS at 3-459, 3-463, 3-475.

[785] *See generally* Draft Forest Plan.

[786] 2008 Amended Forest Plan at 4-24 to 4-25; *id.* at H-8.

[787] Draft Forest Plan at 5-9.

[788] *Compare* 2008 Amended Forest Plan at 4-24 to 4-25; *id.* at H-8 *with* Draft Forest Plan at 4-24; *id.* at H-8.

Plan is projected to allow a nearly 12 percent increase in acres logged from karst lands compared to the 2008 Amended Forest Plan.[789]

Although the DEIS discusses the types of effects that can result from logging in karst lands in general terms and estimates total maximum acres logged in karst lands under each alternative, it does not explain the overall environmental effects of the Draft Forest Plan's ongoing and increased logging in karst.[790] For example, the DEIS does not analyze the cumulative effects of logging 54,755 acres of karst on the productive plant, animal, and aquatic communities that rely on characteristics unique to valuable karst habitat.[791] Nor does it examine how a shift from limited commercial thinning to clear-cutting could change the kinds of effects associated with logging in karst.[792] It is not enough to say how many acres of karst could be logged under the proposed action alternative and note the kinds of effects that could result on those acres.[793] The Forest Service must translate those data into information that allows a meaningful comparison of the alternatives, such as relative risks to forest resources like plants, animals, soil and caves.

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[789] DEIS at 3-32 (showing 48,906 total acres to be logged on karst lands under alternative 1, the no action alternative, and 54,755 acres under alternative 5, the preferred alternative).

[790] *See generally* DEIS at 3-31 to 3-34.

[791] DEIS at 3-26 to 3-28 (describing the unique productivity of karst lands); *id.* at 3-32 to 3-33 (citing no study analyzing the effects of the proposed changes and no source less than eight years old other than monitoring reports from logged areas).

[792] *See* K. A. Harding & D. C. Ford, *Impacts of primary deforestation upon limestone slopes in northern Vancouver Island, British Columbia*, 21 ENVTL. GEOLOGY 137, 142-43 (1993) (documenting effects of clearcutting on karst lands, including loss of soil, moss, and litter, and in some cases "desertification that, in terms of human history, is permanent"); K. Allred, *Some carbonate erosion rates of Southeast Alaska*, 66 J. of Cave and Karst Studies 89, 96 (2004) (finding higher carbonate erosion rates in clearcuts); M. D. Bryant *et al., Coho Salmon Populations in the Karst Landscape of North Prince of Wales Island, Southeast Alaska*, 127 Transactions of the Am. Fisheries Soc'y 425, 426 (1998) (noting that clearcutting can "confound the responses of stream geochemistry and salmonid populations to karst geology").

[793] *See* DEIS at 3-31 to 3-34.

For the reasons stated above, the Draft Forest Plan needlessly mires Southeast Alaska in the destructive and controversial practices of industrial-scale old-growth logging for another 16 years or more to come. The Forest Service should make changes in the Draft Forest Plan to ensure an end to industrial old-growth logging within five years and correct the deficiencies described above.

Respectfully,

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