The Nature Conservancy
Alaska

James Hubbard
Under Secretary
Department of Agriculture
1400 Jefferson Drive, SW
Washington, DC 20024

Victoria Christiansen
Chief
USDA Forest Service
1400 Independence Ave, SW
Washington, DC 20250

December 17, 2019

Re: Public Comments for the USDA Forest Service Rulemaking for Alaska Roadless Areas

Dear Under Secretary Hubbard and Chief Christiansen,

The Nature Conservancy (TNC) appreciates the opportunity to comment on the USDA Forest Service's rulemaking for Alaska Roadless Areas as defined in the Federal Register on October 17, 2019 (84 FR 55522; 0596-AD37).

The Nature Conservancy is a global conservation organization working around the world to protect ecologically important lands and water for people and nature. Our mission is to conserve the lands and waters on which all life depends. Guided by science, we create innovative, on-the-ground solutions to our world's toughest challenges. We use a collaborative approach that engages local communities, governments, the private sector, and other partners.

The Nature Conservancy has been working in Southeast Alaska for nearly two decades to help ensure the sustainability of the diverse benefits that people derive from the lands and waters on the Tongass National Forest (TNF). Over this time, we have worked to improve scientific information on forest conditions and other important resources, collaborated with local residents to help inform and guide forest management to meet the diverse needs of local communities, and engaged innovative strategies in economic development and small-scale lending to support local businesses.

Following a review of the alternatives contained in this Draft Environmental Impact Statement (DEIS), TNC supports Alternative 1, the No Action alternative; and does not support Alternative 6, the preferred alternative. Our views on these alternatives are informed by three primary reasons:

- **The Nature Conservancy believes that the 2001 Roadless Rule has effectively protected the ecologically, socially, and economically important resources in the**

Tongass National Forest; a full exemption leaves these resources more vulnerable to adverse impacts from logging and road building. Roadless areas protect habitat that supports healthy salmon runs, the cornerstone of subsistence, commercial and recreation fishing economies; maintains the wild scenery that is a major draw for Southeast Alaska's massive visitor industry; and keeps intact the globally unique old-growth forests that represent a crucial carbon sink in a time of global warming while providing habitat for healthy populations of wolves, bears, and Sitka black-tailed deer. Meanwhile, the proposed alternatives will allow for increased logging and roadbuilding pressure that threaten these values.

- **The only way to create durable solutions on the Tongass National Forest is to listen to public, community, and tribal input; the preferred alternative and the rulemaking process to-date has jeopardized major investments in building goodwill and trust over many years among a wide range of local interests.** Over the past decade, the Tongass has moved away from conflict and litigation by encouraging collaboration and community engagement. The preferred alternative will undoubtedly increase conflict, as it has been shown to be unsupported by the vast majority of the public, Southeast Alaskan communities, and by all cooperating tribes, and it does not follow collaborative pathways laid out by diverse stakeholder groups including the Tongass Advisory Committee (TAC).
- **Changes to the Roadless Rule, and the preferred alternative in particular, take attention and resources away from productive and necessary work the Forest Service could be doing to further benefit the ecological, social, and economic values on the forest.** Increased focus on administrative processes, uneconomic timber sale planning, and environmental litigation will continue to draw finite funding and other resources away from the work that benefits Southeast Alaska communities while not achieving any meaningful outcomes. Specifically, there is a need to invest in recreation and tourism, which are the backbone of the Southeast Alaska economy, develop a new timber industry in the form of a young-growth industry, and restore streams and forests so that they can provide maximum ecologic and community benefit.

Alternatives 2 and 3, as written, appear to be an attempt by the agency to create options that represent tradeoffs between industry, communities, and conservation. The Nature Conservancy believes in compromise and balancing tradeoffs to benefit nature and people; however, the process that has been followed in drafting the DEIS to date has lacked the necessary elements for creating a durable compromise on these issues. In the absence of meaningful efforts to bring contentious stakeholders to the table and gain consensus and/or concessions, it is not possible to know whether these alternatives, or some variation thereof, may form the basis for a lasting compromise among stakeholders.

DETAILED COMMENTS AND SUPPORTING ANALYSIS

The Nature Conservancy believes that the 2001 Roadless Rule has effectively protected the ecologically, socially, and economically important resources in the Tongass National Forest; a full exemption leaves these resources more vulnerable to adverse impacts from logging and road building.

The 2001 Roadless Area Conservation Rule recognized, in its statement of Purpose and Need, that some of the last remaining tracts of undeveloped, unfragmented lands in the United States were present on U.S. Forest Service (USFS) land. The actions identified as most likely to alter and fragment these final remaining areas were road construction, road reconstruction, and timber harvest.

Characteristics of roadless areas that were highlighted in the 2001 Rule included, "high quality or undisturbed soil, water and air…helping maintain abundant and healthy fish and wildlife populations; and…the basis for many forms of outdoor recreation." The Alaska Citizen Advisory Committee[1] further refined "roadless characteristics" for the Tongass, acknowledging that in addition to their ecological and scenic values, roadless areas in Alaska also have cultural significance for Alaska Native peoples and supply the subsistence resources Southeast Alaska residents depend on. The lands contained in the Tongass underpin much of the economy and sustenance of Southeast Alaska communities, and Inventoried Roadless Areas (IRAs) play an important role in conserving and stewarding some of the most valuable resources in Southeast Alaska.

When compared to the lower 48, the Tongass is a uniquely wild place: it is part of the largest remaining temperate rainforest on Earth, a rarity that is in itself a draw for tourists and which also protects some of the final remaining healthy salmon runs in the United States. The two largest non-government sectors of the Southeast Alaska economy are the visitor industry and seafood, which combined for 21% of total workforce earnings in 2018 (in contrast, the timber industry accounted for 0.8% of total earnings).[2] The economic health and wild nature of the Tongass are inextricably linked, and the unfragmented, unaltered nature of IRAs are crucial to maintaining that wildness. Furthermore, the intact watersheds found in IRAs are a key element of maintaining healthy populations of deer, salmon, and other wildlife species throughout the Tongass. With their wide distribution throughout the Tongass, including in proximity to communities, IRAs provide a function that Wilderness areas (which are generally more remote)

[1] Alaska Roadless Rule Citizen Advisory Committee: Final Report to the Governor and State Forester, 11/21/2018. http://www.alaska.forestry.org/sites/default/files/ak/AKRoadlessRuleCitizenAdvisoryCommittee_FinalReport11212018.pdf

[2] Southeast Conference, Southeast by the Numbers 2019. http://www.seconference.org/sites/default/files/FINAL%20Southeast%20by%20the%20Numbers%202019.pdf

do not do nearly as well - the provision of high-quality hunting and fishing access both within their boundaries and in adjacent roaded areas for Southeast Alaska residents.

Below we explore the ways in which the current 2001 Roadless Rule and roadless areas protect ecological values on the Tongass; potential impacts of rulemaking that alters management of IRAs in relation to these characteristics; and the ways in which the DEIS inadequately represents these impacts. As described above, these ecological values are intricately linked with social and economic values of importance.

Increased road building and large-scale clear-cut logging can impact the ecological values of roadless areas

Roadless areas on the TNF contain high quality habitat that supports healthy wildlife and fish populations. Due to the relatively unfragmented nature of roadless areas, this habitat is not split by any development such as roads or large-scale clear-cuts - the activities most likely to impact ecological function on the Tongass.

The alternatives laid out in the DEIS are complex, with multiple Alaska Roadless Area (ARA) designations with differing levels of protection of these habitats from the impacts of roadbuilding and logging. Table 1 captures the Acres designated as Roadless areas in the rulemaking, wheras Table 2 provides more context to the functional change for activities such as roadbuilding, old-growth logging, and young growth logging. Both tables showcase large-scale changes to the acres open to development under a variety of alternatives.

Table 1. Acres designated as Roadless areas in the rulemaking for Alaska Roadless Areas DEIS by alternative.

	Total acres designated as Roadless Areas	**Acres removed from designated Roadless Areas**	**Acres added to designated Roadless Areas**
Alternative 1	9,223,443	N/A	N/A
Alternative 2	9,251,636	112,470	154,335
Alternative 3	8,118,908	1,153,964	49,428
Alternative 4	8,884,788	375,028	41,865
Alternative 5	6,918,229	2,300,566	0
Alternative 6	0	9,223,443	0

*Offshore islands and Roadless Areas identified in the 2003 Supplemental Roadless EIS (Alternatives 2 & 3), and LUD II acres not currently included in Roadless (Alternatives 2 & 4).

Table 2. Area included in 2019 Alaska Roadless Areas and/or LUD II, by alternative and functional protection. These acres include all 870,000 LUD II acres in column 1 for analysis consistency. For greater detail, see Appendix A.

	Protected from roadbuilding and old-growth logging (acres)	**Protected from old-growth logging; roadbuilding and young growth logging allowed (acres)**	**ARAs not protected from roadbuilding or commercial logging (acres)**	**2001 Roadless Areas opened for roadbuilding and logging (acres)**
TNC Analysis label	*Protected*		*Open to development*	
Alternative 1	9,265,308	0	0	N/A
Alternative 2	9,251,636	0	0	112,470
Alternative 3	8,747,441	366,000	241,646	566,421
Alternative 4	8,135,041	0	749,747	1,124,775
Alternative 5	6,960,094	0	0	2,300,566
Alternative 6*	870,179	0	0	8,387,512

*Out of 870,000 acres of LUD II acres only; no Roadless areas under Alternative 6.

It should be noted that when comparing the impacts of alternatives on ecological values, it is challenging to try to compare roadless areas (areas without roads) with areas designated as "Alaska Roadless Areas", some of which allow roadbuilding and old-growth clear-cuts. Likewise, several alternatives either contain or exclude Congressionally-protected Land Use Designation II (LUD II) areas that are functionally protected regardless of ARA designation. In order to maintain consistency, our analyses of the area functionally protected by each alternative includes all 870,000 acres of LUD II areas for each alternative and excludes the ARAs that allow old-growth clear-cuts and roadbuilding. For our analyses below, we utilize the terms "protected" and "open to development" to represent the functional impacts of any designation changes as a result of any of the alternatives. We also utilize the distinction between Development LUDs and Non-Development LUDs to inform our analysis. To better understand the details of how we are defining these terms in which analysis, see Appendix A.

Understanding the scale of designation changes is helpful in understanding potential impacts, but so is understanding the actual suitability of harvest and likelihood of harvest of any of these areas. An analysis of the total large tree Productive Old Growth (POG), high volume POG, and suitable old growth by alternative (Table 4) showcases a better estimate of how many acres are most likely to be impacted by any potential logging activities.

Table 4. Total Large Tree Productive Old Growth (POG), High Volume POG, and all Old Growth Suitable for harvest by alternative.

	Suitable Large Tree Productive Old Growth (POG) (acres)	**Suitable High-Volume POG (acres)**	**Total Suitable old-growth timber (acres)**
Alternative 1	30,301	95,623	228,713
Alternative 2	31,813	103,091	248,915
Alternative 3	35,425	124,772	306,936
Alternative 4	39,371	150,904	386,909
Alternative 5	40,124	154,254	393,977
Alternative 6	40,124	154,254	393,977

Another way to decipher even further the likely impacts is to examine the spatial distribution of suitable, high-volume productive old-growth, i.e., the most highly sought stands. Table 5 shows that it is likely that the main biogeographic provinces that will see disproportionately high increases in timber harvest are Kupreanof/Mitkof, North Prince of Wales, Etolin/Zarembo, and Revilla/Cleveland Peninsula due to their high proportion of these acres and their locations relative to logging-related infrastructure.

Table 5. Acres of Suitable High-volume POG by alternative and Biogeographic Province.

	Suitable High-Volume Productive Old Growth (acres)					
Biogeographic Province	**Currently Suitable (Alt 1)**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**
E. Baranof Island	1,253	1,274	1,274	3,216	3,216	3,216
E. Chichagof Island	12,184	12,389	14,942	20,354	20,966	20,966
Etolin Zarembo Island Complex	8,589	9,085	11,611	13,329	13,882	13,882
Kuiu Island	10,100	10,112	11,406	12,602	12,602	12,602
Kupreanof / Mitkof Islands	10,991	13,748	16,345	18,673	18,954	18,954
Lynn Canal / Mainland	2,507	2,677	2,677	5,155	5,525	5,525
North Prince of Wales Complex	28,869	30,994	37,037	40,995	41,962	41,962
Outside Islands	3,196	3,318	3,318	3,985	3,985	3,985
Revilla Island / Cleveland Peninsula	13,737	15,279	20,764	24,249	24,787	24,787
South Prince of Wales Island	2,120	2,136	2,181	2,610	2,610	2,610
Stikine River / Mainland	1,368	1,368	2,506	4,367	4,394	4,394
Taku River / Mainland	36	36	36	37	37	37
W. Baranof Island	618	618	618	1,277	1,277	1,277
Yakutat Forelands	50	50	50	50	50	50
Total	**95,623**	**103,091**	**124,772**	**150,904**	**154,254**	**154,254**

The DEIS as-written repeatedly assumes that the impacts of roadbuilding and logging will be similar between alternatives, despite the vast difference in acreage made accessible by the

changes. This assumption fails to adequately address the true potential impacts, especially of accessing new, undeveloped watersheds.

As an example, the DEIS asserts that the current projected timber sale quantity (PTSQ) will not change as a result of this rulemaking process to argue that negative effects to current IRAs will be minimal, including for a full exemption. However, this ignores the difference between "maximum allowable harvest" and what can reasonably be expected to occur. The TNF has repeatedly failed to meet its PTSQ for many years as a result of the unfavorable economics of old-growth timber sales, and it is anticipated that any changes to the Roadless Rule will have limited impacts on their ability to meet these targets, especially on the scale depicted in the media. That being said, the preferred alternative will still increase the acreage that may actually be sold for timber harvest in a way that is not represented by unreasonable "maximum allowable harvest" target, which is so bloated as to mask substantial changes to the old-growth harvest that can be reasonably expected in Alternatives 5 and 6. Indeed, a primary rationale supporting Alternative 6 is its ability to allow for the development of more economical timber sales, and thus increased harvest. As proposed and intended, Alternative 6 will increase old-growth timber harvest as compared to the No Action alternative, regardless of whether it achieves PTSQ.

It also seems certain that a full exemption is intended to and will allow for an expansion of roads to access timber in new watersheds, even if the economics of old-growth may mean that very little timber will be successfully sold from those watersheds (a historic trend). The DEIS fails to adequately account for the impact that roadbuilding will have on fish, wildlife, and invasive species in undeveloped watersheds that currently have culvert-free salmon streams and forests that have thus far avoided the introduction of invasive species. The DEIS notes that 10 intact watersheds would be fragmented under the preferred alternative, but does not go into any further detail as to how accessing these additional intact watersheds will impact terrestrial and aquatic habitat.

The DEIS states that any environmental impacts associated with road building and timber harvested will be analyzed on a site-specific basis as part of the NEPA process. However, road building in particular is an activity whose fragmenting impacts are most felt and best understood at a landscape-wide scale; yet, unlike the 2001 Roadless Rule, this DEIS makes little attempt to analyze the landscape-scale impacts of increased road building.

This level of analysis showcases that predictions of future timber harvest made in the DEIS at a biogeographic province-scale by alternative also appear to be flawed. Table 3.3a-4 of the DEIS, for example, predicts a 13% *decrease* in acres of old-growth harvest in the North Prince of Wales province under Alternative 6. Table 5 provides a sound basis for determining and assessing more localized impacts on wildlife species, like the wolf, in areas (e.g. North Prince of Wales Complex) where significant additional threats can be expected, rather than focusing exclusively and inadequately on the general, forest-wide impacts on such wildlife species.

Tongass IRAs contain 88% of areas scientifically shown to be the highest priority conservation areas in Southeast Alaska.

In 2008, TNC and Audubon Alaska published *A Conservation Assessment for the Coastal Forests and Mountains Ecoregion of Southeast Alaska*,[3] (See Appendix B for a description). This publication was the result of extensive collaboration with scientists, agency staff and stakeholders, as well as compilation and analysis of the most comprehensive data available on forests, wildlife and fisheries and associated habitat values in southeastern Alaska, and resulted in a spatial dataset on a suite of indicators that represent the full range of biodiversity and ecological values in the region, and the identification of the most important areas for long-term conservation of temperate rainforests and associated social, economic and ecological values, known as the TNC/Audubon Conservation Priority Areas. In addition, beginning in 2012, Trout Unlimited utilized these datasets, with additional stakeholder input, to develop the T77 Watersheds, which specifically identify important fish conservation areas.

These joint conservation priority areas are significantly represented in the IRAs that will be impacted by the rulemaking process.

Table 3. Acres of TNC/Audubon Conservation Priority areas and T77 watersheds protected from logging and roadbuilding as roadless areas and/or LUD II areas.

	TNC Audubon and/or T77 Watersheds protected (acres)	**Change (acres)**
Alternative 1	3,357,666	
Alternative 2	3,389,164	+31,497
Alternative 3	3,357,666	0
Alternative 4	3,284,237	-73,429
Alternative 5	2,216,920	-1,140,746
Alternative 6*	140,950	-3,216,717

*Out of 870,000 acres of LUD II acres only; there are no Roadless areas under Alternative 6.

Tongass Inventoried Roadless Areas contain over 40% of the Tongass National Forest's remaining Large Tree Old Growth.

The logging that occurred on the TNF over the past 70 years focused on the largest, highest-volume stands that were easily accessible. Combined with logging that has taken place on private lands, this has meant a substantial diminishment of large tree POG. Of what remains on USFS land (approximately 510,000 acres), 45% – 230,000 acres – is located within IRAs (Table 6). These stands are globally unique, contain centuries of accumulated carbon, and provide valuable habitat for wildlife. Over the course of its relatively short enforcement in Alaska, the 2001 Roadless Rule has likely kept thousands of acres of large tree old-growth from being harvested;

[3] Schoen, J. & E. Dovichin, eds. (2007). A Conservation Assessment of the Coastal Forests and Mountains of the Tongass National Forest and Southeast Alaska. The Nature Conservancy and Audubon Alaska. Anchorage AK.

considering the rarity and outsize importance of these stands to wildlife and the climate, they should continue to be protected, as is most effectively done by Alternative 1.

Table 6: Large Tree Productive Old Growth protected as Roadless by alternative. The "biogeographic provinces most likely to see harvest," according to Table 5, are Kupreanof/Mitkof, North Prince of Wales, Etolin/Zarembo, and Revilla/Cleveland Peninsula.

	Protected (acres)	**Open to development (acres)**	**Large tree POG suitable for harvest (acres)**	**Large tree POG suitable for harvest in biogeographic provinces most likely to see harvest**
Alternative 1	234,598	278,832	30,301	21,103
Alternative 2	239,105	274,325	31,813	22,516
Alternative 3	237,614	275,816	35,425	25,476
Alternative 4	203,528	309,902	39,371	27,696
Alternative 5	160,017	353,413	40,124	28,338
Alternative 6	-	513,430	40,124	28,338

Inventoried Roadless Areas protect 49% of salmon stream miles encompassed by the Tongass National Forest.[4]

The greatest continuing threat to salmon habitat quality on federal lands is road construction because of the potential for sediment delivery and the ability of a poorly designed or constructed stream crossing to block fish passage. Currently, nearly half of the salmon stream habitat on the TNF – and over 60% of coho and sockeye spawning habitat – is located in IRAs, protecting it from these impacts (Table 7). This unaltered habitat provides commercial and subsistence salmon for free- no habitat management, restoration, or hatcheries needed. Allowing roadbuilding in these watersheds would diminish these ecosystem services for little gain. As noted in the DEIS, even modern road construction following best management practices can have negative impacts on fish habitat. Improperly constructed crossings can cut off anadromous fish access to portions of the stream upstream from the crossing; even a few instances of this in a previously undeveloped watershed can be a significant diminishment of habitat. Any analysis done on the alternatives should account for the impact of road construction and operation on previously unroaded watersheds.

[4] As identified in the 2018 Alaska Anadromous Waters Catalog (AWC)

Table 7: Salmon stream protection, by alternative.

	Salmon stream miles protected (% of total on USFS land)	Chinook	Chum	Coho	Pink	Sockeye
Alternative 1	2,561 mi. (49%)	15%	31%	62%	50%	69%
Alternative 2	2,540 mi. (48%)	15%	33%	61%	51%	67%
Alternative 3	2,410 mi. (46%)	15%	32%	55%	48%	61%
Alternative 4	2,255 mi. (43%)	15%	29%	55%	44%	64%
Alternative 5	1,915 mi. (37%)	11%	17%	50%	34%	59%
Alternative 6*	590 mi. (11%)	7%	7%	26%	17%	41%

*Values in this row are exclusively for 870,000 acres of LUD II.

The 2001 Roadless Rule contains important wildlife habitats and populations that benefits Southeast Alaska communities.

In order to better understand the potential implications of the alternatives on critical wildlife habitat, TNC has performed an analysis using data from *A Conservation Assessment for the Coastal Forests and Mountains Ecoregion of Southeast Alaska*,[5] which was developed by TNC and Audubon Alaska to describe and assess the spatial distribution of important ecological values across Southeast Alaska. This data shows that Tongass IRAs protect 51% of Sitka black-tailed deer habitat and 52% of bear habitat.

Table 8: Deer and bear habitat protection by alternative

	Deer habitat protected (% of total deer habitat suitability index value on TNF)	Bear habitat protected (% of total bear habitat suitability index value on TNF)
Alternative 1	51%	52%
Alternative 2	52%	53%
Alternative 3	53%	53%
Alternative 4	45%	47%
Alternative 5	35%	37%
Alternative 6*	8%	9%

*Values for 870,000 acres of LUD II not included in Roadless under Alt 6.

It is important to consider the situation of deer habitat at a Biogeographical Province scale as well. This analysis shows that in several of the provinces most likely to see increased logging pressure, the preferred alternative will place >40% of deer habitat value in development LUDs open to logging and roadbuilding (Table 9). This includes the North Central Prince of Wales

[5] Schoen, J. & E. Dovichin, eds. (2007). A Conservation Assessment of the Coastal Forests and Mountains of the Tongass National Forest and Southeast Alaska. The Nature Conservancy and Audubon Alaska. Anchorage AK.

Biogeographic Province, which encompasses multiple communities and has already seen large decreases in deer habitat capability due to extensive logging. Bear habitat will be similarly impacted in these provinces (Table 10).

Table 9: Amount of deer habitat most likely to see impacts of logging and roadbuilding

	Deer habitat open to development (% of total deer habitat suitability index value within each biogeographic province)					
Biogeographic Province	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Etolin Zarembo Island Complex	24%	27%	26%	37%	48%	48%
Kupreanof / Mitkof Islands	15%	19%	19%	30%	50%	50%
North Prince of Wales Complex	26%	27%	27%	34%	43%	43%
Revilla Island / Cleveland Peninsula	11%	12%	16%	18%	31%	31%

Table 10: Amount of bear habitat most likely to see impacts of logging and roadbuilding

	Bear habitat open to development (% of total deer habitat suitability index value within each biogeographic province)					
Biogeographic Province	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Etolin Zarembo Island Complex	20%	23%	23%	35%	44%	44%
Kupreanof / Mitkof Islands	11%	13%	14%	26%	47%	47%
North Prince of Wales Complex	24%	25%	26%	34%	42%	43%
Revilla Island / Cleveland Peninsula	6%	7%	10%	13%	31%	31%

In many areas of Southeast Alaska, deer habitat is also important to one of their predators- the Alexander Archipelago wolf. Petitions to list the Alexander Archipelago wolf were filed in 1993 and 2011, in part due to decreasing populations in some areas of Southeast Alaska (for instance, on Prince of Wales Island, populations decreased from 39.5 wolves/1,000 km^2 in 1994 to 11.9/1,000 km^2 in 2015.[6]) The causes of this decline are complex, but there is little question that both increased road access (and the resultant increase in human interactions) and decreasing deer populations place negative pressure on wolf populations. Both of these negative pressures are expected to expand under the preferred alternative. While the DEIS does discuss wolf population, the impacts analysis for wolves is inadequate in that it focuses exclusively on the forest-wide population and ignores significant impacts on threatened regional populations. As a result, changes that are acknowledged to likely have a negative impact on a species that has seen

[6] Wolf Technical Committee. 2017. Interagency Wolf Habitat Management Program: Recommendations for Game Management Unit 2. Management Bulletin R10-MB-822. USDA Forest Service, USDI Fish and Wildlife Service, and Alaska Department of Fish and Game. Available at: https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/fseprd537975.pdf

a 75% decrease in population in one region over the past 25 years are set aside without thorough analysis, an issue that should be rectified in the final EIS.

Considering that predicted timber harvest by biogeographic province is likely flawed in the DEIS, it is unlikely that the impacts a full exemption to the Roadless Rule will have on deer, bear, and wolves have been properly quantified, especially for Prince of Wales Island.

Tongass roadless areas are critical to a world with a changing climate

Roadless areas, in their undeveloped nature, provide natural climate resilience for the ecological systems of Southeast Alaska amid year-to-year uncertainty. Research around the globe examining the connection between fragmentation and ecosystem resilience shows that more fragmented ecosystems (by roads and other development) are less resilient to detrimental changes to habitat and climate conditions. Considering the uncertainty surrounding climate 7 having intact, unfragmented watersheds in all corners of the Tongass increases the resiliency of the forests and wildlife of the National Forest.

In addition to this role, the forests of the Tongass themselves serve as a safeguard against climate change. Temperate rainforests contain some of the highest concentrations of sequestered carbon of any forest type globally, and the undisturbed old-growth forests found in roadless areas contain carbon accumulated over centuries in their trees and soils. With a disturbance regime that mainly consists of small windthrow events (0.25-1 acre in size) and no fire return interval, the forests of Southeast Alaska are also among the most stable stores of natural carbon. The table below, which was derived by recent analysis of the spatial distribution of carbon storage on the Tongass,[8] showcases the vast stores of biomass carbon currently protected in roadless areas.

Table 11: Carbon stored in biomass protected by alternative

	Carbon biomass storage protected (Mg Carbon)	**Percentage of Total TNF Carbon stored**
Alternative 1	481,018,676	50%
Alternative 2	480,392,603	50%
Alternative 3	447,860,178	47%
Alternative 4	408,055,089	43%
Alternative 5	324,139,724	34%
Alternative 6*	59,025,571	6%

*Values in this row are exclusively for 870,000 acres of LUD II.

[7] Shanley, Colin S., et al. "Climate change implications in the northern coastal temperate rainforest of North America." *Climatic Change* 130.2 (2015): 155-170.

[8] Buma, Brian, and Thomas Thompson. "Long-term exposure to more frequent disturbances increases baseline carbon in some ecosystems: Mapping and quantifying the disturbance frequency-ecosystem C relationship." *PloS one* 14.2 (2019): e0212526.

Inventoried Roadless Areas are critical defenses against the spread of invasive species

According to the 2001 Roadless Conservation Rule, IRAs serve as a "bulwark" against the intrusion of invasive species into previously unaffected landscapes. Invasive plant species compete with native vegetation, with potential negative impacts for both the flora and fauna of an ecosystem. In Southeast Alaska, species of note include reed canarygrass, Japanese knotweed, and spotted knapweed. Climate change has increased the risk of invasion by these species; as the DEIS notes, "…the current and predicted milder winter temperatures and the longer growing season in Southeast Alaska have created opportunities for the spread and establishment of invasive plant species within this region."[9]

With seeds and invasive plant parts spreading by hitching a ride on heavy equipment used for roadbuilding and logging, roads in the TNF are a conduit for invasive species to colonize new areas. Roads accessing parts of the Tongass that were previously undeveloped are likely to have an outsized impact in terms of invasive species. When comparing a mile of road in a watershed that already has had significant road and logging development to a mile of road in an undeveloped watershed, the two are not equal; in the former, impacts have already occurred in the vicinity, while in the latter, a new avenue for the spread of invasive species is being opened for the first time. The DEIS fails to make this distinction.

The only way to create durable solutions on the Tongass is to listen to public, stakeholder, community, and tribal input; the preferred alternative and the process to date has jeopardized major investments in building goodwill and trust over many years among a wide range of local interests

The Purpose and Need of the Alaska Roadless Rule rulemaking DEIS states that this rule is meant to provide a "long-term, durable approach to roadless area management…that accommodates the unique biological, social, and economic situation found in and around the Tongass."[10] The long history of the Tongass is marked by conflict, litigation, and unstable policies that have prevented long-term durable solutions to land management challenges. We are pleased to see this as a purpose of this process, but it is difficult to argue that a full exemption to the Roadless Rule meets the stated Purpose and Need.

Experience on the Tongass has demonstrated that the way to achieve a durable solution is through compromise, involvement of diverse stakeholders , and reliance on the best available information. Experience has also demonstrated the importance of process: a process that is responsive to public input from inclusive, collaborative, and empowered stakeholders is far more likely to have a broad constituency in favor of the final outcome than a rule based solely on top-down dictates.

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[9] DEIS 3-122
[10] DEIS ES-2

Recent trends have suggested that the region has been moving in this direction. The 2016 TLMP Amendment and the Prince of Wales Landscape Level Analysis are both examples of processes that used collaborative, well-informed stakeholder input in drafting TNF plans and projecta, Both documents incorporated diverse viewpoints and concerns, creating plans that can serve the communities of the Tongass. The key in these cases was that the resulting Record of Decisions were responsive to the input of the Tongass Advisory Committee[11] and the Prince of Wales Landscape Assessment Team,[12] respectively. In spirit, these projects move the Tongass forward by focusing on the transition to young growth, recreation projects, and the salmon and deer that are major staples of the economy and sustenance of the region.

The Alaska Roadless Rule rulemaking process also had the opportunity to be responsive to collaborative, diverse inputs. During the scoping period, the agency toured a large number of rural Southeast Alaskan communities and generated many public scoping comments. The State of Alaska established a Citizen's Advisory Committee, which spent many hours discussing potential alternatives and related issues. Five tribal governments signed on as Cooperating Agencies and contributed an unprecedented amount of time and energy into analyzing the potential impacts of a rulemaking on their traditional lands. According to the USFS, only 2 of the 14 communities visited during the scoping period were not overwhelmingly supportive of the 2001 Roadless Rule; and a large majority of the public written comments were not supportive of a full exemption. According to the President of the regional tribe, Central Council Tlingit and Haida Indian Tribes of Alaska, none of the cooperating tribes supported a full exemption, and the process severely diminished their voices; and since scoping a variety of tribes and subsistence boards have voted to support a no-action alternative. The Citizen's Advisory Committee did not recommend a full exemption, and many of the issues that were included as priorities by this group have not been addressed by the preferred alternative.

Alternatives 2 and 3 appear to be alternatives that represent attempts by the USFS to respond to diverse input by creating "middle-ground" options. The Nature Conservancy is supportive of the attempts to including TNC/Audubon Conservation Priority Areas and T77 areas into a protected status, as included in Alternative 2 and 3; and we are broadly supportive of the idea of creating community priority areas that allow areas near communities to have a particular status. However, without any time or interest in developing Alternatives 2 and 3 in a way that brings other stakeholders (i.e., industry or other supporters of the preferred alternative) to the table, even these options seem non-durable. Furthermore, the community priority areas seem to have been created in haste, only apply criteria associated with local processing of timber (and not other community priorities such as subsistence or cultural uses) and have been applied to several communities that have been on the record in opposition to any changes to the Roadless Rule. Meanwhile, none of the recommendations from the tribes that signed on as Cooperative Agencies have been incorporated into these community priority areas.

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[11] Tongass Advisory Committee Final Recommendations. December 2015. Available at: https://s31207.pcdn.co/wp-content/uploads/2019/06/Tongass-Advisory-Committee-Final-Recommendations_Dec-2015.pdf

[12] Prince of Wales Landscape Assessment Team Final Package. June 2017. https://static1.squarespace.com/static/566f1973a2bab8b3e485212d/t/59401661ff7c50ca37809356/1497372293342/POWLAT+Final+Package+June+2017.pdf

The need to connect communities, access mining claims, and develop renewable energy projects were all cited as arguments for changing the 2001 Roadless Rule in Alaska. However, the 2001 Roadless Rule in Alaska already provides exceptions for renewable energy development and mining within IRAs, and the State of Alaska has easement for utility/transport corridors across the Tongass under Section 4407 of the 2005 federal transportation funding bill.[13] Furthermore, in 2018 the process for approving IRA exceptions was streamlined by delegating authority for approval to the Regional Forester (previously, delegation had been to the USFS Chief in Washington, D.C.), in order to expedite these exceptions.[14] However, the USFS has noted that IRAs do not allow for the development of geothermal projects in roadless areas. If this is an issue that presents a durable solution to ensure community access to renewable energy, TNC supports a concise, targeted amendment to the rule for Alaska that will allow geothermal development alongside the existing exceptions. A full exemption (or any change to IRA boundaries) is not required to achieve this outcome.

Changes to the Roadless Rule, and the preferred alternative in particular, take attention and resources away from productive and necessary work the Forest Service could be doing to further benefit the ecological, social, and economic values on the forest.

The Roadless Rule rulemaking process to date has already cost considerable agency resources, and if a full exemption is implemented, it will undoubtedly lead to the continuation of USFS resources being dominated by illogical priorities, including uneconomic planning for old-growth timber sales and a likely another lengthy administrative process to revise the TLMP. Finite funding and staffing resources available to the USFS – and the region more generally - are best put to use on projects that advance management activities that will benefit the economy and communities of Southeast Alaska.

Historic prioritization of old-growth timber planning has consistently cost more than it has benefitted the Southeast Alaska economy.

A recent report from Taxpayers for Common Sense highlighted the fact that the Tongass National Forest loses millions of dollars annually supporting its old-growth timber program.[15] This reveals the paradox on the Tongass: while old-growth trees are thought to supply the only products valuable enough to pay their way from the mill to markets outside of Southeast Alaska, little attention is paid to the initial costs of planning for and accessing those stands. The Nature Conservancy supports the transition to young growth because we view it as a viable industry; the hurdle of accessing young growth stands was crossed during the era of subsidized roadbuilding. Old-growth simply isn't worth enough to justify the immense timber sale preparation and infrastructure costs associated with it, particularly when discussing opening undeveloped watersheds for timber cruising that may require construction of log transfer facilities (LTF) and

[13] http://www.law.state.ak.us/press/releases/2019/061219-Tongass.html
[14] https://www.eenews.net/assets/2018/11/08/document_gw_02.pdf
[15] Taxpayers for Common Sense 2019. https://www.taxpayer.net/wp-content/uploads/2019/09/TCS-Cutting-Our-Losses-2019-.pdf

trunk roads for initial access. Any old-growth timber that was easily accessible or economically viable on the TNF has likely already been harvested, and there are many examples of planned timber sales that have failed to find a buyer. Lastly, the great majority of timber sales on the TNF are significantly delayed or held up by environmental litigation, another costly expense.

Included in the 2001 Roadless Area Conservation Rule is the recognition that, "the size of the existing forest road system and attendant budget constraints prevent the agency [USFS] from managing its road system to the safety and environmental standards to which it was built." The USFS currently has a $3.4 billion deferred road maintenance backlog; however, the cost of maintaining the additional roads that will be built accessing current IRAs is not addressed in the Alaska Roadless Rule rulemaking DEIS. Meanwhile, the TNF's record of building multi-million dollar roads not included in timber sale costs (North Kuiu being a good recent example) suggests that opening IRAs to roadbuilding for logging will likely cost the taxpayer and not result in any new timber sales.

In order to support the economy and communities of Southeast Alaska, the Tongass National Forest should be focusing its resources on things that generate productive and positive benefits, including restoration, recreation and tourism infrastructure, and the transition of the timber industry to a viable future.

Improving fish habitat is a categorical need across the Tongass

One legacy of 70 years and 440,000 acres of large-scale clear-cut logging and roadbuilding on the Tongass is that of diminished fish habitat, especially in locations logged prior to the Tongass Timber Reform Act in 1990. In many cases, riparian forests were logged with no buffer along salmon spawning streams, streams were used as skid trails, and downed wood that provided instream structure was removed from stream channels intentionally. Additionally, roads were constructed with stream crossings and culverts that are barriers to fish passage (known as "red crossings"). Since the 1990s, it has been recognized that watersheds so impacted could be improved through instream restoration.[16]

The Tongass National Forest currently has instream restoration and "red crossing" removal needs well in excess of funding and personnel resources available to do the work. The Nature Conservancy has partnered with the TNF on several such projects, and we applaud the efforts being made to stabilize fish habitat. However, restoration completed and planned in the near future addresses only a small part of the identified need. Just considering fish passage and access to habitat, between two recent Landscape Level Analyses on Prince of Wales Island and in the "Central Tongass," 899 red crossings were identified as needing replacement.

Large-scale attention to wildlife habitat is needed to prevent population declines of important species

Fifteen to twenty years after clear-cut logging, dense young growth enters a period called "stem exclusion," a state that features little light reaching the ground to support shrubs and herbs

[16] Bryant, Mason, and Fred Everest. 1998. "Management and Condition of Watersheds in Southeast Alaska: The Persistence of Anadromous Salmon." *Northwest Science*, 72:4, p 249-267.

wildlife need, and which can persist for 150 years.[17] This has a negative impact on many wildlife species, including Sitka black-tailed deer (an important source of protein for local communities), wolves that prey on deer, and bears. There is a substantial need on the Tongass to address this, especially in areas that have had large amounts of historical logging: TNC estimates that habitat capability for Sitka black-tailed deer in the North Prince of Wales Complex biogeographic province has declined by 38% since 1954. Looking forward, the total area of young growth projected to be in stem exclusion by 2045 within Game Management Unit 2 (encompassing Prince of Wales and neighboring islands) is between 251,000 and 496,500 acres, with a consequent decline in deer populations of 21%-32% from 2015 levels.[18] Current restoration needs on the Prince of Wales alone are estimated to total $20 million.

Research shows that intermediate silvicultural treatments can delay stem exclusion, extending the amount of time a harvested stand provides forage for herbivores. Forest restoration can serve multiple purposes, but in development LUDs, it should be designed to benefit future timber harvest by thinning the stand to concentrate resources on tree growth in fewer residuals, and wildlife by mimicking natural disturbance through the creation of 0.1-acre forest openings that will contain persistent forage growth for decades.

The largest driver of Southeast Alaska's economy needs investment for continued growth

The visitor industry provides the largest share of worker earnings in Southeast Alaska of any private industry. It is poised for significant growth over the next decade. The USFS's recreation infrastructure is also important for the large majority of Southeast Alaska residents whose main interaction with the TNF is in using its cabins, trails, shelters, and campgrounds.

A good example of this infrastructure need was demonstrated by the Prince of Wales Landscape Analysis Team (POWLAT), which produced a list of projects for the Prince of Wales Landscape Level Analysis. Out of 60 project recommendations, that group provided a list of 31 projects centered on recreation, including cabins, kayak shelters, trails, and a campground.[19] Conversations at POWLAT meetings included discussions of cross-island hut-to-hut hiking trails, potential for kayak tours linking offshore islands, and the utility and safety remote island shelters would provide to local residents boating in a place with unpredictable weather. To date, implementation of these projects is slow due to lack of funding and district prioritization.

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[17] Alaback, Paul B. "Dynamics of Understory Biomass in Sitka Spruce-Western Hemlock Forests of Southeast Alaska: Ecological Archives E063-004." *Ecology* 63.6 (1982): 1932-1948.

[18] Gilbert, S. L., T. Haynes, M. S. Lindberg, D. Albert, and M. L. Kissling. 2015. Future population trends and drivers of change for Alexander Archipelago wolves on and near Prince of Wales Island, Alaska. Draft report submitted to the U.S. Fish and Wildlife Service, Region 7, Anchorage, Alaska, by the University of Alaska Fairbanks, Department of Biology and Wildlife and Institute of Arctic Biology.

[19] Prince of Wales Landscape Assessment Team Final Package. June 2017. Available at: https://static1.squarespace.com/static/566f1973a2bab8b3e485212d/t/59401661ff7c50ca37809356/1497372293342/POWLAT+Final+Package+June+2017.pdf

A Southeast Alaska timber industry will only continue to exist if the mapped transition to a young growth timber industry is supported

The timber industry has been a part of the fabric of many areas of Southeast Alaska for decades, and a sustainable young growth industry has a role to play as part of a future diversified economy in the Tongass. The Nature Conservancy strongly supports continued progress toward the transition to a young growth industry. The transition is urgent: the economics of continued old-growth logging are becoming increasingly marginal with every remaining acre that is cut to the point that, without a transition to young growth, there may not be a timber industry in Southeast Alaska in 20 years. The transition will require significant effort and investment of time and resources from the TNF if it is going to succeed in supporting a viable domestic timber industry. The Tongass Advisory Committee recommended "transformative steps" that included pursuing partnerships and collaboration, revamping sale planning and assessment, use of stewardship contracting, and addressing ways to incentivize the development of a domestic industry.[20] In the time since those recommendations were submitted to the USFS in December 2015, there have been efforts to improve information regarding young growth supply and workforce capacity development achieved in collaboration with partners, but much remains to be done.

A roadmap for the transition exists that does not include the need to exempt the TNF from the Roadless Rule. Work started by the Tongass Advisory Committee, which then formed the basis of the 2016 TLMP, has the Tongass on track to transition to young growth by 2032. Recent inventory supports this: growth and yield modeling presented at the third "Young Growth Symposium" October 21-23, 2019 showed that, in the southern half of the TNF, a sustained yield of 41 million board feet (MMBF)/year (the projected demand in the 2016 TLMP) will be achieved by 2029, increasing rapidly in the years following that to exceed 100 MMBF/year by 2033. The Nature Conservancy's inventory based on LiDAR showed that, on Prince of Wales Island, there are currently ~68 MMBF in suitable young growth stands exceeding an average of 30,000 board feet per acre. The supply of young growth is on track to achieve the timeline laid out by the TAC and 2016 TLMP, and we encourage the USFS to focus the attention of their timber program on fostering a local domestic young growth industry that can utilize that supply.

The addition of 20,000 acres of young growth to the suitable timber base under the preferred alternative will likely not have any positive effect on the transition; these scattered stands are mostly either less than 20 years old or very remote; and TNC estimates that 2/3 of these suitable young growth acres are highly unlikely to contribute anything to the transition.

CLOSING

The TNF is a national treasure, and TNC is proud to be a long-standing partner of the USFS in helping improve land management of its forests. We are thankful that the USFS can articulate

[20] Tongass Advisory Committee Final Recommendations. December 2015. Available at: https://s31207.pcdn.co/wp-content/uploads/2019/06/Tongass-Advisory-Committee-Final-Recommendations_Dec-2015.pdf

the need to create durable policy solutions for the purposes of improving the efficiency and effectiveness of land management.

However, the proposed alternative, the DEIS, and the rulemaking process to date make it hard to believe that any decisions derived will ultimately meet the stated purpose and need of said process. The majority of the alternatives fail to adequately protect the ecological, social and economic properties of roadless areas by making road building and timber harvest easier and more likely in very specific areas that have seen the cumulative impacts of roadbuilding and logging over the course of decades. The majority of the alternatives also fail to address the stated desires by the great majority of local and national stakeholders and will damage relationships that have been built between stakeholders over the last decade. Finally, this effort continues a worrying trend of outsized spending and attention on an uneconomic and unsustainable industry, at the expense of current and future industries and other more pressing needs.

Sincerely,

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Appendix A: Notes on the Analyses of Alaska Roadless Areas defined in the DEIS

The alternatives laid out in the DEIS are complex, with multiple Alaska Roadless Area (ARA) designations with differing levels of protection. As a result, straightforward analysis of changes in the total area contained in Roadless by alternative fails to capture the functional change in land area protected from development activities such as roadbuilding, old-growth logging, and young growth logging.

It should be noted that when comparing the impacts of alternatives on ecological values, it is challenging to try to compare roadless areas (areas without roads) with areas designated as "Alaska Roadless Areas", some of which allow roadbuilding and old-growth clear-cuts. Likewise, several alternatives either contain or exclude Congressionally-protected Land Use Designation II (LUD II) areas that are functionally protected regardless of ARA designation. In order to maintain consistency, our analyses of the area functionally protected by each alternative includes all 870,000 acres of LUD II areas for each alternative and excludes the ARAs that allow old-growth clear-cuts and roadbuilding.

For each analyses, we analyzed different levels of protection status to better understand the functional change. Table A1 showcases a variety of protection status levels which have been utilized differently for different analyses.

Table A1. Area included in 2019 Alaska Roadless Areas and/or LUD II, by alternative and functional protection. These acres include all 870,000 LUD II acres in column 1 for analysis consistency.

	Protected from roadbuilding and old-growth logging (acres)	**Protected from old-growth logging; roadbuilding and young growth logging allowed (acres)**	**ARA not protected from roadbuilding or commercial logging (acres)**	**2001 Roadless Areas opened for roadbuilding and logging (acres)**
TNC Analysis label	*Protection Status 1*	*Protection Status 2*	*Open to development*	
Alternative 1	9,265,308	0	0	N/A
Alternative 2	9,251,636	0	0	112,470
Alternative 3	8,747,441	366,000	241,646	566,421
Alternative 4	8,135,041	0	749,747	1,124,775
Alternative 5	6,960,094	0	0	2,300,566
Alternative 6*	870,179	0	0	8,387,512

*Out of 870,000 acres of LUD II acres only; no Roadless areas under Alternative 6.

We've organized these functional protections into three categories:

Protection Status 1: Protections that restrict roadbuilding and all commercial logging. This applies to LUD IIs, current Roadless Areas, and the Roadless Priority and Watershed Priority ARAs. This is the level of protection analyzed for fish and stream habitat.

Protection Status 2: Protections that do not allow old-growth logging, but do allow roadbuilding and young-growth logging. This is restricted to Alternative 3's formalizing of TLMP protections for TNC/Audubon Conservation Priority Areas and T77 Watersheds. Combined with Protection Status 1, this is the level used to analyze impacts to wildlife such as deer and bears.

Open to development: This applies to ARA designations that allow old-growth logging and roadbuilding- specifically, the Community Priority ARA for Alternative 3, and the Timber Priority ARA for Alternative 4.

Other analyses displayed relies on data directly comparable across alternatives: timber Suitability for harvest by alternative (Tables 4, 5, and 6) or areas in Development LUDs open to roadbuilding and commercial logging (Tables 9 and 10).

It is worth noting that, according to spatial data provided by the US Forest Service, Alternative 3 will remove 325,000 acres of currently roadless areas from the 2001 Roadless Rule- not 212,000 acres as claimed in the DEIS. Of this total, 257,000 acres would be in Development LUDs, as defined by the 2016 TLMP. The lack of information as to the extent of Community ARAs in Hydaburg and Kake also makes analysis of Alternative 3 incomplete (and optimistic). This is a striking situation for an issue as momentous as changing roadless area boundaries; the DEIS should not have been released without clear spatial understanding of all the alternatives.

A detailed breakdown the different Alaska Roadless Rule alternatives by protections status is shown below.

Table A2. Detailed breakdown of the different Alaska Roadless Rule alternatives by protections status afforded through the various Alaska Roadless Areas (ARAs). Note that for the sake of consistency, LUD II areas are included in the *Total Protected* row regardless of roadless status.

		Area effected by 2019 Alaska Roadless Rule rulemaking DEIS, by alternative (acres)*					
	ARA Designation	**Alternative 1**	**Alternative 2**	**Alternative 3**	**Alternative 4**	**Alternative 5**	**Alternative 6**
	Total Roadless Area	9,223,443	9,251,636	8,118,908	8,884,788	6,918,229	0
Protected from Roadbuilding, commercial logging	Roadless Priority ARA	N/A	5,120,835	4,658,430	7,264,862	6,089,048	0
	Watershed Priority ARA	N/A	3,260,622	3,218,831	0	0	0
	LUD II ARA	N/A	870,179	N/A	870,179	829,181	0
	LUD II outside Roadless**	41,865	0	870,179	0	41,865	870,179
	Total Protected	*9,265,308*	*9,251,636*	*8,747,441*	*8,135,041*	*6,960,094*	*870,179*
Not protected from roadbuilding or commercial logging	Timber Priority ARA	N/A	0	0	749,747	0	0
	Community Priority ARA	N/A	0	241,646	0	0	0
	Removed from Roadless	N/A	112,470	1,153,964	375,028	2,300,566	9,215,613

*discrepancies in acreage are generally caused by slight overlap, differing coastline, and/or slightly unmatched GIS layers between alternatives

**This row contains acres not included in Roadless Areas. It is included here because several Roadless Alternatives include the addition of LUD IIs into Alaska Roadless Areas. The LUD II Areas are independently legislatively protected; changes to Roadless status in these areas does not change their protected status.

Appendix B: TNC Conservation Priority Areas

Conservation Priorities for Forests and Freshwater in the Tongass National Forest

Summary: In 2008 The Nature Conservancy and Audubon Alaska published *A Conservation Assessment for the Coastal Forests and Mountains Ecoregion of Southeast Alaska* (Schoen & Dovichin 2008)[1]. This publication was the result of **extensive collaboration with scientists, agency staff and stakeholders**, as well as **compilation and analysis of the most comprehensive data every available on forests, wildlife and fisheries and associated habitat values in southeastern Alaska**. Our approach was to develop GIS data on a suite of indicators that represent the full range of biodiversity and ecological values in the region (Fig. 1), characterize how these values have changed over time, and identify the most important areas for long-term conservation of temperate rainforests and associated social, economic and ecological values. We used the optimization tool MARXAN to identify the set of areas that contain the highest concentrations of values for this suite of indicators within the smallest total area, as well as the highest concentrations of economic timber values with least overlap to areas important for biodiversity.

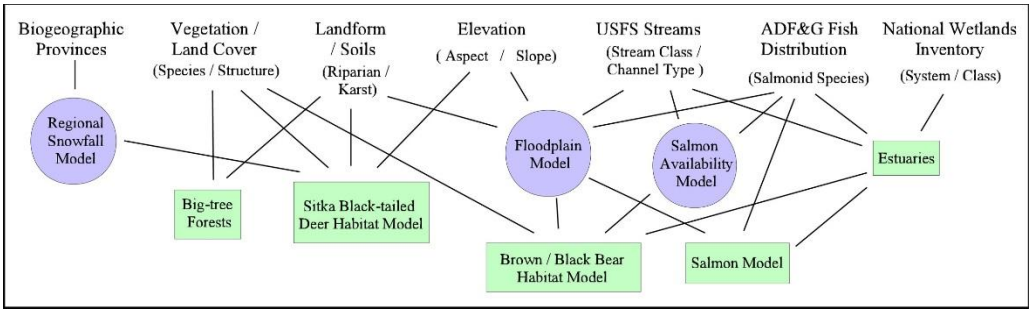
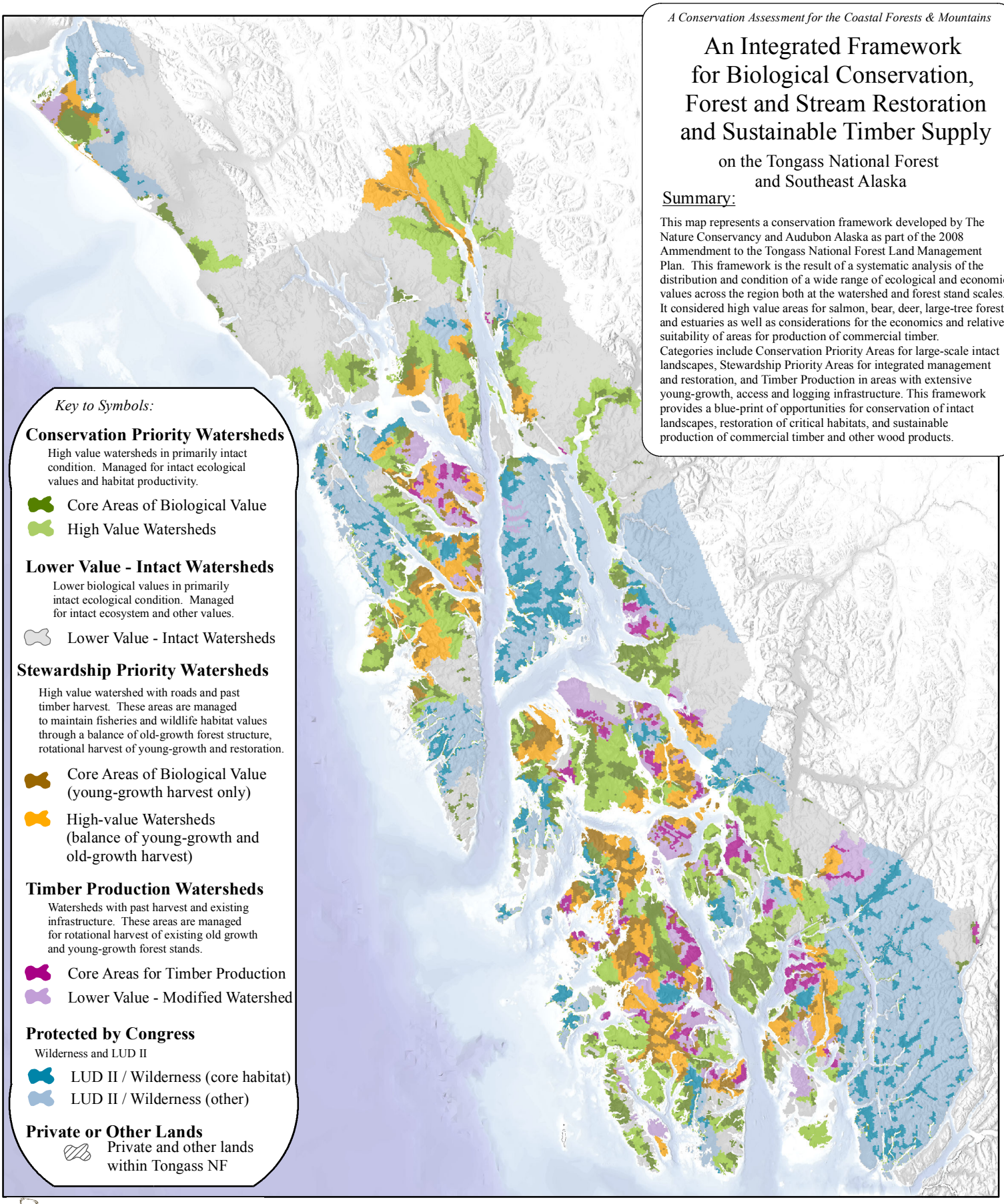


Figure 1. Data sources, key attributes and interim models used to map focal species and systems in the Coastal Forests and Mountains of Southeast Alaska.

Integrated Conservation Framework: The result of this assessment was an Integrated Conservation Framework – integrated because it takes into account a range of strategies for conservation of intact watersheds, stewardship of high-value modified watersheds and sustainable timber supply in areas with existing roads and other infrastructure.

- *Conservation Priority Watersheds*: Areas with high ecological values that are mostly intact with little to no past logging or industrial activity. These areas are best suited for long-term conservation to provide the unique range of social, economic and ecological values associated with oldgrowth temperate rainforests.
- *Stewardship Priority Watersheds*: Areas that have high ecological values, but also contain substantial past timber harvest and road infrastructure. In some cases, past harvest has created the need for restoration, and young-growth forests provide management opportunities over time.
- *Timber Production Watersheds*: Areas with substantial past harvest and extensive logging infrastructure, with extensive young-growth forests and sufficient remaining oldgrowth to supply local needs until young-growth forests mature.
- *Lower Value Intact Watersheds*: Areas that are mostly free of industrial activity, but primarily dominated by mountainous terrain, glaciers or extensive wetlands. These areas provide important values for recreation and other activities, but relatively low value for logging and low conflict.

[1] Schoen, J. & E. Dovichin, eds. (2007). A Conservation Assessment of the Coastal Forests and Mountains of the Tongass National Forest and Southeast Alaska. The Nature Conservancy and Audubon Alaska. Anchorage AK.



A Conservation Assessment for the Coastal Forests & Mountains

An Integrated Framework for Biological Conservation, Forest and Stream Restoration and Sustainable Timber Supply

on the Tongass National Forest and Southeast Alaska

Summary:

This map represents a conservation framework developed by The Nature Conservancy and Audubon Alaska as part of the 2008 Ammendment to the Tongass National Forest Land Management Plan. This framework is the result of a systematic analysis of the distribution and condition of a wide range of ecological and economic values across the region both at the watershed and forest stand scales. It considered high value areas for salmon, bear, deer, large-tree forests and estuaries as well as considerations for the economics and relative suitability of areas for production of commercial timber. Categories include Conservation Priority Areas for large-scale intact landscapes, Stewardship Priority Areas for integrated management and restoration, and Timber Production in areas with extensive young-growth, access and logging infrastructure. This framework provides a blue-print of opportunities for conservation of intact landscapes, restoration of critical habitats, and sustainable production of commercial timber and other wood products.

Key to Symbols:

Conservation Priority Watersheds

High value watersheds in primarily intact condition. Managed for intact ecological values and habitat productivity.

- Core Areas of Biological Value
- High Value Watersheds

Lower Value - Intact Watersheds

Lower biological values in primarily intact ecological condition. Managed for intact ecosystem and other values.

- Lower Value - Intact Watersheds

Stewardship Priority Watersheds

High value watershed with roads and past timber harvest. These areas are managed to maintain fisheries and wildlife habitat values through a balance of old-growth forest structure, rotational harvest of young-growth and restoration.

- Core Areas of Biological Value (young-growth harvest only)
- High-value Watersheds (balance of young-growth and old-growth harvest)

Timber Production Watersheds

Watersheds with past harvest and existing infrastructure. These areas are managed for rotational harvest of existing old growth and young-growth forest stands.

- Core Areas for Timber Production
- Lower Value - Modified Watershed

Protected by Congress

Wilderness and LUD II

- LUD II / Wilderness (core habitat)
- LUD II / Wilderness (other)

Private or Other Lands

- Private and other lands within Tongass NF

Audubon ALASKA

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Appendix C: Data analysis by Biogeographic Province

Table C1: Acres of Suitable Large Tree POG by alternative and Biogeographic Province.

	Suitable Large Tree Productive Old Growth (acres)					
Biogeographic Province	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**
E. Baranof Island	17	17	17	77	77	77
E. Chichagof Island	1,720	1,720	2,045	2,614	2,628	2,628
Etolin Zarembo Island Complex	1,808	1,868	2,044	2,427	2,487	2,487
Kuiu Island	3,639	3,639	3,924	4,014	4,014	4,014
Kupreanof / Mitkof Islands	2,306	2,696	2,999	3,240	3,247	3,247
Lynn Canal / Mainland	211	240	240	762	858	858
North Prince of Wales Complex	14,731	15,403	17,171	18,281	18,569	18,569
Outside Islands	1,467	1,528	1,528	1,657	1,657	1,657
Revilla Island / Cleveland Peninsula	2,258	2,549	3,262	3,748	4,035	4,035
South Prince of Wales Island	1,472	1,481	1,502	1,662	1,662	1,662
Stikine River / Mainland	554	554	575	770	770	770
Taku River / Mainland	1	1	1	2	2	2
W. Baranof Island	59	59	59	59	59	59
Yakutat Forelands	57	57	57	57	57	57
Total	**30,301**	**31,813**	**35,425**	**39,371**	**40,124**	**40,124**

Table C2: Miles of salmon streams protected by alternative and Biogeographic Province.

	Salmon stream miles protected					
Biogeographic Province	**Alt 1**	**Alt 2**	**Alt 3**	**Alt 4**	**Alt 5**	**Alt 6**
Admiralty Island	23	22	22	22	19	0
Dall Island Complex	56	56	56	54	45	0
E. Baranof Island	47	52	52	44	40	0
E. Chichagof Island	203	226	225	180	174	113
Etolin Zarembo Island Complex	39	38	33	25	22	0
Fairweather Icefields	3	3	0	0	3	0
Kuiu Island	75	86	83	70	42	6
Kupreanof / Mitkof Islands	338	329	315	273	185	26
Lynn Canal / Mainland	100	97	92	91	66	12
North Misty Fjords	14	14	14	14	10	0
North Prince of Wales Complex	278	255	244	227	204	124
Outside Islands	72	75	75	69	65	36
Revilla Island / Cleveland Peninsula	180	169	161	155	120	22
South Misty Fjords	50	50	50	50	50	0

South Prince of Wales Island	78	78	78	71	45	9
Stikine River / Mainland	137	140	138	133	111	0
Taku River / Mainland	96	96	96	92	66	0
W. Baranof Island	139	139	137	135	123	0
W. Chichagof Island	13	12	13	12	12	8
Yakutat Forelands	620	604	526	538	541	234
Total	**2,561**	**2,540**	**2,410**	**2,255**	**1,943**	**590**

**LUD II already has legislative protection, making changes to its Roadless status irrelevant. Alt 6 does not have any Roadless protections; miles listed for that alternative are protected by LUD II.*

Table C3: Amount of deer habitat open to development

Biogeographic Province	**Deer habitat open to development (% of total deer habitat suitability index value within each biogeographic province)**					
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Admiralty Island	0%	0%	0%	0%	0%	0%
Chilkat River Complex	0%	0%	0%	0%	0%	0%
Dall Island Complex	0%	0%	0%	3%	14%	14%
E. Baranof Island	21%	16%	7%	30%	42%	42%
E. Chichagof Island	24%	20%	17%	32%	39%	39%
Etolin Zarembo Island Complex	24%	27%	26%	37%	48%	48%
Fairweather Icefields	0%	0%	0%	0%	0%	0%
Glacier Bay	0%	0%	0%	0%	0%	0%
Kuiu Island	18%	14%	10%	21%	29%	29%
Kupreanof / Mitkof Islands	15%	19%	19%	30%	50%	50%
Lynn Canal / Mainland	7%	7%	6%	13%	23%	28%
North Misty Fjords	1%	1%	1%	1%	2%	2%
North Prince of Wales Complex	26%	27%	27%	34%	43%	43%
Outside Islands	17%	14%	11%	20%	22%	22%
Revilla Island / Cleveland Peninsula	11%	12%	16%	18%	31%	31%
South Misty Fjords	0%	0%	0%	0%	0%	0%
South Prince of Wales Island	5%	6%	5%	15%	26%	26%
Stikine River / Mainland	7%	7%	6%	13%	33%	33%
Taku River / Mainland	2%	2%	1%	7%	29%	29%
W. Baranof Island	5%	5%	4%	9%	15%	15%
W. Chichagof Island	0%	0%	0%	0%	0%	0%
Yakutat Forelands	7%	8%	17%	17%	17%	17%
Grand Total	**12%**	**12%**	**12%**	**18%**	**27%**	**27%**

Table C4: Amount of bear habitat open to development

Biogeographic Province	Bear habitat open to development (% of total bear habitat suitability index value within each biogeographic province)					
	Alt 1	Alt 2	Alt 3	Alt 4	Alt 5	Alt 6
Admiralty Island	0%	0%	0%	0%	0%	0%
Chilkat River Complex	0%	0%	0%	0%	0%	0%
Dall Island Complex	0%	0%	0%	3%	14%	14%
E. Baranof Island	10%	8%	4%	15%	25%	25%
E. Chichagof Island	19%	14%	12%	27%	37%	37%
Etolin Zarembo Island Complex	20%	23%	23%	35%	44%	44%
Fairweather Icefields	0%	0%	0%	0%	0%	0%
Glacier Bay	0%	0%	0%	0%	0%	0%
Kuiu Island	18%	15%	9%	21%	30%	30%
Kupreanof / Mitkof Islands	11%	13%	14%	26%	47%	47%
Lynn Canal / Mainland	4%	4%	3%	9%	16%	20%
North Misty Fjords	0%	0%	0%	0%	1%	1%
North Prince of Wales Complex	24%	25%	26%	34%	42%	43%
Outside Islands	11%	9%	6%	13%	15%	15%
Revilla Island / Cleveland Peninsula	6%	7%	10%	13%	31%	31%
South Misty Fjords	0%	0%	0%	0%	0%	0%
South Prince of Wales Island	3%	3%	3%	12%	22%	22%
Stikine River / Mainland	3%	3%	3%	10%	25%	25%
Taku River / Mainland	1%	1%	1%	5%	25%	25%
W. Baranof Island	4%	4%	3%	6%	11%	11%
W. Chichagof Island	0%	0%	0%	0%	0%	0%
Yakutat Forelands	2%	3%	7%	8%	8%	8%
Grand Total	**7%**	**7%**	**7%**	**13%**	**21%**	**22%**

Appendix D: Analysis of Potential Climate Impacts of Roadless Rulemaking

The Tongass National Forest contains vast stores of carbon in its living matter and soils, both above and below ground. As Southeast Alaska has little to no recent history of catastrophic fire or large-scale disturbance, the largest threat to this carbon store is from human actions, specifically clear-cut logging. Post-logging clear-cuts quickly regenerate into rapidly growing young growth stands, but do not attain the level of stored carbon present in their old-growth predecessors for at least 200 years.[21] Likewise, while some of the timber harvested may be milled into products expected to last for 100 years or more, is it estimated that only 13% of the total aboveground carbon will be stored in this way.[22] This accounting does not include the sizeable proportion (possibly >50%) of a forest's carbon sequestered in its soils, and the effects of clear-cutting on that carbon.

Carbon sequestration in the Tongass can be quantified by modeled aboveground and belowground biomass[23], soil carbon,[24] and CO_2-equivalent.[25] In analyzing impacts of the Roadless Rule rulemaking by alternative, TNC is focusing on aboveground stores of Carbon in old-growth stands Suitable for harvest (Table D1), although all carbon stores initially decrease following harvest due to microclimate-induced changes in decomposition rates and soil disturbance.

Table D1: Aboveground biomass Carbon storage suitable for harvest, by alternative. This table also includes a comparison of the CO_2-equivalent found in the aboveground biomass of these stands with the number of American cars its emission would equal (average emissions on an annual basis).

	Area, Suitable OG (acres)	Aboveground Carbon (Mg)	Aboveground CO2-equivalent (Mg CO_2e)	Equivalent Annual US Car Emissions (# of cars)
Alternative 1	228,713	13,695,210	50,179,248	10,908,532
Alternative 2	248,915	14,861,019	54,450,773	11,837,124
Alternative 3	306,936	18,326,301	67,147,565	14,597,297
Alternative 4	386,909	23,001,737	84,278,365	18,321,384
Alternative 5	393,977	23,495,778	86,088,531	18,714,898
Alternative 6	393,977	23,495,778	86,088,531	18,714,898

[21] Harmon, Mark E., et al. "Effects on carbon storage of conversion of old-growth forests to young forests." *Science*, vol. 247, no. 4943, 1990, p. 699

[22] Leighty, Wayne W., et al. "Effects of Management on Carbon Sequestration in Forest Biomass in Southeast Alaska." *Ecosystems*, vol. 9, no. 7, 2006, p. 1051-1065.

[23] Buma, Brian, and Thomas Thompson. "Long-term exposure to more frequent disturbances increases baseline carbon in some ecosystems: Mapping and quantifying the disturbance frequency-ecosystem C relationship." *PloS one* 14.2 (2019): e0212526.

[24] McNicol, Gavin, et al. "Large, climate-sensitive soil carbon stocks mapped with pedology-informed machine learning in the North Pacific coastal temperate rainforest." *Environmental Research Letters* 14.1 (2019): 014004.

[25] Based on an expansion factor of 3.664 applied to dry biomass Carbon.