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First name: Joseph
Last name: Sandri
Organization: Archangel Ancient Tree Archive
Title: Board Member/Attorney
Comments: See attached Public Comment on Draft Environmental Impact Statement, Alternative to a Proposed Alaska Roadless Rule

Before the

United States Forest Service

Washington, DC

COMMENTS

of the

ARCHANGEL ANCIENT TREE ARCHIVE

SPECIAL AREAS; ROADLESS AREA CONSERVATION; NATIONAL FOREST SYSTEM LANDS IN ALASKA (RIN 0596-AD37) (36 CFR PART 294)

The Archangel Ancient Tree Archive (AATA)1 hereby responds to the Forest Service[rsquo]s request for comment in the Notice of Proposed Rulemaking (NPRM) regarding the Tongass National Forest.2

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I. SUMMARY

Lumber is no longer the primary product of old growth forests.

Economic measures now validate that multiple other services that old growth trees provide far outweigh the short-term value of lumbering or mineral and fossil fuel extraction. In other words, lumbering, or extracting minerals or fossil fuels at the cost of destroying old growth trees no

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longer reaches the provable economic value to justify the degradation of a much more valuable and exceedingly difficult to replace economic resource, the intact old growth forest.

Old growth forests represent a measurably miniscule portion of the nation[rsquo]s forests. Old growth acreage trends continue in relentless decline. At the same time, the economic value of old growth forests has risen precipitously.

It would be arbitrary and capricious to allow any further erosion of that high value acreage, especially for exceedingly low economic value activities.

The statutory mission of the U.S. Forest Service requires ensuring the health of national forest assets and avoiding their needless waste or destruction, especially when (i) substantially similar lumber and materials can be sourced from new growth or recycled sources, and (ii) Tongass area lumber industry personnel can be trained to expand higher value old growth resources.

In fact, old growth forests are now an apex resource whose decline must be arrested and whose footprint must be expanded, as the Forest Service mission requires.

II. FORESTRY SERVICE OBLIGATIONS UNDER THE ADMINISTRATIVES PROCEDURES ACT

The mission of the USDA Forest Service is to sustain the health, diversity, and productivity of the Nation[rsquo]s forests and grasslands to meet the needs of present and future generations.4

AATA simply asks that the Forestry Service carefully weigh the information provided herein.

The Administrative Procedures Act (APA) was enacted in 1946 (60 Stat. 237, 5 U.S.C.A.). It governs the rulemaking processes before federal administrative agencies, such as the Forest Service.

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III. OLD GROWTH FOREST METRICS & FEDERALLY IMPACTED LANDS

Old growth forests have been in rapid decline for decades and decades.5

Over 95% of the United States[rsquo] original old growth forests have been destroyed.6

AATA has developed a version 1.0 Atlas of old growth Champion Trees of some of most ecologically important species, both in the U.S. and globally.

There are 2.3 billion acres of land in the U.S. The federal government surface lands cover nearly 650 million of those acres.7 However, when subsurface rights and ownership and excavation and extraction are included, the impact on the surface reaches well beyond the 650 million surface acres. 8 Nationally, the Forest Service manages 193 million surface acres.

5 For example, see: Bolsinger, Charles L.; Waddell, Karen L. 1993. Area of old-growth forests in California, Oregon, and Washington. (Resour. Bull. PNW-RB-197). Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, at page 26 . Between 1945 and 1993, the area of old-growth forests in California, Oregon, and Washington declined by 3/5ths from roughly 63 million acres to 10 million acres. https://www.fs.fed.us/r5/rsl/publications/oldgrowth/old-growth-ca-or-wa.pdf

That decline has continued to the present day, and the Tongass old growth stands have not grown, but have continually been reduced. See generally, [ldquo]Trees older than America: a primeval Alaskan forest is at risk in the Trump era: Tongass is the world[rsquo]s largest intact temperate rainforest, with trees more than 1,000 years old. But a pro-logging effort could uproot them,[rdquo] by Brendan Jones in Sitka, Alaska, The Guardian (March 22, 2018). https://www.theguardian.com/us-news/2018/mar/22/alaska-tongass-forest-at-risk-logging-trump

6 See generally, The Man Who Planted Trees: A Story of Lost Groves, The Science of Trees, and a Plan to Save the Planet, by New York Times science writer, Jim Robbins [copy] 2012, with afterwards [copy] 2015.

7 "The federal government owns about 640 million acres of land in the United States, about 28% of the total land area of 2.27 billion acres.[3][4] The majority of federal lands (610.1 million acres in 2015) are administered by the Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (FWS), National Park Service (NPS), or U.S. Forest Service (FS). BLM, FWS, and NPS are part of the U.S. Department of the Interior, while the Forest Service is part of the U.S. Department of Agriculture. An additional 11.4 million acres of land (about 2% of all

federal land) is owned by the U.S. Department of Defense (DOD).[4] The majority of federal lands are located in Alaska and the Western states.[4]"

https://en.wikipedia.org/wiki/Federal_lands

8 Federal Land Ownership: Overview and Data Updated March 3, 2017. Congressional Research Service. https://crsreports.congress.gov/product/pdf/R/R42346

Federal land holdings have been recently reduced by about 25 million acres. Over 21 million of those acres were in Alaska. 9 Alaskan federal lands are managed by a variety of agencies. 10

Only scattered pockets of original old growth forests remain intact in the U.S. The Tongass contains some of those rare remaining original and intact old growth forests.

9 ID at p.16. Federal land holding declines lead by sharp declines in U.S. Government holdings of lands in Alaska. Table 3. Change in Federal Acreage Since 1990, by Agency. 1990 2000 2010 2015 Change 1990-2015. % Change Since 1990. BLM 272,029,418 264,398,133 247,859,076 248,345,551 -23,683,867 -8.7% FS 191,367,364 192,355,099 192,880,840 192,893,317 1,525,953 0.8% FWS 86,822,107 88,225,669 88,948,699 89,092,711 2,270,604 2.6% NPS 76,133,510 77,931,021 79,691,484 79,773,772 3,640,262 4.8% DOD 20,501,315 24,052,268 19,421,540 11,368,434 -9,132,881 -44.5% U.S. Total 646,853,714 646,962,190 628,801,839 621,473,785 - 25,379,929 -3.9%

Sources: See sources listed Table 2. Notes: See notes for Table 1. Also, DOD figures for the years indicated were not readily available. Rather, the DOD figures for the four columns were derived respectively from the FY1989 Base Structure Report (published in February 1988), the FY1999 Base Structure Report (with data as of September 30, 1999), the FY2010 Base Structure Report (with data as of September 30, 2009), and the FY2015 Base Structure Report (with data as of September 30, 2014). The total federal acreage decline (shown in Table 3) is a composite of various decreases in acreage in 15 states and increases in acreage in 36 states (including the District of Columbia). However, a reduction in federal lands in Alaska was a major reason for the total decline in federal lands since 1990. As shown in Table 4, federal land declined in Alaska by 21.5 million acres (8.8%) between 1990 and 2015. This decline in Alaska is largely the result of the disposal of BLM land, under law, to the State of Alaska, Alaska Natives, and Alaska Native Corporations. Federal land also decreased in the 11 contiguous western states, by 6.6 million acres (1.9%). Reflected in this overall decline are reductions for 4 of the 11 states, with decreases of 6.3 million acres in Arizona, 4.1 million acres in Nevada,38 and smaller decreases in Utah and California. Seven of the 11 states had varying increases, with the largest being 2.8 million acres in New Mexico. Outside Alaska and the other western states, federal land increased by 2.8 million acres (6.1%). This increase was not uniform, with declines in some states and varying increases (in acreages and percentage) in others.

10 ID at Figure 3, p.15: Figure 3. Federal Lands in Alaska and Hawaii Managed by Five Agencies. Source: Map boundaries and information generated by CRS using federal lands GIS data from the National Atlas, 2005, and an ESRI USA Base Map. Note: Hawaii scale 1:8,000,000. Alaska scale 1:20,000,000. Also, the map may reflect a broader definition of DOD land than shown in the data in Table 2.

IV. KEY QUESTIONS

Key questions must be answered prior to proceeding with a decision. Material questions within the Forest Service[rsquo]s mandate and inextricably intertwined with both the instant Notice of Proposed Rulemaking (NPRM), and the draft environmental impact statement (DEIS), include and are not limited to:

1. Refreshed & Detailed Maps: How many old growth trees of each species are in the Tongass? Have they been individually mapped using non-invasive technologies now available? If so, what are the results of such mapping?
2. Tongass Champion Tree Inventory & Survey: Where are the oldest and largest trees of each species and subspecies in the Tongass? How many are champions in Alaska, regionally, nationally and globally of their species or subspecies?
3. Genetic preservation across all sectors: Have the Tongass[rsquo] old growth tree species and subspecies[rsquo][mdash]especially the champions[rsquo]-- genetics been assessed and preserved? How many pharmaceutical opportunity assessments have been made of each species and subspecies?
4. Carbon sequestration and oxygen conversion using best-in-class metrics: What are the surveyed carbon sequestration metrics for each individual acre in the Tongass? What are the carbon dioxide to oxygen conversion volumes surveyed for each acre? What are the sequestration and oxygen conversion metrics for the Tongass[rsquo]s oldest and largest trees, and have those metrics been readied for publication and peer review? How many U.S. citizens[rsquo] total carbon usage is offset by the current old growth forests within the Tongass? If this information is currently unavailable, what is the plan to obtain such information prior to approving any next steps regarding the diminution or expansion of the Tongass[rsquo] old growth acreage?
5. Aerosol, pheromone, and chemical inventory & research institution and market-based valuations: What aerosols, pheromones, and chemicals do the oldest and largest trees of each species and subspecies of tree in the Tongass produce? Have those products been inventoried and stored and made available and their characteristics published for peer review study? Have their economic values been assessed through peer-reviewed journals? Does the Forest Service have a method for distinguishing and preserving these products by region and corridor within the Tongass? If so, how many regions and corridors have been establishing within the Tongass for each species and subspecies of old growth tree?
6. Ancient Tree Preservation & Replacement Plan: If an 800-year old or older tree, grove or forest is destroyed by man with the permission of the Forest Service, can it be simply replaced?
7. Macro & Micro Entomological, Avian, Reptilian, Amphibian and Mammalian Impacts: What are the macro and micro entomological, avian, reptilian, amphibian and mammalian impacts due to old growth deforestation that has already occurred globally, in North America, in Alaska and in the Tongass? If those impacts have not been assessed using

currently available methods, when will those impacts be made available? How will they be submitted for peer review? What are the impacts if the current extreme deforestations are simply halted but no material efforts are made to restore and expand old growth forests? What are the impacts if old growth forests are allowed to continue to be reduced?

1. Old Growth Forest Acreage by Species: What does the archeological and documentary record show as the amount of acreage for each major tree species globally, in North America, in Alaska and in the Tongass as of 10,000 years ago? 1,000 years ago? 250 years ago? 100 years ago? 50 years ago? 25 years ago? 10 years

ago? 1 year ago? If these studies have been produced have they been made available for peer review? Have they distinguished between old growth, second growth, third growth and subsequent growth stands? If these materials have not been produced, or not been refreshed using currently available standards, what is the schedule and plan for producing this information prior to any decision concerning potential future interdiction into old growth forests?
2. Transition of Old Growth Forest Economies: What industries and other manmade activities have destroyed old growth trees over the last 10,000 years? 1,000 years? 250 years? 100 years? 50 years? 25 years? 10 years? 1 year? What is the plan to transition those industries and manmade activities from low or negative-value to high value activities that arrest old growth forest destruction and instead restore old growth forests? What incentives are being put in place for industries? How is the U.S. preparing for a global leadership role in these newly emerged economies?

V. KEY DATA

Image: Old Growth Trees in Tongass

SOURCE:https://ak.audubon.org/sites/default/files/styles/bean_wysiwyg_full_width/public/tongass_big_trees_phot os.jpg?itok=0zPi0dT1

The forest lands contain ample untapped and measurable resources. According to the U.S. Department of Agriculture: [ldquo]It is proposed that one large tree can provide a day[rsquo]s supply of oxygen for up to four people.[rdquo]11

Old growth trees in the Tongass will provide much larger carbon dioxide to oxygen conversion volumes than smaller mature trees.

A single mature old growth tree (such as a Champion Spruce, Hemlock or Cedar, let alone a Coast Redwood) can offset the lifetime carbon usage of a human being.12 Some champion trees

11 Stancil, Joanna Mounce. The Power of One Tree - The Very Air We Breathe. U.S. Department of Agriculture. March 17, 2015. https://www.usda.gov/media/blog/2015/03/17/power-one-tree-very-air-we-breathe

12 "Mean net annual oxygen production (after accounting for decomposition) per hectare of trees (100% tree canopy) offsets oxygen consumption of 19 people per year (8 people per acre of tree cover), but ranges from nine people per hectare of canopy cover (4 people/ac cover) in Minneapolis, Minnesota, to 28 people/ha cover (12 people/ac cover) in Calgary, Alberta."

can sequester over 1200 tons of wet weight carbon (or 400 tons dry weight). Moreover, for each ton of carbon sequestered, the tree can process 3.6 tons of carbon dioxide into oxygen.

Trees, especially the larger and longer-lived old growth trees, measurably act as the earth[rsquo]s lungs and filter

impurities out of the soil, air and water.13

Old growth forests have been found to be instrumental economic and environmental foundation stones for the spawning ground [lsquo]strongholds[rsquo] that host valuable flows of sustainably sourced salmon. The long-term value of that sustainably sourced salmon raised among the

shores of old-growth forests was found to outweigh the short-term value of a timber cut, or the damage caused by roadways or pipelines.14 In fact, economic decisions were made to keep old growth forests intact precisely to preserve such strongholds.

Dr. William Libby, a professor emeritus of forestry and genetics at the University of California, Berkeley, has stated that it is [ldquo]embarrassing how little we know[rdquo] about tree genetics and forests.15 It is well-established that it is extremely damaging to forests, and the surrounding sensitively interconnected rhizosphere, by introducing roads and logging.

Rhizosphere scientists continue to uncover astonishing aspects of old growth forests, and the manifold services they provide. However, the extensive body of knowledge is still very limited compared to the matters that still require study.16

Old growth forests like the Tongass cannot be replaced without over 800 years of untrammeled growth in a pristine environment.

Why would it make economic sense to destroy the ancient DNA, the geocoding, the carbon services, the sustainably sourced protein services, the pharmaceutical services, the air, water and soil filtration services and so many other services that these last remaining forests provide, especially without first conducting thorough studies and inventories of all their assets and services and then assessing peer-reviewed economic values to those assets and services?

Reportedly the Tongass old growth forest may assist in temporarily sustaining Viking Lumber with 34 lumbering jobs while it cuts down old growth and other growths. In order to do what? Reportedly to make door jams and sell wood to China.17 At what actual cost? The value in carbon services alone far outweighs the short-term values of the proposed sale of the old-growth lumber. Many of the old growth trees in the Tongass represent the total carbon usage of a human being throughout their lifetime. One tree = a lifetime carbon offset for one human.

13 See generally, The Man Who Planted Trees.

14 Stronghold: One Man's Quest to Save the World's Wild Salmon by Tucker Malarky. Random House. [copy] 2019

15 The Man Who Planted Trees at p.95.

16 See, for example: 2020 Rhizosphere: Engineering for Sustainable Agriculture Conference plan, https://waset.org/rhizosphere-engineering-for-sustainable-agriculture-conference-in-july-2020-in-berlin

17 [ldquo]Trees older than America: a primeval Alaskan forest is at risk in the Trump era: Tongass is the world[rsquo]s largest intact temperate rainforest, with trees more than 1,000 years old. But a pro-logging effort could uproot them,[rdquo] by Brendan Jones in Sitka, Alaska, The Guardian (March 22, 2018). https://www.theguardian.com/us-news/2018/mar/22/alaska-tongass-forest-at-risk-logging-trump

Human Carbon Dioxide MetricsSOURCE: Thought Delivery Systems, Inc.

Thus, it is time to provide Viking and other lumbering and old growth impacting resource extraction organizations the opportunity to retool their services in order to plant, expand and maintain old growth forests.

The health care sector has a role to play in assessing old growth and newer growth forests. The anti-cancer drug Taxol is derived from the Pacific yew tree.18 Aspirin is derived from the willow tree.19 A mature chestnut tree can provide enough food to sustain a family of four for a year.20 There is no evidence that the old growth forests of the Tongass, let alone the U.S., have been assessed using state-of-the-art metrics, for their pharmaceutical value.

VI. OLD GROWTH PROPAGATION, ARCHIVING AND REFORESTATION IS POSSIBLE AND UNDERWAY

AATA locates the world[rsquo]s oldest and largest trees of the most ecologically important species and propagates saplings and seedlings from those trees, archives the living DNA, and then reforests with those saplings and seedlings. It has the largest known living archive of champion trees. AATA also provides education to others about how to replicate its methods.21

18 [ldquo]The Pacific yew in North America provided the natural molecule that has since been synthesized, and is under the brand name Taxol, a powerful chemotherapeutic used to treat breast, prostate, lung, stomach, head and neck cancers.[rdquo] Id at p.156.

19 Id.at p. 62. Aspirin is derived from willow bark. [ldquo]Aspirin remains something of a miracle drug. Beyond head and body aches, taken regularly in small amounts it can prevent heart attacks and strokes.[rdquo] Studies show that it can also play a [ldquo]powerful role in in preventing mortality from lung, colon, breast, prostate, rectum, and esophageal cancer[rdquo] and also reduce the effects of Alzheimer[rsquo]s disease.

20 See generally: The Global Forest, by Diana Beresford-Kroeger, Viking Press [copy] 2010

21 Sample information about the AATA mission, processes and projects includes: (i) E360 Digest. [ldquo]Arborists Have Cloned Ancient Redwoods From Their Massive Stumps.[rdquo] Yale Environment 360. December 27, 2018. https://e360.yale.edu/digest/arborists-have-cloned-ancient-redwoods-from-their-massive-stumps ; (ii) Langellier,

DNA Expedition, Sequoia Crest, CA. November 16, 2018.

DNA Expedition, Crescent City, CA. May 18, 201

1. ECONOMICS & ASSETS OF OLD GROWTH FORESTS

Enough empirical data is in to know that it is economically illiterate to destroy any sections of the limited remaining old growth forests, especially if such destruction is in the service of low value or net-negative value activities like road or pipeline building in the service of lumbering or mineral and fossil fuel extraction. Carbon sequestration metrics and markets, carbon-to-oxygen conversion data, human health research and services, environmental health research and services, medical and pharmaceutical and rhizosphere scientific research,

and agricultural and ecotourism measures all now validate the economic value of intact and undisturbed old growth forests.

As with any high value asset, good stewardship requires that its myriad products and services be inventoried and assessed, especially prior to deciding upon any change. Such surveying and inventorying must be thorough, accurate and represent current metrics.

The remaining old growth trees in the Tongass reach 800 to 1,000 years old or older. The Tongass forests contain hemlock, spruce and cedar and other species. These old growth stands need extensive additional study to further understand the economic and other values of the products and services they provide.

1. CONCLUSION

Lumber is no longer the primary product of old growth forests.

Economic measures now validate that multiple other services that trees provide[mdash]especially old growth trees[mdash]far outweigh the short-term value of lumbering or mineral and fossil fuel extraction. In other words, minerals or fossil fuels that exist beneath old growth forests also no longer reach the provable economic value to justify the degradation of a much more valuable and exceedingly difficult to replace economic resource, the intact forest.

Old growth forests represent a measurably miniscule portion of the nation[rsquo]s forests. Old growth acreage trends continue in relentless decline. At the same time, the economic value of old growth forests has risen precipitously.

It would be arbitrary and capricious to allow any further erosion of that high value acreage, especially for exceedingly low economic value activities.

The statutory mission of the U.S. Forest Service requires ensuring the health of national forest assets and avoiding their needless waste or destruction, especially when (i) substantially similar lumber and materials can be sourced from new growth or recycled sources, and (ii) Tongass area lumber and other resource extraction industry personnel can be trained to derive livelihoods from higher value, non-destructive practices that expand old growth resources.

Old growth forests are now an apex resource whose decline must be arrested and whose footprint must be expanded, as the Forest Service statutory mission requires.

For these reasons, AATA respectfully requests that Forest Service (1) obtain the data necessary to create the studies suggested herein, (2) decline any proposed rule changes or projects that would further destroy old growth forests in the Tongass, and (3) incorporate these comments as its stated policy for forest management.

Respectfully submitted,

Attorney for:

ARCHANGEL ANCIENT TREE ARCHIVE

Joseph M. Sandri, Esq.

Board Member

Archangel Ancient Tree Archive

[Exhibit includes tables and graphs supporting information]

[Position]

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There are 2.3 billion acres of land in the U.S. The federal government surface lands cover nearly 650 million of those acres.7 However, when subsurface rights and ownership and excavation and extraction are included, the impact on the surface reaches well beyond the 650 million surface acres. 8 Nationally, the Forest Service manages 193 million surface acres.

5 For example, see: Bolsinger, Charles L.; Waddell, Karen L. 1993. Area of old-growth forests in California, Oregon, and Washington. (Resour. Bull. PNW-RB-197). Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station, at page 26 . Between 1945 and 1993, the area of old-growth forests in California, Oregon, and Washington declined by 3/5ths from roughly 63 million acres to 10 million acres. https://www.fs.fed.us/r5/rsl/publications/oldgrowth/old-growth-ca-or-wa.pdf

That decline has continued to the present day, and the Tongass old growth stands have not grown, but have continually been reduced. See generally, [ldquo]Trees older than America: a primeval Alaskan forest is at risk in the Trump era: Tongass is the world[rsquo]s largest intact temperate rainforest, with trees more than 1,000 years old. But a pro-logging effort could uproot them,[rdquo] by Brendan Jones in Sitka, Alaska, The Guardian (March 22, 2018). https://www.theguardian.com/us-news/2018/mar/22/alaska-tongass-forest-at-risk-logging-trump

6 See generally, The Man Who Planted Trees: A Story of Lost Groves, The Science of Trees, and a Plan to Save the Planet, by New York Times science writer, Jim Robbins [copy] 2012, with afterwards [copy] 2015.

7 "The federal government owns about 640 million acres of land in the United States, about 28% of the total land area of 2.27 billion acres.[3][4] The majority of federal lands (610.1 million acres in 2015) are administered by the Bureau of Land Management (BLM), U.S. Fish and Wildlife Service (FWS), National Park Service (NPS), or U.S. Forest Service (FS). BLM, FWS, and NPS are part of the U.S. Department of the Interior, while the Forest Service is part of the U.S. Department of Agriculture. An additional 11.4 million acres of land (about 2% of all

federal land) is owned by the U.S. Department of Defense (DOD).[4] The majority of federal lands are located in Alaska and the Western states.[4]"

https://en.wikipedia.org/wiki/Federal_lands

8 Federal Land Ownership: Overview and Data Updated March 3, 2017. Congressional Research Service. https://crsreports.congress.gov/product/pdf/R/R42346

Federal land holdings have been recently reduced by about 25 million acres. Over 21 million of those acres were in Alaska. 9 Alaskan federal lands are managed by a variety of agencies. 10

Only scattered pockets of original old growth forests remain intact in the U.S. The Tongass contains some of those rare remaining original and intact old growth forests.

9 ID at p.16. Federal land holding declines lead by sharp declines in U.S. Government holdings of lands in Alaska. Table 3. Change in Federal Acreage Since 1990, by Agency. 1990 2000 2010 2015 Change 1990-2015. % Change Since 1990. BLM 272,029,418 264,398,133 247,859,076 248,345,551 -23,683,867 -8.7% FS 191,367,364 192,355,099 192,880,840 192,893,317 1,525,953 0.8% FWS 86,822,107 88,225,669 88,948,699 89,092,711 2,270,604 2.6% NPS 76,133,510 77,931,021 79,691,484 79,773,772 3,640,262 4.8% DOD 20,501,315 24,052,268 19,421,540 11,368,434 -9,132,881 -44.5% U.S. Total 646,853,714 646,962,190 628,801,839 621,473,785 - 25,379,929 -3.9%

Sources: See sources listed Table 2. Notes: See notes for Table 1. Also, DOD figures for the years indicated were not readily available. Rather, the DOD figures for the four columns were derived respectively from the FY1989 Base Structure Report (published in February 1988), the FY1999 Base Structure Report (with data as of September 30, 1999), the FY2010 Base Structure Report (with data as of September 30, 2009), and the FY2015 Base Structure Report (with data as of September 30, 2014). The total federal acreage decline (shown in Table 3) is a composite of various decreases in acreage in 15 states and increases in acreage in 36 states (including the District of Columbia). However, a reduction in federal lands in Alaska was a major reason for the total decline in federal lands since 1990. As shown in Table 4, federal land declined in Alaska by 21.5 million acres (8.8%) between 1990 and 2015. This decline in Alaska is largely the result of the disposal of BLM land, under law, to the State of Alaska, Alaska Natives, and Alaska Native Corporations. Federal land also decreased in the 11 contiguous western states, by 6.6 million acres (1.9%). Reflected in this overall decline are reductions for 4 of the 11 states, with decreases of 6.3 million acres in Arizona, 4.1 million acres in Nevada,38 and smaller decreases in Utah and California. Seven of the 11 states had varying increases, with the largest being 2.8 million acres in New Mexico. Outside Alaska and the other western states, federal land increased by 2.8 million acres (6.1%). This increase was not uniform, with declines in some states and varying increases (in acreages and percentage) in others.

10 ID at Figure 3, p.15: Figure 3. Federal Lands in Alaska and Hawaii Managed by Five Agencies. Source: Map boundaries and information generated by CRS using federal lands GIS data from the National Atlas, 2005, and an ESRI USA Base Map. Note: Hawaii scale 1:8,000,000. Alaska scale 1:20,000,000. Also, the map may reflect a broader definition of DOD land than shown in the data in Table 2.

IV. KEY QUESTIONS

Key questions must be answered prior to proceeding with a decision. Material questions within the Forest Service[rsquo]s mandate and inextricably intertwined with both the instant Notice of Proposed Rulemaking (NPRM), and the draft environmental impact statement (DEIS), include and are not limited to:

1. Refreshed & Detailed Maps: How many old growth trees of each species are in the Tongass? Have they been individually mapped using non-invasive technologies now available? If so, what are the results of such mapping?
2. Tongass Champion Tree Inventory & Survey: Where are the oldest and largest trees of each species and subspecies in the Tongass? How many are champions in Alaska, regionally, nationally and globally of their species or subspecies?
3. Genetic preservation across all sectors: Have the Tongass[rsquo] old growth tree species and subspecies[rsquo][mdash]especially the champions[rsquo]-- genetics been assessed and preserved? How many pharmaceutical opportunity assessments have been made of each species and subspecies?
4. Carbon sequestration and oxygen conversion using best-in-class metrics: What are the surveyed carbon sequestration metrics for each individual acre in the Tongass? What are the carbon dioxide to oxygen conversion volumes surveyed for each acre? What are the sequestration and oxygen conversion metrics for the Tongass[rsquo]s oldest and largest trees, and have those metrics been readied for publication and peer review? How many U.S. citizens[rsquo] total carbon usage is offset by the current old growth forests within the Tongass? If this information is currently unavailable, what is the plan to obtain such information prior to approving any next steps regarding the diminution or expansion of the Tongass[rsquo] old growth acreage?
5. Aerosol, pheromone, and chemical inventory & research institution and market-based valuations: What aerosols, pheromones, and chemicals do the oldest and largest trees of each species and subspecies of tree in the Tongass produce? Have those products been inventoried and stored and made available and their characteristics published for peer review study? Have their economic values been assessed through peer-reviewed journals? Does the Forest Service have a method for distinguishing and preserving these products by region and corridor within the Tongass? If so, how many regions and corridors have been establishing within the Tongass for each species and subspecies of old growth tree?
6. Ancient Tree Preservation & Replacement Plan: If an 800-year old or older tree, grove or forest is destroyed by man with the permission of the Forest Service, can it be simply replaced?
7. Macro & Micro Entomological, Avian, Reptilian, Amphibian and Mammalian Impacts: What are the macro and micro entomological, avian, reptilian, amphibian and mammalian impacts due to old growth deforestation that has already occurred globally, in North America, in Alaska and in the Tongass? If those impacts have not been assessed using

currently available methods, when will those impacts be made available? How will they be submitted for peer review? What are the impacts if the current extreme deforestations are simply halted but no material efforts are made to restore and expand old growth forests? What are the impacts if old growth forests are allowed to continue to be reduced?

1. Old Growth Forest Acreage by Species: What does the archeological and documentary record show as the amount of acreage for each major tree species globally, in North America, in Alaska and in the Tongass as of 10,000 years ago? 1,000 years ago? 250 years ago? 100 years ago? 50 years ago? 25 years ago? 10 years

ago? 1 year ago? If these studies have been produced have they been made available for peer review? Have they distinguished between old growth, second growth, third growth and subsequent growth stands? If these materials have not been produced, or not been refreshed using currently available standards, what is the schedule and plan for producing this information prior to any decision concerning potential future interdiction into old growth forests?
2. Transition of Old Growth Forest Economies: What industries and other manmade activities have destroyed old growth trees over the last 10,000 years? 1,000 years? 250 years? 100 years? 50 years? 25 years? 10 years? 1 year? What is the plan to transition those industries and manmade activities from low or negative-value to high value activities that arrest old growth forest destruction and instead restore old growth forests? What incentives are being put in place for industries? How is the U.S. preparing for a global leadership role in these newly emerged economies?

V. KEY DATA

Image: Old Growth Trees in Tongass

SOURCE:https://ak.audubon.org/sites/default/files/styles/bean_wysiwyg_full_width/public/tongass_big_trees_phot os.jpg?itok=0zPi0dT1

The forest lands contain ample untapped and measurable resources. According to the U.S. Department of Agriculture: [ldquo]It is proposed that one large tree can provide a day[rsquo]s supply of oxygen for up to four people.[rdquo]11

Old growth trees in the Tongass will provide much larger carbon dioxide to oxygen conversion volumes than smaller mature trees.

A single mature old growth tree (such as a Champion Spruce, Hemlock or Cedar, let alone a Coast Redwood) can offset the lifetime carbon usage of a human being.12 Some champion trees

11 Stancil, Joanna Mounce. The Power of One Tree - The Very Air We Breathe. U.S. Department of Agriculture. March 17, 2015. https://www.usda.gov/media/blog/2015/03/17/power-one-tree-very-air-we-breathe

12 "Mean net annual oxygen production (after accounting for decomposition) per hectare of trees (100% tree canopy) offsets oxygen consumption of 19 people per year (8 people per acre of tree cover), but ranges from nine people per hectare of canopy cover (4 people/ac cover) in Minneapolis, Minnesota, to 28 people/ha cover (12 people/ac cover) in Calgary, Alberta."

can sequester over 1200 tons of wet weight carbon (or 400 tons dry weight). Moreover, for each ton of carbon sequestered, the tree can process 3.6 tons of carbon dioxide into oxygen.

Trees, especially the larger and longer-lived old growth trees, measurably act as the earth[rsquo]s lungs and filter

impurities out of the soil, air and water.13

Old growth forests have been found to be instrumental economic and environmental foundation stones for the spawning ground [lsquo]strongholds[rsquo] that host valuable flows of sustainably sourced salmon. The long-term value of that sustainably sourced salmon raised among the

shores of old-growth forests was found to outweigh the short-term value of a timber cut, or the damage caused by roadways or pipelines.14 In fact, economic decisions were made to keep old growth forests intact precisely to preserve such strongholds.

Dr. William Libby, a professor emeritus of forestry and genetics at the University of California, Berkeley, has stated that it is [ldquo]embarrassing how little we know[rdquo] about tree genetics and forests.15 It is well-established that it is extremely damaging to forests, and the surrounding sensitively interconnected rhizosphere, by introducing roads and logging.

Rhizosphere scientists continue to uncover astonishing aspects of old growth forests, and the manifold services they provide. However, the extensive body of knowledge is still very limited compared to the matters that still require study.16

Old growth forests like the Tongass cannot be replaced without over 800 years of untrammeled growth in a pristine environment.

Why would it make economic sense to destroy the ancient DNA, the geocoding, the carbon services, the sustainably sourced protein services, the pharmaceutical services, the air, water and soil filtration services and so many other services that these last remaining forests provide, especially without first conducting thorough studies and inventories of all their assets and services and then assessing peer-reviewed economic values to those assets and services?

Reportedly the Tongass old growth forest may assist in temporarily sustaining Viking Lumber with 34 lumbering jobs while it cuts down old growth and other growths. In order to do what? Reportedly to make door jams and sell wood to China.17 At what actual cost? The value in carbon services alone far outweighs the short-term values of the proposed sale of the old-growth lumber. Many of the old growth trees in the Tongass represent the total carbon usage of a human being throughout their lifetime. One tree = a lifetime carbon offset for one human.

13 See generally, The Man Who Planted Trees.

14 Stronghold: One Man's Quest to Save the World's Wild Salmon by Tucker Malarky. Random House. [copy] 2019

15 The Man Who Planted Trees at p.95.

16 See, for example: 2020 Rhizosphere: Engineering for Sustainable Agriculture Conference plan, https://waset.org/rhizosphere-engineering-for-sustainable-agriculture-conference-in-july-2020-in-berlin

17 [ldquo]Trees older than America: a primeval Alaskan forest is at risk in the Trump era: Tongass is the world[rsquo]s largest intact temperate rainforest, with trees more than 1,000 years old. But a pro-logging effort could uproot them,[rdquo] by Brendan Jones in Sitka, Alaska, The Guardian (March 22, 2018). https://www.theguardian.com/us-news/2018/mar/22/alaska-tongass-forest-at-risk-logging-trump

Human Carbon Dioxide MetricsSOURCE: Thought Delivery Systems, Inc.

Thus, it is time to provide Viking and other lumbering and old growth impacting resource extraction organizations the opportunity to retool their services in order to plant, expand and maintain old growth forests.

The health care sector has a role to play in assessing old growth and newer growth forests. The anti-cancer drug Taxol is derived from the Pacific yew tree.18 Aspirin is derived from the willow tree.19 A mature chestnut tree can provide enough food to sustain a family of four for a year.20 There is no evidence that the old growth forests of the Tongass, let alone the U.S., have been assessed using state-of-the-art metrics, for their pharmaceutical value.

VI. OLD GROWTH PROPAGATION, ARCHIVING AND REFORESTATION IS POSSIBLE AND UNDERWAY

AATA locates the world[rsquo]s oldest and largest trees of the most ecologically important species and propagates saplings and seedlings from those trees, archives the living DNA, and then reforests with those saplings and seedlings. It has the largest known living archive of champion trees. AATA also provides education to others about how to replicate its methods.21

18 [ldquo]The Pacific yew in North America provided the natural molecule that has since been synthesized, and is under the brand name Taxol, a powerful chemotherapeutic used to treat breast, prostate, lung, stomach, head and neck cancers.[rdquo] Id at p.156.

19 Id.at p. 62. Aspirin is derived from willow bark. [ldquo]Aspirin remains something of a miracle drug. Beyond head and body aches, taken regularly in small amounts it can prevent heart attacks and strokes.[rdquo] Studies show that it can also play a [ldquo]powerful role in in preventing mortality from lung, colon, breast, prostate, rectum, and esophageal cancer[rdquo] and also reduce the effects of Alzheimer[rsquo]s disease.

20 See generally: The Global Forest, by Diana Beresford-Kroeger, Viking Press [copy] 2010

21 Sample information about the AATA mission, processes and projects includes: (i) E360 Digest. [ldquo]Arborists Have Cloned Ancient Redwoods From Their Massive Stumps.[rdquo] Yale Environment 360. December 27, 2018. https://e360.yale.edu/digest/arborists-have-cloned-ancient-redwoods-from-their-massive-stumps ; (ii) Langellier,

DNA Expedition, Sequoia Crest, CA. November 16, 2018.

DNA Expedition, Crescent City, CA. May 18, 201

1. ECONOMICS & ASSETS OF OLD GROWTH FORESTS

Enough empirical data is in to know that it is economically illiterate to destroy any sections of the limited remaining old growth forests, especially if such destruction is in the service of low value or net-negative value activities like road or pipeline building in the service of lumbering or mineral and fossil fuel extraction. Carbon sequestration metrics and markets, carbon-to-oxygen conversion data, human health research and services, environmental health research and services, medical and pharmaceutical and rhizosphere scientific research,

and agricultural and ecotourism measures all now validate the economic value of intact and undisturbed old growth forests.

As with any high value asset, good stewardship requires that its myriad products and services be inventoried and assessed, especially prior to deciding upon any change. Such surveying and inventorying must be thorough, accurate and represent current metrics.

The remaining old growth trees in the Tongass reach 800 to 1,000 years old or older. The Tongass forests contain hemlock, spruce and cedar and other species. These old growth stands need extensive additional study to further understand the economic and other values of the products and services they provide.

1. CONCLUSION

Lumber is no longer the primary product of old growth forests.

Economic measures now validate that multiple other services that trees provide[mdash]especially old growth trees[mdash]far outweigh the short-term value of lumbering or mineral and fossil fuel extraction. In other words, minerals or fossil fuels that exist beneath old growth forests also no longer reach the provable economic value to justify the degradation of a much more valuable and exceedingly difficult to replace economic resource, the intact forest.

Old growth forests represent a measurably miniscule portion of the nation[rsquo]s forests. Old growth acreage trends continue in relentless decline. At the same time, the economic value of old growth forests has risen precipitously.

It would be arbitrary and capricious to allow any further erosion of that high value acreage, especially for exceedingly low economic value activities.

The statutory mission of the U.S. Forest Service requires ensuring the health of national forest assets and avoiding their needless waste or destruction, especially when (i) substantially similar lumber and materials can be sourced from new growth or recycled sources, and (ii) Tongass area lumber and other resource extraction industry personnel can be trained to derive livelihoods from higher value, non-destructive practices that expand old growth resources.

Old growth forests are now an apex resource whose decline must be arrested and whose footprint must be expanded, as the Forest Service statutory mission requires.

For these reasons, AATA respectfully requests that Forest Service (1) obtain the data necessary to create the studies suggested herein, (2) decline any proposed rule changes or projects that would further destroy old growth forests in the Tongass, and (3) incorporate these comments as its stated policy for forest management.

Respectfully submitted,

Attorney for:

ARCHANGEL ANCIENT TREE ARCHIVE

Joseph M. Sandri, Esq.

Board Member

Archangel Ancient Tree Archive

[Exhibit includes tables and graphs supporting information]

[Position]