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Comments: Dear Denise,

Defenders of Wildlife is pleased to submit the following comments on the Chugach National Forest Draft Land Management Plan (August 2018). Established in 1947, Defenders is a national, science-based non-profit conservation organization. With more than 1.8 million members and supporters nationwide including over 5,000 in Alaska, Defenders is focused on conserving and restoring native species and habitat, including in national forests throughout the country.

We have greatly appreciated the chance to meet with you and other members of the Planning Team at different points in the development of the draft plan and draft Environmental Impact Statement (DEIS). We look forward to further engagement with you and the planning team as you work to finalize the plan and EIS.

We've grouped our comments into three sections: general comments; wildlife; and integration of climate change considerations.

1. General Comments on the Draft Plan and DEIS

Our comments are focused on Goal 3 [ndash] Provide for Ecological Sustainability.

1. Desired Conditions

For some desired conditions, it is difficult to determine how the condition will be managed/evaluated, which will likely have implications for effective implementation and evaluation of the plan. We concur that the Forest's ecosystems have high degrees of ecological integrity, yet there will be critical cases in certain geographic areas experiencing higher degrees of use [ndash] such as the Kenai with 100,000 plus acres

of front country¹ (1 In the Kenai front country, one area of emphasis is the restoration of forest and riparian vegetation affected by insects, disease, and fire, as well as the generation of forest products, so it will be necessary to have measurable desired conditions to design restoration and forestry projects. The front country MA is also suitable for all uses or activities, minus commercial timber production, emphasizing the need for clear desired conditions.)[ndash] where evaluation of ecosystem conditions is very important. We assume that the Forest understands how these desired conditions will be evaluated, but the essential question for planning is how the public will understand if the desired conditions are being achieved due to implementation of the plan. If the Forest is committed to this approach, for whatever reason, we welcome further conversations to increase understanding of how conditions are to be evaluated. The following questions about some of the desired conditions characterize this theme:

- * What are the spatial and temporal patterns desired for composition, distribution of seral stages and key habitat components? What information will projects use to characterize those desired ecosystem conditions?
- * What are the conditions necessary to maintain habitat quantity, quality and distributions to sustain native fish and wildlife?
- * What is the metric for existing habitat connectivity?
- * How will the sufficiency of instream flows be measured?
- * Where can the public find the desired ranges of stream channel morphology, structure, complexity and

diversity?

* Are there thresholds where the Forest may not be able to provide habitat of sufficient quality, diversity, connectivity, and abundance to support self-sustaining populations of wildlife?

* Does the Forest have a sense of measurable desired conditions for fire behavior, intensity, severity and frequency?

* What is the appropriate distribution of early seral vegetation for moose?

1. Design Criteria

For minerals, there is a guideline to [ldquo]reduce impacts to riparian resources to the extent feasible.[rdquo] That, and the requirement that projects will include design features [ldquo]commensurate with potential resources impacts[rdquo] does not offer very much clarity on how this guideline will protect riparian resources. The effectiveness of other guidelines for mineral development, such as requiring [ldquo]compatibility[rdquo] with the Region 10 Aquatic Ecosystem Handbook and maintaining the productivity of anadromous fish habitat [ldquo]to the maximum extent feasible[rdquo] are also difficult to interpret.

For watersheds and aquatics, there is a standard to apply BMPs, but it is not clear what these are. There is also a standard to identify and delineate riparian management areas. The planning rule requires the establishment of widths for riparian management zones within which required plan components apply (36 CFR 219.8(a)(3)). Have those zones been delineated within the plan? There is also a guideline to design riparian management activities consistent with a Forest Service handbook. What is the implication for forest planning and effects analysis if that handbook is changed? There is a guideline to consult with an aquatic biologist to prescribe measures to ensure a natural range and frequency of aquatic habitat conditions [ndash] can those desired conditions be found in the plan or will they be determined at a later date via a different planning process?

For vegetation management there is a guideline to treat slash piles [ldquo]outside of a buffer distance designed to keep sediment[hellip]out of stream channels.[rdquo] When and how will that buffer distance be determined? There is a guideline to [ldquo]avoid riparian management areas[rdquo] when cutting sawtimber. Where are these areas located?

For silviculture, there is a guideline to produce cover types consistent with desired conditions for forest stands and landscapes. Given the nature of the desired conditions for ecosystems, we are curious how this guideline will be interpreted and implemented at the project-level. For clearcutting, the plan should describe the at-risk species that will benefit from this condition. Also, if clearcutting is going to be used to [ldquo]rehabilitate lands adversely impacted by events that include fires, windstorms, insect or disease infestations, or other factors affecting forest health[rdquo] it will be necessary to evaluate and determine departures from desired reference conditions for those areas. We are not convinced that the existing desired condition framework allows these determinations to be made. How will the forest plan support determinations of which stands require rehabilitation? What is the rationale, based on ecological

integrity, to rehabilitate via clearcutting a stand that is [ldquo]poorly stocked[rdquo] due to natural events? There should be measurable desired conditions for forest types to support the development of forest management projects. Effects analysis for the plan should reflect effects to integrity of fewer snags and down wood being retained in the WUI. Retaining 10 percent of treatment units to [ldquo]maintain an

ecological and genetic imprint of the former stand[rdquo] sounds like a desired condition for integrity. Will the forest plan define [ldquo]sensitive areas and features[rdquo] desired for retention for ecological purposes, or will those decisions be made at a later date? What is the relationship between bark beetle disturbance and ecological integrity? What desired conditions will salvage harvest fulfill? Are there implications for ecological integrity?

For wildlife, there is a guideline to minimize disturbance to important habitats, including animal movement corridors, breeding areas, and winter range. Can the plan help in identifying these important areas? A guideline for dusky Canada goose requires low impact operational methods; how will this be interpreted and implemented for this and other plan components? Should there be desired conditions and objectives to support management activities [ldquo]to promote the conservation of[hellip]migratory bird species[rdquo]?

For wildfire, there is a standard to manage wildfire to meet protection and resource management objectives. What objectives is this referring to?

1. Comments on the DEIS

The EIS states that [ldquo]there is a need to manage or maintain key ecosystem elements[rdquo] and [ldquo]promote ecosystem resilience in a changing climate[rdquo] (implying that the plan will have affirmative effects on ecosystems) which supports the notion that desired conditions for integrity be measurable and subject to evaluation. In order to promote resilience, there should be affirmative resiliency and adaptation objectives in the plan. The EIS should evaluate the affirmative effect of this plan direction to meet this purpose and need.

Yet the EIS does not shed great light on the effect of the plan on integrity and diversity. In fact the general sentiment of the EIS is that the plan will have no effect on ecosystems, watersheds and habitats. Exceptions occur, for example, for invasive species and motorized use, which would be better controlled

under alternatives C and D. It is not clear if the EIS considers climate change a stressor that can be alleviated via management actions sanctioned under the forest plan.

For wildfire, the EIS states that areas not treated [ldquo]will continue to advance toward climate successional stages[rdquo] and that [ldquo]coarse and fine-scale landscape patterns will become more homogenous as succession advances[rdquo] (p. 43). This seems to imply that natural disturbance processes are a barrier to ecological integrity. This type of assumption is important to clarify in the EIS. Similarly, the EIS (same page) states that ecosystems express reduced [ldquo]resilience against insects and disease[rdquo] and contain/will contain undesirable fuel loadings and undesirable fire conditions. These statements, which justify interventions in ecosystems to restore resiliency, stand in some contrast to other overarching statements concerning

the existing resiliency of the Forest[rsquo]s ecosystems.

The EIS assumes that implementation of site-specific projects would be consistent with plan components such as desired conditions (p. 46). But as we have noted, it is difficult to determine how projects would be deemed in compliance with desired conditions that are difficult to measure, including key direction for ecosystem integrity and resiliency.

Looking at the specific analyses of environmental consequences does not shed too much more light on how the plan will affect ecosystems and watersheds. For instance, [ldquo]plan components have been modified and added to provide more of an emphasis towards providing ecosystem resilience for

changing conditions[rdquo] (p. 264). The EIS could identify those components and attempt to disclose their effects on watershed resiliency. This inability to declare those affirmative effects contributes to our concern that it is difficult to evaluate the effectiveness of desired conditions for integrity. This section begins with a statement that climate change is a [ldquo]major driver of change[rdquo] on the Forest. What is not clear is what effect the Forest[rsquo]s resiliency management will have on powerful climate effects.

For aquatic ecosystems, the EIS determines that road construction and timber harvest will have no effect on those ecosystems and resources (pp. 303-304). Can the EIS point to the plan direction that is providing those protections? There is no mention of designated riparian management zones. Why is it not possible to develop plan components to protect essential fish habitat?

The discussion of [ldquo]large catastrophic wildfire[rdquo] effects on fish habitat needs some explanation. Are these fires outside of the natural range of variation?

The EIS states that mining operations are [ldquo]carefully monitored to ensure compliance with the terms of the mine operating plan.[rdquo] This is not the same as plan components ensuring no effects on resources. For recreation, the EIS states that under Alternative B [ldquo]Fish resources should not be affected[rdquo] (p. 308). This is troubling. The EIS acknowledges impacts to fish and water resources, and even high impacts at points of concentrated use, but presumes [ldquo]proper management[rdquo] will reduce impacts.

There is no clear discussion of the effects of the plan on terrestrial ecosystem integrity despite plan direction intended to influence that integrity, including forest management actions. There is also this statement that [ldquo]coarse and fine-scale landscape patterns will become more homogenous as succession advances[rdquo] (p. 432). Does that assume achievement of desired conditions? Will desired conditions for terrestrial ecosystem integrity have effects? The forest management section of the EIS includes the following (p. 125). This seems to have implications for forest ecosystem integrity:

Forest stand structure would be expected to experience a decline in tree diameter size with repeat harvesting in highly accessible areas, resulting in a decline in the amount of larger trees. Total standing volume could continue to increase over time, but the distribution of the biomass would be distributed over a larger amount of trees. The forest would have smaller diameter trees, resulting in fewer opportunities for regeneration type harvests (clearcutting, seedtree, and shelterwood) in the future.

It would be helpful to see a discussion in the FEIS of the future integrity of forest ecosystems on the Kenai under the implementation of the forest plan.

1. Wildlife

Defenders and many other groups and agencies, including the Forest Service, have taken keen

interest in Kenai brown bears over the years. The draft plan, however, removes some of the protections afforded to Kenai brown bears in the current forest plan and we urge the Forest Service to reconsider this issue before finalizing the revised plan. We also encourage the Forest Service to ensure that the Species of Conservation Concern (SCC) list reflects the best available science and that all required findings are made transparent. Finally, we note additional species that the FEIS should further illuminate and that the Forest Service should consider for drafting additional plan components.

1.

1. Kenai Brown Bears

The draft revised plan removes the teeth from the protective measures afforded to Kenai brown bears in the current plan. These include measures protecting 750-foot buffers around important feeding areas from both road construction and vegetation management actions (unless those were intended to maintain or improve ecological

conditions for brown bears).² (2 2002 Forest Plan at 3-29.) We urge the Forest Service to retain these provisions at the very minimum, and to consider strengthening them.

The human population on the Kenai Peninsula has greatly expanded each decade since 1960. That expansion and the accompanying increase in roads, housing developments, new settlements, etc., has reduced and fragmented brown bear habitat and imposed connectivity challenges for bears on the Kenai.³ (3 81 Fed. Reg. 27037 (May 5, 2016) (Publication of the Kenai National Wildlife Refuge public use rule).) That dynamic has continued apace since the current Forest Plan was adopted in 2002; indeed, the Forest Service has now proposed to amend the 2002 Forest Plan specifically to allow new road construction in designated brown bear feeding habitat.⁴ (4 83 Fed. Reg. 49060 (September 28, 2018))

The FEIS should quantify and explain the loss and fragmentation of habitat, connectivity implications, displacement of bears and/or prey from desired areas, noise and other impacts on Kenai brown bear habitat that have occurred since 2002. We think that analysis will support the retention of protective measures for brown bears, and may provide a basis for establishing additional measures, especially those to promote and ensure connectivity between and among discontinuous prime brown bear habitat. Clear desired conditions and associated Standards and Guidelines for protecting Kenai brown bear habitat would help measure the plan's effectiveness in providing for their continued viability on the forest.

Draft plan direction for ecosystem and habitat connectivity that could benefit brown bears suffers from several weaknesses that should be improved in the final plan. For example, Ecosystem Processes and Conditions Desired Condition 6 associated with Goal 3 aspires to maintain existing habitat connectivity and Terrestrial Ecosystems Desired Condition 1 aspires to provide sufficient habitat connectivity. The actual measurable degree of connectivity needed to support Kenai brown bear populations should be articulated within the final plan. The Terrestrial Ecosystems Management Approach to "[m]aintain or restore habitat connectivity to maximize opportunities for species to shift home ranges or alter habitat selections in response to changing ecological conditions" is probably helpful to brown bears, although we question why a management approach is being used rather than formal, and binding, plan direction. It is also unclear when these actions would be taken in response to changing ecological conditions; continued habitat loss and fragmentation on the Kenai Peninsula should qualify. Monitoring changes in ecological conditions for brown bears and evaluating the sufficiency of conditions, including connectivity, to inform maintenance and/or restoration decisions, should be added to the monitoring plan.

Increased hunting pressure is another reason to retain existing protective measures for brown bears. In recent years, the Alaska Board of Game has greatly liberalized the hunting regulations for Kenai brown bears, including significantly expanding the hunting season and allowing the take of brown bears over bait. The DEIS correctly observes that the subsequent harvest of Kenai brown bears "[e]xceeded

suggested sustainable harvest rates."⁵ (5 DEIS at 380.) The Alaska Department of Fish and Game⁶ (6 Alaska Department of Fish and Game, 2015 Brown Bear Management Report at p.6-5 e) and the Kenai National Wildlife Refuge reached the same conclusion, and the FWS closed the bear hunting season for two years in a row as a result.

Notwithstanding all that, the new Department of Interior has ordered the Kenai National Wildlife Refuge to better align its regulations with the state's, so we can fully expect to see the Kenai Refuge seek to allow brown bear baiting on its lands as well, which would be unprecedented. As the DEIS notes,

"[m]anagement decisions outside Forest Service authority may compromise brown bear populations in the future."⁷ (7 DEIS at 380.) Those management decisions already have resulted in short-term unsustainable

harvest levels that have reduced the Kenai brown bear population. In all, there is a clearly more aggressive, less-protective regulatory structure in place for brown bear hunting on the Kenai than there was in 2002, and this fact counsels in favor of fully retaining and potentially expanding the protections afforded to brown bears and habitat in the Forest Plan.

Finally, human-caused mortality of Kenai brown bears not related to legal hunting is an additional consideration counseling in favor of retaining or expanding brown bear conservation measures. These sources of mortality, which include reported and unreported illegal hunting (poaching), car collisions and other accidents, and [ldquo]Defense of Life and Property[rdquo] (DLP) killings, naturally vary in number and sometimes make a significant contribution to overall mortality.⁸ (8 81 Fed. Reg. 27037.) While many of these incidents would also be outside Forest Service authority to regulate, they are among the cumulative impacts to brown bears that the Forest Service should consider in the FEIS before deciding whether to reduce, maintain or increase protections for Kenai brown bears.

We appreciate that the high-profile negative human-bear interactions that occurred in the late 1990s and early 2000s on the Kenai Peninsula have been reduced in number. Significantly, however, it was an aggressive and concerted effort including sustained public education, investments in coexistence materials like locking garbage containers and electric fences, and local, state and federal laws and regulations that helped achieve this reduction.

Remnants of that effort still exist, and Defenders actively partners with the Forest Service, Fish and Wildlife Service and others to reduce DLPs and other negative human-bear interactions on the Kenai. But much of the coexistence infrastructure and capacity present in 2002 has waned substantially over the years, including the Interagency Brown Bear Study Team and any clear implementation of the Kenai Peninsula Brown Bear Conservation Strategy. It is safe to say that that non-hunting-related mortality presents a continuing threat to Kenai brown bears, and counsels for continuing, and potentially expanding, existing protections for brown bears in light of the cumulative threats.

1.

1. Species of Conservation Concern

A species of conservation concern is a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species[rsquo] capability to persist over the long-term in the plan area.⁹ (9 36 C.F.R. sec. 219.9(c).) The development of the SCC list should include the opportunity for the public to provide input on a proposed list.¹⁰ (10 FSH 1909.12, Chapter 10 sec. 12.52a; Chapter 40, sec. 42.11.)

As you know, we have had trouble tracking and understanding the Forest Service[rsquo]s process of identifying and evaluating candidate SCC species. We do sincerely appreciate the efforts of several Forest Service staff that were not necessarily involved in the efforts in 2012-14 leading to the Regional Forester[rsquo]s selection of SCCs on the Chugach to retrieve the relevant documents and try to reconstruct the process to help us better understand the agency[rsquo]s thinking.

It does not appear that the Forest Service complied with the letter or spirit of the public participation component cited above. There was no public circulation of any proposed list of SCCs for public comment, for example. While there was a good discussion of [ldquo]At Risk Species [ndash] Potential Species of Conservation Concern[rdquo] in the 2014 Ecological Assessment, no reader of that 310-page document could be reasonably expected to have known that that discussion, on pages 126-134, was in fact a draft list of SCCs upon which public comment was being invited. Other than Defenders[rsquo] correspondence with the Forest Service, there appears to be no

evidence of any public input on the SCC issue during the plan revision process to date.

On the merits of the listing decision itself, there still appear to be species for which SCC status appears warranted. Species with G1/2 or S1/2 Nature Serve rankings, for example, shall be included as SCC

unless [ldquo]it can be demonstrated and documented that known threats for the species . . . are not currently present or relevant in the plan area.[rdquo]11 (11 FSH 1909.12_12.52d.) Kittlitz[rsquo]s murrelets have a G2 ranking and are threatened by ground contamination such as oil spills and by receding glacial habitat [ndash] these threats are very present on the Chugach.12 (12 2014 Ecological Assessment at 129-30.) The Regional Forester should add Kittlitz[rsquo]s murrelets to the SCC list and the Forest Service should add plan components to ensure the continued viability of this species on the forest. Alternatively, the FEIS and Record of Decision should explain how these known threats are not present or relevant on the Chugach.

Similarly, the plant Sessileleaf scurvygrass have G2/S2 ranking and there is no documentation that the threats facing this species are not present on the Chugach. The habitat for this species [ndash] intertidal areas, gravel bars and spits [ndash] is very vulnerable to the effects of subsidence or uplift resulting from tectonics and tidal waves. It may also be affected by activities such as construction, invasive species and recreational use of intertidal areas, which can all be influenced by Forest Service management actions. One population of this species is believed to have been obliterated by construction of harbor facilities in the plant[rsquo]s habitat. There seems to be nothing poorly defined or hypothetical about the threats to this species, and certainly nothing demonstrating that they are not present or relevant in the plan area.

The Regional Forester can amend the SCC list at any time, working with the Responsible Official as necessary. This Forest Plan revision process provides a good opportunity to do so since best available science on various species is being collected and analyzed anyway. We urge the Forest Service to continue to evaluate the best available scientific information regarding species that occur on the Chugach and either propose additions to the SCC list or make the necessary findings regarding the absence of threats to G1/2- and S1/2-ranked species.

1.

1. Kenai Mountains Caribou Herd

Caribou are thought to have been abundant on the Kenai Peninsula in the late 1800s, but were extirpated by 1913. Reintroductions occurred in the mid 1960s, and the current population had reached an estimated 500 animals before estimates fell sharply during 2009-14.13 (13 DEIS at 107.) The population has been below State management objectives since 2011 and the [ldquo]small size of the Kenai Mountains Caribou Herd has become a conservation concern[rdquo] leading to a 90% reduction in hunting permits issued in recent years.14 (14 Id.)

The draft plan contains no Standards and Guidelines for Caribou Management. Given the precipitous population decline and stated conservation concern for the Kenai Mountains Caribou Herd, the FEIS should further assess and document known or potential causes for this decline. The Forest Service should adopt appropriate Standards and Guidelines and consider this caribou herd for inclusion on the SCC list.

1.

1. Other Species Previously Identified as Having a Viability Concern

The 2002 Forest Plan identified the following species as having [ldquo]potential concerns for viability or distribution[rdquo] on the Chugach National Forest:15 (15 2002 Forest Plan at 2-11.)

Montague Island hoary marmot
Dusky Canada goose

Wolverine Brown bear

Steller sea lion Black oystercatcher Gray wolf

Northern red-backed vole Montague Island tundra vole

The draft plan identifies no viability or distribution concern for these species except dusky Canada goose and Steller sea lion. There is no rationale presented for why there are no longer viability concerns for the gray wolf, wolverine, and northern red-backed vole.

Gray wolves receive very minimal discussion in the DEIS and none in the Forest Plan. The DEIS notes that wolves were considered extirpated from the Kenai Peninsula by 1915 due to unregulated hunting and trapping.¹⁶ (16 DEIS at 370.) The DEIS concludes that wolves were not observed again until the 1960s, with hunting and trapping resuming in 1974 and managers then assuming that wolves occupied most available habitat.¹⁷ (17 Id.) It seems unlikely that a 1974 managerial assumption about wolves would constitute the best available science in 2018.

The presence of wolverines on the forest is noted several times in the DEIS, but there is no discussion of the conservation status of wolverines and no explanation for why there is no longer a viability concern for them. The DEIS doesn't mention the northern red-backed vole. The FEIS should assess and alert the reader to the best available science regarding these species and explain why there is no longer a conservation concern for them on the CNF.

Regarding Steller sea lions, which are listed as threatened under the Endangered Species Act, it is appropriate for the plan to provide conditions that support the recovery of the species. To that end, Prince William Sound Geographic Area; Fish, Wildlife, and Habitats Desired Condition 4 should specify those necessary conditions. It is not clear if those conditions are simply the prohibitions on management and authorized activities within 3,000 feet of critical habitat found in the At-risk Species Habitat Management standard on p. 67 of the draft plan.

Similarly, we concur with the Forest Service and National Marine Fisheries Service that increasing public use of the Twentymile River mouth area creates a potential conservation concern for listed Cook Inlet beluga whales. Although the Forest Service doesn't directly manage fishing or boating, it does manage recreational uses, and should be an active partner in ensuring conditions that support the recovery of belugas where Forest lands include or adjoin areas important for that recovery. The forest plan should provide a desired condition for recreational activity and resulting impacts to belugas in the Twentymile area.

1.

1. Focal species

We recommend that salmon and other members of the salmon family be added as focal species for monitoring the ecological integrity of aquatic systems on the forest. Designating them as such would be consistent with the assessment (p. 40):

This evaluation is based on using fish as an indicator of aquatic ecosystem character and function. The underlying assumption is that the condition of primary fish species can be informative of the overall condition of the aquatic ecosystem where they occur (Irvine & Riddell, 2007). The primary advantage of using this approach is that data of sufficient detail and scope were readily available making it possible to make these classifications with some confidence for most of the Chugach National Forest.

Monitoring salmonids as focal species would contribute to an evaluation of the plan's effectiveness in having [ldquo]minimal effects on aquatic[rdquo] systems (p. 14), sustaining [ldquo]self-supporting populations of native aquatic[rdquo] fish (p. 16), retaining aquatic ecosystem adaptive capacity and connectivity (p. 16), and many other aquatic desired conditions. Monitoring salmonids as focal species would also further stated research objectives on the Forest, including the opportunity to study the effects of climate change on aquatic ecosystems (p. 3).

III.

Climate Change

The 2012 Planning Rule established a planning framework with the stated intent [ldquo]to create a responsive planning process that informs integrated resource management and allows the Forest Service to adapt to changing conditions, including climate change, and improve management based on new information and monitoring.[rdquo]18 (1836 CFR [sect] 219.5) The rule further states that, in providing for ecological sustainability and ecosystem integrity, [ldquo]The plan must include plan components, including standards or guidelines, to maintain or restore the ecological integrity of terrestrial and aquatic ecosystems and watersheds in the plan area . . .taking into account. . . (iv) System drivers, including dominant ecological processes, disturbance regimes, and stressors, such as natural succession, wildland fire, invasive species, and climate change; and the ability of terrestrial and aquatic ecosystems on the plan area to adapt to change.[rdquo]19 (19 36 CFR [sect] 219.8(a)(1)) The supplementary information to the Planning Rule, which provides background and context, indicates that [ldquo][The 2012 Planning Rule] was also developed to ensure that plans are consistent with and complement existing, related Agency policies that guide management of resources on the National Forest System (NFS), such as the Climate Change Scorecard . . .[rdquo]20 (20 77 Fed. Reg. 21162) Defenders of Wildlife is particularly interested in ensuring that national forests are fully engaging in the Climate Change Performance

Scorecard's [ldquo]Dimension 3: Adaptation [mdash] assess impacts of climate change and manage change.[rdquo]21 (21 <https://www.fs.fed.us/climatechange/advisor/scorecard/scorecard-guidance-08-2011.pdf>) Adaptation covers three of the ten elements of the Scorecard: #6: Assessing Vulnerability, #7 Adaptation Actions, and #8 Monitoring.

In our view, the Chugach National Forest has done a very good job of addressing #6 with its publication

of the [ldquo]Climate Change Vulnerability Assessment for the Chugach National Forest and the Kenai

Peninsula.[rdquo]22 (22 Hayward et al. 2017. PNW-GTR-950. <https://www.fs.usda.gov/treesearch/pubs/54139>)

This detailed, science-based document assesses the impacts of climate change on snow and ice, seascapes, salmon, vegetation, and a selection of mammal species. The Draft Forest Plan itself addresses #8 of the Scorecard, with a monitoring question and four indicators to measure changes in the plan area resulting from climate change and other stressors.23 (23 Chugach NF DLMP, page 89.) Conspicuously absent, however, are any elements whatsoever to address #7: none of the Plan's Standards and Guidelines are clearly

connected to, or explicitly support, the Plan's desired conditions of climate change resilience, which are

articulated for forests and for the Copper River Delta.

Desired conditions for climate resiliency could also be improved. For instance, in the Kenai Geographic Area there is a desire to have forest composition, structure and function resilient to climate change and distributed in seral stages that are consistent with the natural range of variation. It is not clear what those resilient and adaptive structural and compositional characteristics are. The absence of this information in the plan would seem to make it difficult to plan and implement forest resiliency and adaptation actions on the Kenai. It is not appropriate to determine those plan-level required desired conditions at the project level; the measurable parameters for forest resiliency and adaptation should be in the plan.

Similarly, there is a desired condition that the wetlands of the Copper River Delta will have sufficient resilience to accommodate climate change stressors (p. 22). The plan assumes that the current condition is resilient and adaptive, but without measurable parameters of climate resiliency, how will we know if the system is suffering from climate stress?

There is a very important management approach on p. 47 of the draft plan:

Support science-based land management by identifying and coordinating research proposals with Forest Service research stations and others to help inform actions about species of conservation concern, management activities, and potential climate change impacts to habitat productivity and resiliency, public use patterns, and infrastructure assets within the national forest.

This is good plan direction, but the plan should be built so that those research questions can be answered to inform land management. To investigate climate change impacts on habitat productivity and resiliency, there should be measurable conditions for those values. How will researchers evaluate the plan's effectiveness in adapting to climate change impacts and achieving desired resiliency? This is not something that should occur outside of the planning process. This is related to the plan monitoring program which outlines measurable indicators for evaluating climate impacts on ecosystems. Is there a reason why measurable conditions for ecosystem resiliency cannot be articulated within the plan?

Additional indicators should be added that alert managers to changes in ecosystem condition that may represent negative effects of climate stress that could be exacerbated by management actions (or inactions). Defenders stands ready to collaborate with the Forest on the development and implementation of a climate adaptation

strategy.

We strongly encourage the Chugach National Forest to use the forest planning process as a way to explore various options to respond to climate change, which, as described in the publication

["Responding to Climate Change in National Forests: A Guidebook for Developing Adaptation Options,"] (Peterson et al. 2011. PNW-GTR-855. https://www.fs.fed.us/pnw/pubs/pnw_gtr855.pdf) include promoting resistance, developing resilience, assisting response, and realigning highly disturbed ecosystems. The Forest Service has already developed detailed approaches to adapting to climate change for Olympic National Forest (Halofsky et al. 2011. PNW-GTR-844. https://www.fs.fed.us/pnw/pubs/pnw_gtr844.pdf) and for the Northwoods of Wisconsin (Swanston & Janowiak 2012. GTR-NRS-87. https://www.nrs.fs.fed.us/pubs/gtr/gtr_nrs87.pdf) We recommend that the Chugach develop a similar set of adaptation options and to incorporate these into plan components.

Thank you for your consideration of these comments. We look forward to continued collaboration with you to protect the treasured public resources found on the Chugach National Forest.