12-4-2018

Keith Lannom, Forest Supervisor
Payette National Forest
500 N. Mission Street, Building 2
McCall, Idaho 83638
Submitted via email to: comments-intermtn-payette@fs.fed.us

Re: Granite Meadows Project – Scoping

Dear Mr. Lannom:

WildEarth Guardians respectfully submits these comments to the U.S. Forest Service concerning the scope of the agency's analysis under the National Environmental Policy Act (NEPA) of the Granite Meadows Project across approximately 83,000 acres, of which roughly 70,000 acres are on National Forest System (NFS) lands within the New Meadows and McCall Ranger Districts on the Payette National Forest. The landscape-scale project includes a number of activities requiring rigorous environmental analysis and includes vegetative treatments (commercial, non-commercial, prescribed burning, and associated actions); watershed improvement and restoration treatments; and recreation improvements. Additionally, the project proposes to use livestock grazing as a means to reduce wildland fire risk. *See* 83 Fed. Reg. 54,702 (Oct. 31, 2018). Please add our name and organization to the contact list to receive any future public notices regarding this project.

We are very encouraged to see the Payette National Forest considering watershed improvement and restoration treatments within the project area, especially within priority subwatersheds as there is a significant need to address the many factors that continue to degrade their ecological integrity. In general, we support projects that improve overall ecosystem function. This is especially true for the plan components that seek to restore and improve wildlife habitat for species of concern and Endangered Species Act (ESA)-listed species, based on the most recent science, to reduce overall road density by returning expensive and deteriorating forest roads to the wild, and to restore fish habitat connectivity across the project area. We strongly support the agency's approach to prepare an environmental impact statement (EIS), especially in regards to specific proposed actions as outlined below.

I. The Forest Service should fully consider the Payette National Forest's travel analysis report, identify the minimum road system for the project area, and identify more unneeded roads to prioritize for decommissioning or other uses.

The Forest Service faces many challenges with its vastly oversized, under-maintained, and unaffordable road system. The impacts from roads to water, fish, wildlife, and ecosystems are

tremendous and well documented in scientific literature. The Payette National Forest is no exception, with many miles of system roads, the required maintenance of which exceeds annual maintenance costs. To address its unsustainable and deteriorating road system, the Forest Service promulgated the Roads Rule (referred to as "subpart A") in 2001. 66 Fed. Reg. 3206 (Jan. 12, 2001); 36 C.F.R. part 212, subpart A. The Roads Rule created two important obligations for the agency. One obligation is to identify the minimum road system needed for safe and efficient travel and for the protection, management, and use of National Forest system lands. *Id.* § 212.5(b)(1). Another obligation is to identify unneeded roads to prioritize for decommissioning or to be considered for other uses. 36 C.F.R. § 212.5(b)(2).

a. We support the Forest Service's efforts to create a resilient future road network.

Guardians applauds the Payette National Forest's approach of using the travel analysis process to establish a minimum road system that will, "address the need to reduce road related negative effects to resources... such as riparian function, elk security, and fish habitat." *See* McCall and New Meadows Ranger Districts, Payette National Forest, *Description of the Proposed Action for the Granite Meadows Project* (Oct. 2018) (hereafter, "Description"), page 4.

Identifying a resilient future road network is one of the most important endeavors the Forest Service can undertake to restore aquatic systems and wildlife habitat, facilitate adaptation to climate change, ensure reliable recreational access, and operate within budgetary constraints. And it is a win-win-win approach: (1) it's a win for the Forest Service's budget, closing the gap between large maintenance needs and drastically declining funding through congressional appropriations; (2) it's a win for wildlife and natural resources because it reduces negative impacts from the forest road system; and (3) it's a win for the public because removing unneeded roads from the landscape allows the agency to focus its limited resources on the roads we all use, *improving* public access across the forest and helping ensure roads withstand strong storms.

We are very encouraged to see the Forest Service considering the Payette's road system on a landscape-scale. We strongly support a thoughtful, strategic approach to improving public access to the forest, reducing negative impacts from forest roads to water quality and aquatic habitats, and improving watersheds and forest resiliency by returning expensive, deteriorating, and seldom used forest roads to the wild.

b. Explain how the travel analysis report and list of unneeded roads informed identification of the minimum road system in the NEPA analysis.

It is encouraging to see the Payette National Forest utilizing its travel analysis report, and follow direction under subpart A is to consider the applicable portions for identifying and implementing the minimum road system.[1] National guidance directs this to happen through analysis of site-specific

[1] *See* Memorandum from Leslie Weldon to Regional Foresters *et al.* on Travel Management, Implementation of 36 CFR, Part 212, Subpart A (Mar. 29, 2012), page 2 ("The next step in identification of the [minimum road system] is to use the travel analysis report to develop proposed actions to identify the [minimum road system] . . . at the scale of a 6th code subwatershed or larger.") (Attachment A).

projects of the appropriate geographic size under NEPA.[2] Here, we support the Forest Service's reliance on the travel analysis process to develop the proposed road treatments. Given the Forest Service is considering changes across 70,000 acres of NFS lands that include a large number of miles of roads, this is the perfect opportunity for the Forest Service to utilize its travel analysis report and to identify and begin implementing the minimum road system. Attachment A at 2.

The Forest Service explains the Granite Meadows Interdisciplinary (ID) Team relied on both the forest-wide and district level travel analyses to develop the proposed road management actions. The *Payette National Forest-wide Travel Analysis Report* (Sept. 2015) (hereafter, "Payette NF TAR") provides the following key results and findings:

- 240 miles or 8 percent of roads in the current system have been assessed to have a greater risk than benefit and should be considered for decommissioning.
- 151 miles or 5 percent of roads in the current system have been assessed to have low benefit and low risk and should be considered for closure or conversion to trail, or mitigated to reduce resource risk.
- 980 miles or 33 percent of the current system are roads with medium benefit and require further review at the project level to make a recommendation.
- 1,597 miles or 54 percent of the current system are roads with high to medium benefits and should be considered for continued routine maintenance, additional maintenance to mitigate resource risk, or used only for administrative needs

(Payette NF TAR, p. vii)

In assessing the road system under various alternatives, the EIS should fully explain how the proposed road treatments in the Granite Meadows Projects incorporates these key results and findings. Specifically, it should list how many road miles fall within each category, and evaluate how the proposed road treatments will achieve the project's objective, "... to reduce long-term maintenance costs, improve elk security habitat (Forest Plan, Appendix E), reduce overall road density and road-related impacts to water quality and fish habitat, improve habitat for terrestrial and aquatic species, and improve long-term soil productivity." Description at 9.

The Forest Service should assess its proposed road actions in relation to the risks and benefits analysis in its forest-wide and district level travel analysis reports, as well as the factors for a minimum road system, with the goal of minimizing adverse environmental impacts. To the extent that any of the alternatives in the EIS differ from what is recommended in the travel analysis reports, the Forest Service should explain that inconsistency in the EIS. *See, e.g.*, *Smiley v. Citibank*, 517 U.S. 735 (1996) ("Sudden and unexplained change . . . or change that does not take account of legitimate reliance on prior interpretation . . . may be 'arbitrary, capricious [or] an abuse of discretion") (internal citations omitted).

The Forest Service states that decommissioning 30-35 miles of NFS roads would establish the minimum road system in the project area. Description at 8. The EIS should fully disclose whether

[2] *Id.* at 2 (directing forests to "analyze the proposed action and alternatives in terms of whether, per 36 CFR 212.5(b)(1), the resulting [road] system is needed"); Memorandum from Leslie Weldon to Regional Foresters on Travel Analysis Reports, Subpart A – Data Management (Sept. 19, 2016) (Attachment B).

that system meets the factors that make up a minimum road system, as defined by the Forest Service's own regulations. The rules define the minimum road system as that needed to:

- "meet resource and other management objectives adopted in the relevant land and resource management plan";
- "meet applicable statutory and regulatory requirements";
- "reflect long-term funding expectations"; and
- "ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance."

36 C.F.R. §212.5(b)(1).

c. Consider closing or decommissioning more miles of roads.

Subpart A directs the agency to "identify the roads on lands under Forest Service jurisdiction that are no longer needed," and therefore should be closed or decommissioned.[3] While we strongly support the Forest Service's proposal to decommission 30-35 miles of system roads, we also urge the agency to further identify decommissioning opportunities. Based on current natural resource conditions, assessed risks from the existing road network, road densities across the landscape, the agency's limited resources, and long-term funding expectations, we believe additional decommissioning or closures are warranted. This is especially true given the Payette NF TAR lists 980 miles as only providing medium benefits and requiring site-specific analysis to determine their need as part of the minimum road system. The Forest Service should decommission any high-risk road or explain the need for such a road, how the Forest Service will mitigate those risks and its capacity to do so under current and future budget projections. The agency should also provide this explanation for any medium risk road retained in the project area.

The Forest Service explains the following:

> Within the Brown Creek drainage, a tributary to Hard Creek which is an Aquatic Conservation Strategy (ACS) priority subwatershed (USDA Forest Service 2003), approximately 5 miles of NFS road would be decommissioned, reducing NFS road density. NFS road decommissioning and unauthorized route restoration is designed to improve the Brown Creek drainage of the ACS priority subwatershed toward the desired condition. The Mud Creek and Goose Creek subwatersheds are identified as functioning at unacceptable risk (FUR) under the WCF, and would also be moved toward the desired conditions by decommissioning NFS roads and additional unauthorized routes, reducing overall road density and road-related effects.

(Description at 9)[4]

Given the Watershed Condition Framework rankings, and the fact that each of these watersheds have poor ratings for road and trail conditions, there is a need to maximize road decommissioning in

[3] 36 C.F.R. § 212.5(b)(2). The rule applies to *all* roads, not just National Forest System roads. *See Center for Sierra Nevada v. U.S. Forest Service*, 832 F. Supp. 2d 1138, 1155 (E.D. Cal. 2011) ("The court agrees that during the Subpart A analysis the Forest Service will need to evaluate all roads, including any roads previously designated as open under subpart B, for decommissioning.").

[4] It is important to note that Hard Creek is also functioning at risk (Class 2). Description at 18.

order to improve conditions. However, the Forest Service proposes only 5 miles within the Hard Creek subwatershed and the Description lacks any specific measure for the number of road miles proposed for decommissioning in the Mud and Goose Creek watersheds. The EIS must disclose current open and total road densities in these watersheds and the project area as a whole. We also urge the EIS include total open route densities in order to incorporate the fact that unauthorized routes contribute to degraded watershed conditions and reduce wildlife habitat effectiveness.

As forest road users and conservationists, we understand that a strategic reduction in road miles does not necessarily equate to a loss of access to the forest. Some roads are already functionally closed due to lack of use, natural vegetation growth, etc. Other roads receive limited use and are costly to maintain. Resources can be better spent on roads providing significant access than to spread resources thinly to all roads. This is why we support the careful analysis and decision to decommission or close more road miles, to bring the project area closer to desired conditions in the 2003 Payette Forest Plan and 2011 Watershed Condition Framework.

II. The Forest Service should prepare a robust environmental analysis under NEPA.

The Forest Service should prepare a robust environmental analysis of the Granite Meadows Project, ensuring that it takes NEPA's required "hard look." The agency may not ignore topics if the information is uncertain or unknown. Where information is lacking or uncertain, the Forest Service must make clear that the information is lacking, the relevance of the information to the evaluation of foreseeable significant adverse effects, summarize the existing science, and provide its own evaluation based on theoretical approaches. 40 C.F.R. § 1502.22.

a. The Forest Service should clearly articulate the statement of purpose to include its duty to identify the minimum road system, and provide support for the claimed need.

The Forest Service states the purpose of this project is to, *inter alia*:

A. Move vegetation toward desired conditions defined in the Forest Plan with an emphasis on improving wildlife habitat; reducing the risk of uncharacteristic and undesirable wildland fire; returning fire to the ecosystem; promoting the development of large tree forest structures mixed with a mosaic of size classes; improving growth, maintaining and promoting seral species composition (e.g., quaking aspen, whitebark pine, western larch, ponderosa pine, and Douglas-fir), and increasing resiliency to insects, disease, and fire.
B. Support the development of fireadapted rural communities.
C. Provide for a safe, sustainable and efficient NFS transportation network for administration, utilization, and protection of NFS lands, and reduce road-related negative effects to resources.
D. Move subwatersheds within the project area toward the desired conditions for soil, water, riparian, and aquatic resources.
E. Implement site-specific streambank and wetland restoration activities where stream channels, wetlands, or riparian areas are in a degraded condition.
F. Manage recreation use by improving trails, addressing unauthorized trails, improving other recreation infrastructure, and thus improve soil and water conditions while also minimizing the potential for conflicts between users, and addressing the risk to forest users.

G. Contribute to the economic vitality of the communities adjacent to the Payette National Forest through improvements to recreational opportunities, timber sales, and other removals of forest products, which also fosters a resilient, adaptive ecosystem to mitigate wildfire risk and strengthen communities.

83 Fed. Reg. at 54703.

Among others, the agency explains there is a need to reduce road-related negative effects to resources with a focus on riparian function, elk security, and fish habitat, as well as other road related impacts. Description at 4. We applaud the Forest Service for expressly including the need to reduce adverse ecological effects from its overburdened road system. Given the numerous associated harmful impacts a restoration project like this necessarily should address the road system.

In addition to achieving the desired conditions set forth in the 2003 Payette Forest Plan and the 2011 Watershed Condition Framework, the Forest Service should shape the project's purpose and need statement according to applicable statutory and regulatory requirements. When the agency takes an action "pursuant to a specific statute, the statutory objectives of the project serve as a guide by which to determine the reasonableness of objectives outlined in an EIS." *Westlands Water Dist. v. U.S. Dept. of Interior,* 376 F.3d 853, 866 (9th Cir. 2004). Under the 2001 Roads Rule, the Forest Service has a substantive duty to address its over-sized road system. *See* 36 C.F.R. § 212.5. This underlying substantive duty should inform the scope of the agency's NEPA analysis. After more than 15 years since finalizing the subpart A rules, the Forest Service can no longer delay in addressing its duty to create a fiscally and environmentally sustainable road system.

b. The Forest Service should accurately define the official road network as the baseline for the NEPA analysis.

The baseline and no-action alternative can, and sometimes do differ.[5] Analysis of the road system in this project area should recognize and build on those distinctions. Current management direction does not compel the Forest Service to recognize decommissioned roads and unauthorized roads as part of the official road system. But disclosure of the actual number and location of decommissioned routes and unauthorized routes on the landscape, as well as the impacts of those routes, is a necessary component of the no-action alternative that should be disclosed to inform meaningful public comment. An assessment of the no-action alternative should therefore be separate and distinct from the identification of the baseline (the official open road system).

c. The Forest Service should consider a broad array of impacts related to forest roads in its NEPA analysis.

NEPA requires Forest Service to "[e]ncourage and facilitate public involvement in decisions which affect the quality of the human environment." 40 C.F.R. § 1500.2(d). A critical part of this obligation is presenting data and analysis in a manner that will enable the public to thoroughly review and understand the analysis of environmental consequences. NEPA procedures must insure that

[5] *See, e.g.*, FSH 1909.15, 14.2; Council on Environmental Quality's (CEQ) Forty Most Asked Questions (1981), #3 (explaining "[t]here are two distinct interpretations of 'no action'"; one is "'no change' from current management direction or level of management intensity," and the other is if "the proposed activity would not take place").

environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of high quality. Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA. Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail. 40 C.F.R. § 1500.1(b). The Data Quality Act expands on this obligation, requiring that influential scientific information use "best available science and supporting studies conducted in accordance with sound and objective scientific practices." Treasury and General Government Appropriations Act for Fiscal Year 2001, Pub.L. No. 106-554, § 515.

Site-specific Analysis

We are pleased that the Forest Service intends to complete an EIS for this project. A project of this size and scope clearly contemplates significant effects that are best analyzed in an EIS. However, the Forest Service must conduct site-specific analysis as a part of the DEIS. This includes explicitly delineating where logging will occur, what type of logging will occur where, where roads activities will be conducted (including maintenance, construction of temporary or new roads, reconstruction of closed roads, etc.), and the resulting impacts of such activity on important forest resources.

NEPA requires the hard look assessment take place at the site-specific level if there are no additional NEPA processes yet to occur in the future to fully implement the project and the environmental impacts are reasonably foreseeable. Specifically, NEPA requires the Forest Service to disclose and analyze the direct, indirect, and cumulative impacts and consequences of its activities. 40 C.F.R. §§ 1502.16(a), 1502.16(b), 1508.25(c), 1508.27(b)(7).

Here, site-specific analysis is crucial. For example, the Forest Service states that, "road closures would be strategically located to maximize effectiveness," but lacks any mention of methods to ensure the effectiveness of such closures. Description at 9. For unauthorized routes not needed for future management, the Forest Service says it will evaluate them for "some level" of restoration treatments. *Id.* The Forest Service also explains that it will explore opportunities to use livestock grazing to reduce fine fuels. Description at 7. At the same time, the agency acknowledges livestock grazing historically contributed to altered forest structure, and degraded watershed conditions. Description at 5 and 18. The EIS must provide analysis demonstrating the agency's ability to effectively implement closures, restore unauthorized routes, and ensure "targeted" livestock grazing does not further degrade ecological conditions.

Impacts from Forest Roads

The best available science shows that forest roads have significant adverse impacts on forest resources. A 2014 literature review from The Wilderness Society surveys the extensive and best available scientific literature—including the Forest Service's General Technical Report synthesizing the scientific information on forest roads (Gucinski 2001)—on a wide range of road-related impacts to ecosystem processes and integrity on National Forest lands. *See* The Wilderness Society, *Transportation Infrastructure and Access on National Forests and Grasslands: A Literature Review* (May 2014) (Attachment C). Erosion, compaction, and other alterations in forest geomorphology and hydrology associated with roads seriously impair water quality and aquatic species viability. Roads disturb and

fragment wildlife habitat, altering species distribution, interfering with critical life functions such as feeding, breeding, and nesting, and resulting in loss of biodiversity. Roads facilitate increased human intrusion into sensitive areas, resulting in poaching of rare plants and animals, human-ignited wildfires, introduction of exotic species, and damage to archaeological resources. In fact, much of this project focuses on reducing wildland fire risk, but makes no mention of the intersection between roads and fire ignitions or fire behavior. The EIS must disclose how road densities can change micro-climates and alter fire behavior in comparison to roadless conditions.

Roads often contribute to degraded baseline conditions in watersheds containing bull trout. Roads are a primary source of sediment impacts to developed watersheds. Accumulation of fine sediment is detrimental to bull trout habitat. Lee et al. (1997) found a pattern of decreasing strong populations of bull trout with increasing road density. Sediment delivered to streams is greatest in riparian areas where roads cross the streams. Fords and approaches to the crossings deliver sediment directly to streams. Culverts can produce a large amount of sediment if the culvert plugs and fails. Travel management decisions affecting roads and trails are most likely to affect substrate embeddedness[6] and stream bank condition.[7] Plus roads and trails paralleling streams can interfere with large wood reaching the stream and cause increased erosion and decreased stream bank condition.

The agency proposes to improve fish passage and hydrologic activity on five road-crossings. Description at 9. However, the agency does not disclose the number of fish passages in need of improvement within the project area. As noted above, site-specific information as to the actual number of crossings over fish-bearing streams will be essential to fully understanding the baseline conditions and likely impacts of the proposed action. Such analysis should also quantify the actual benefit to overall fish passage in the project area and toward improving Watershed Condition Class ratings.

Temporary Roads

The Forest Service proposes to use temporary roads as part of the project. Description at 7. During the project, however, and for an additional 10 years after completion of the project, the temporary roads will continue to have very real impacts on the landscape. For example, temporary roads will continue to allow for harassment of wildlife, littering, fires, invasive plant distribution, and negative impacts to aquatic and riparian habitat, as well as the fish that depend on that habitat.

- What assurances does the Forest Service provide that these roads will be used for 1 year or less, and that all temporary roads are in fact decommissioned once logging activities are complete?
- How will this information be tracked, and will it be available to the public?

The agency must consider the effects of its proposal to construct temporary roads when combined with the effects of its minimum road system. It must also consider how construction of the proposed temporary roads will detract from the purpose of subpart A of the agency's own rules, to

[6] Which can be measured as change in total acreage open to motorized use, based on the assumption that embeddedness is related to the total area susceptible to erosion.
[7] Which can be measured as an inverse of stream crossings.

"identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of the National Forest System lands." 36 C.F.R. § 212.5(b). This is especially true if the Forest Service fails to provide assurances that the proposed temporary roads will in fact be closed within 10 years of completion of the relevant project. After temporary roads are no longer needed, we strongly encourage the Forest Service to decommission them within one year, instead of keeping them on the landscape.

Unauthorized Routes

We strongly support decommissioning or closing all unauthorized routes, and urge they not be added to the NFS road or trail system as proposed. Description at 9-10. The agency states it proposes to restore 50-75 miles of unauthorized routes in the project area Description at 9. The agency should increase this number to include all user-created trails and unauthorized roads. The continuing presence of user-created routes on the landscape, certainly known to those who created them, continues to allow harassment of wildlife, fragmentation of wildlife habitat, littering, fires and invasive plant distribution all while contributing to the degradation of fish habitat and riparian areas . The agency must also consider the cumulative impacts suffered by the landscape.

Climate Change and Forest Roads

The Forest Service should consider the impacts of climate change and the cumulative impacts resulting from the project and climate change. Pursuant to final guidance issued by the Council on Environmental Quality (CEQ) on August 1, 2016,[8] all federal projects should consider:

(1) The potential effects of a proposed action on climate change as indicated by assessing greenhouse gas (GHG) emissions (e.g., to include, where applicable, carbon sequestration); and,
(2) The effects of climate change on a proposed action and its environmental impacts.

CEQ's 2016 final guidance recommends agencies quantify a proposed agency action's projected direct and indirect GHG emissions, taking into account available data and GHG quantification tools suitable for the proposed agency action. It suggests agencies use projected GHG emissions as a proxy for assessing potential climate change effects. And it recommends that where an agency does not quantify an action's projected GHG emissions because tools, methodologies, or data inputs are not reasonably available to support calculations for a quantitative analysis, it should include a qualitative analysis in the NEPA document and explain the basis for determining that quantification is not reasonably available.

Climate change intensifies the impacts associated with roads. The Forest Service should include existing and reasonably foreseeable climate change impacts as part of the affected environment,

[8] *See* Council on Environmental Quality, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (2016) (Attachment E) (noting that "[a]nalyzing a proposed action's GHG emissions and the effects of climate change relevant to a proposed action—*particularly how climate change may change an action's environmental effects*—can provide useful information to decision makers and the public.").

assess them as part of the agency's hard look at impacts, and integrate them into each of the alternatives, including the no action alternative. The Forest Service has a substantive duty under its own Forest Service Manual to establish resilient ecosystems in the face of climate change.[9] The Forest Service should analyze in detail the impact of climate change on forest roads and resources.

Socio-economic Analysis & Social Cost of Carbon

Additionally, the Forest Service must analyze the ecosystem services provided by the natural resources of the project area, how those ecosystem services have changed in recent years as a result various factors including changing climate patterns and fire suppression, and how implementation of the project would impact those ecosystem services. To properly assess this project with an integrated and holistic approach, we recommend the Forest Service use a Total Economic Valuation framework (Peterson and Sorg 1987) to prepare any benefit-cost analysis for the Project.[10] The Forest Service should consider memorandum M-16-01 (October 7, 2015), directing federal agencies to incorporate ecosystem services into their decision-making, including through "monetization" and "ecosystem-services assessment methods" where "an agency's analysis require consideration of costs." M-16-01 at 2.

The Forest Service's socio-economic analysis should analyze the social cost of carbon to assess the project area's existing carbon sequestration value and the predicted or foreseeable net changes to its carbon sequestration capacity as a result of the cumulative impact of climate change and the specific activities that would flow from the proposed action. Executive Order 12,866 directs federal agencies to assess and quantify carbon costs and benefits of regulatory action, including the effects on factors such as the economy, environment, and public health and safety, among others. *See* Exec. Order No. 12,866, 58 Fed. Reg. 51,735 (Sept. 30, 1993).[11] The Ninth Circuit has also ruled that agencies must include the climate benefits of a significant regulatory action in federal cost-benefit analyses:

> [T]he fact that climate change is largely a global phenomenon that includes actions that are outside of [the agency's] control ... does not release the agency from the duty of assessing the effects of its actions on global warming within the context of other actions that also affect global warming.

Ctr. for Biological Diversity v. Natl. Highway Traffic Safety Admin., 538 F.3d 1172, 1217 (9th Cir. 2008) (quotations and citations omitted); *see also Border Power Plant Working Grp. v. U.S. Dep't of Energy*, 260 F. Supp. 2d 997, 1028-29 (S.D. Cal. 2003) (finding agency failure to disclose project's indirect carbon dioxide emissions violates NEPA).

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[9] *See, e.g.*, FSM 2020.2(2) (directing forests to "[r]estore and maintain resilient ecosystems that will have greater capacity to withstand stressors and recover from disturbances, especially those under changing and uncertain environmental conditions and extreme weather events"); FSM 2020.3(4) ("[E]cological restoration should be integrated into resource management programs and projects . . . Primary elements of an integrated approach are identification and elimination or reduction of stressors that degrade or impair ecological integrity.").

[10] *See* June 2015 comments submitted by the Conservation Economics Institute to the U.S. Bureau of Land Management regarding proposed oil and gas rules. See http://www.conservationecon.org/#log/kl7ht

[11] See also Executive Order 13563, 76 Fed. Reg. 3821 (Jan. 18, 2011) (reaffirming the framework of EO 12866 and directing federal agencies to conduct regulatory actions based on the best available science).

d. The Forest Service should consider a reasonable range of alternatives.

The alternatives analysis is the "heart" of NEPA, and therefore "an agency must *on its own initiative* study all alternatives that appear reasonable and appropriate for study at the time, and must also look into other significant alternatives that are called to its attention by other agencies, or by the public during the comment period afforded for that purpose." *Dubois v. Dep't of Agriculture*, 102 F.3d 1273, 1291 (1st Cir. 1996), *quoting Seacoast Anti-Pollution League, v. Nuclear Reg. Comm'n*, 598 F.2d 1221, 1231 (1st Cir. 1979) (emphasis from *Dubois* court) (internal citations omitted). Here, the agency should consider an alternative that would close or decommission more miles of roads. It should also consider whether the road system of each alternative analyzed in detail fits the regulatory definition of a minimum road system.

III. New designations for motorized use must satisfy the minimization criteria.

The Forest Service proposes unspecified changes to its motorized trail system. *See* Description at 9-10. Because these changes are designating new motorized use routes, the Forest Service must demonstrate compliance with the minimization criteria in the record as required by the Executive Orders and Travel Management Rule. Comments at 16-19. 36 C.F.R. § 212.55(b) (requiring the Forest Service to "consider effects on [the listed criteria] *with the objective of minimizing* . . ."). General, project-wide statements about OHV trail designations do not fulfill the agency's substantive duty to comply with the minimization criteria. *WildEarth Guardians v. U.S. Forest Service*, 790 F.3d 920, 931 (9th Cir. 2016) ("What is required is that the Forest Service *document* how it evaluated and applied the data on an *area-by-area basis* with the objective of minimizing impacts as specified in the [Travel Management Rule].") (emphasis added). Rather, the agency should show how it locates the new OHV routes with the objective of minimizing damage to soil, watershed, vegetation, and other natural resources; harassment of wildlife and significant disruption of wildlife habitat; conflicts between different types of uses; and conflicts among different classes of motorized uses.[12] The Forest Service also explains in regards to the oversnow vehicle closure area that this project will "[i]dentify parameters or conditions to inform adaptive management of the closure in collaboration with the Winter Recreation Forum." Description at 10. Any such parameters must include adherence to 36 C.F.R. § 212.55(c).

IV. Ensure compliance with the Clean Water Act and Endangered Species Act.

As part of the analysis in its draft EIS, the Forest Service should ensure compliance with the Clean Water Act (CWA) and the Endangered Species Act (ESA). The CWA requires all federal agencies to comply with water quality standards, including a state's anti-degradation policy. 33 U.S.C. § 1323(a). The Forest Service must ensure that the project will not violate Idaho's water quality standards.

[12] The Wilderness Society, *Achieving Compliance with the Executive Order "Minimization Criteria" for Off-Road Vehicle Use on Federal Public Lands: Background, Case Studies, and Recommendations* (May 2016) (Attachment D) (recommending that when designating ORV trails and areas, an agency actually *minimize* impacts—not just identify or consider them—and show in the record how it did so, and apply a transparent and common-sense methodology for applying the minimization criteria).

In its proposal, the Forest Service does not specifically identify listed or proposed ESA species or critical habitat that exists in the project area. It does mention northern Idaho ground squirrel, bull trout, and bull trout critical habitat. As part of the site-specific information, the Forest Service should disclose these details in the DEIS.

Section 7 of the ESA imposes a substantive obligation on federal agencies to "insure that any action authorized, funded, or carried out by such agency . . . is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of" habitat that has been designated as critical for the species. 16 U.S.C. § 1536(a)(2); *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 524 F.3d 917, 924 (9th Cir. 2008). The Forest Service must consult with the U.S. Fish and Wildlife Service (FWS) under section 7 of the ESA as to the impacts of the project on species listed under the ESA and designated critical habitat. The Forest Service must ensure its proposal to authorize logging that will require use of forest roads and any changes to the motorized trail system will not harm listed wildlife or degrade its critical habitat.

Where a species is proposed for listing, or critical habitat is proposed, the process is different. Section 7(a)(4) of the ESA requires a Federal action agency to conference with the Services if a proposed action is likely to jeopardize a proposed species, or destroy or adversely modify proposed critical habitat. 16 U.S.C. § 1536(a)(4); 50 C.F.R. § 402.10(a). *See also* 50 C.F.R. § 402.02 (defining "[c]onference" as "a process which involves informal discussions between a Federal agency and the Service under section 7(a)(4) of the [ESA] regarding the impact of an action on proposed species or proposed critical habitat and recommendations to minimize or avoid the adverse effects."). The agencies must record any results of a conference. *Id.* at § 401.10(e) ("The conclusions reached during a conference and any recommendations shall be documented by the Service and provided to the Federal agency").

We encourage the Forest Service to be transparent about any consultation process and affirmatively post all consultation documents, including any Forest Service Biological Evaluations or Assessments, any letters seeking concurrence, and any responses or Biological Opinions from FWS. Without these records, we are unable to assess the agency's analysis of impacts to fish and wildlife in light of FWS's expert opinion. Providing this information will allow the public to view these critical documents, and other documents in the project record, without the need to submit a formal Freedom of Information Act request. Without this information being publicly available during the notice and comment period, we are unable to meaningfully comment on the agencies' determinations or analysis.

Conclusion

We look forward to reviewing the Forest Service's analysis in a draft EIS. The Payette's current road system is over-sized and unaffordable. Identifying and implementing a sustainable road network is one of the most important endeavors the Forest Service can undertake to restore aquatic systems and wildlife habitat, facilitate adaptation to climate change, enhance recreation, and lower operating expenses. The proposed road-related activities in this project has the potential to move the Payette towards its goal of improving forest resiliency and sustainability. Expanding decommissioning opportunities and fully restoring unauthorized routes will ensure the agency maximizes this

opportunity to improve watershed conditions and increase the project area's ecological integrity. Such benefits should not be diminished by adding to the motorized trail system or incorporating unauthorized roads into the official road system.

Sincerely,

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Attachments

Attachment A: Memorandum from Leslie Weldon to Regional Foresters *et al.* on Travel Management, Implementation of 36 CFR, Part 212, Subpart A (Mar. 29, 2012).

Attachment B: Memorandum from Leslie Weldon to Regional Foresters on Travel Analysis Reports, Subpart A – Data Management (Sept. 19, 2016).

Attachment C: The Wilderness Society, *Transportation Infrastructure and Access on National Forests and Grasslands: A Literature Review* (May 2014).

Attachment D: The Wilderness Society, *Achieving Compliance with the Executive Order "Minimization Criteria" for Off-Road Vehicle Use on Federal Public Lands: Background, Case Studies, and Recommendations* (May 2016).

Attachment E: Council on Environmental Quality, Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews (2016).

Transportation Infrastructure and Access on National Forests and Grasslands
A Literature Review
May 2014

Introduction

The Forest Service transportation system is very large with 374,883 miles (603,316 km) of system roads and 143,346 miles (230,693 km) of system trails. The system extends broadly across every national forest and grasslands and through a variety of habitats, ecosystems and terrains. An impressive body of scientific literature exists addressing the various effects of roads on the physical, biological and cultural environment – so much so, in the last few decades a new field of "road ecology" has emerged. In recent years, the scientific literature has expanded to address the effects of roads on climate change adaptation and conversely the effects of climate change on roads, as well as the effects of restoring lands occupied by roads on the physical, biological and cultural environments.

The following literature review summarizes the most recent thinking related to the environmental impacts of forest roads and motorized routes and ways to address them. The literature review is divided into three sections that address the environmental effects of transportation infrastructure on forests, climate change and infrastructure, and creating sustainable forest transportation systems.

I. Impacts of Transportation Infrastructure and Access to the Ecological Integrity of Terrestrial and Aquatic Ecosystems and Watersheds

It is well understood that transportation infrastructure and access management impact aquatic and terrestrial environments at multiple scales, and, in general, the more roads and motorized routes the greater the impact. In fact, in the past 20 years or so, scientists having realized the magnitude and breadth of ecological issues related to roads; entire books have been written on the topic, e.g., Forman et al. (2003), and a new scientific field called "road ecology" has emerged. Road ecology research centers have been created including the Western

Transportation Institute at Montana State University and the Road Ecology Center at the University of California - Davis.[1]

Below, we provide a summary of the current understanding on the impacts of roads and access allowed by road networks to terrestrial and aquatic ecosystems, drawing heavily on Gucinski et al. (2000). Other notable recent peer-reviewed literature reviews on roads include Trombulak and Frissell (2000), Switalski et al. (2004), Coffin (2007), Fahrig and Rytwinski (2009), and Robinson et al. (2010). Recent reviews on the impact of motorized recreation include Joslin and Youmans (1999), Gaines et al. (2003), Davenport and Switalski (2006), Ouren et al. (2007), and Switalski and Jones (2012). These peer-reviewed summaries provide additional information to help managers develop more sustainable transportation systems

Impact on geomorphology and hydrology

The construction or presence of forest roads can dramatically change the hydrology and geomorphology of a forest system leading to reductions in the quantity and quality of aquatic habitat. While there are several mechanisms that cause these impacts (Wemple et al. 2001 , Figure 1), most fundamentally, compacted roadbeds reduce rainfall infiltration, intercepting and concentrating water, and providing a ready source of sediment for transport (Wemple et al. 1996, Wemple et al. 2001). In fact, roads contribute more sediment to streams than any other land management activity (Gucinski et al. 2000). Surface erosion rates from roads are typically at least an order of magnitude greater than rates from harvested areas, and three orders of magnitude greater than erosion rates from undisturbed forest soils (Endicott 2008).

[1] See http://www.westerntransportationinstitute.org/research/roadecology and http://roadecology.ucdavis.edu/

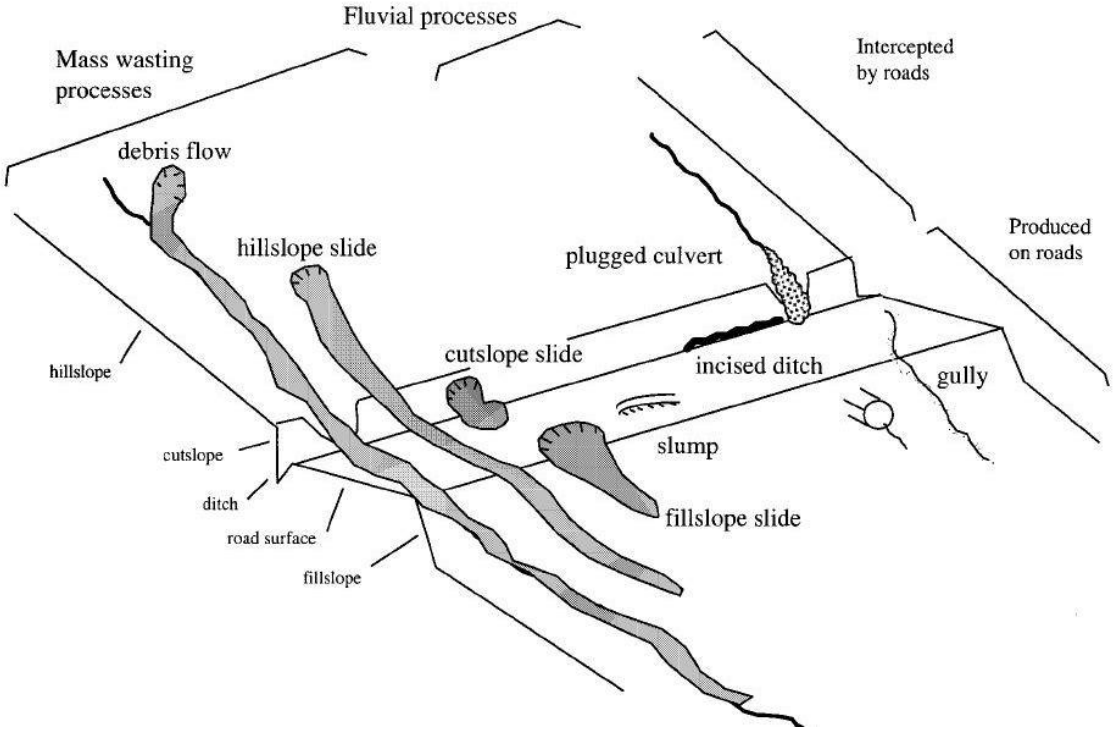

Figure 1: Typology of erosional and depositional features produced by mass-wasting and fluvial processes associate with forest roads (reprinted from Wemple et al. 2001)

Erosion of sediment from roads occurs both chronically and catastrophically. Every time it rains, sediment from the road surface and from cut- and fill-slopes is picked up by rainwater that flows into and on roads (fluvial erosion). The sediment that is entrained in surface flows are often concentrated into road ditches and culverts and directed into streams. The degree of fluvial erosion varies by geology and geography, and increases with increased motorized use (Robichaud et al. 2010). Closed roads produce less sediment, and Foltz et al. (2009) found a significant increase in erosion when closed roads were opened and driven upon.

Roads also precipitate catastrophic failures of road beds and fills (mass wasting) during large storm events leading to massive slugs of sediment moving into waterways (Endicott 2008; Gucinski et al. 2000). This typically occurs when culverts are undersized and cannot handle the volume of water, or they simply become plugged with debris. The saturated roadbed can fail entirely and result in a landslide, or the blocked stream crossing can erode the entire fill down to the original stream channel.

The erosion of road- and trail-related sediment and its subsequent movement into stream systems affects the geomorphology of the drainage system in a number of ways. The magnitude of their effects varies by climate, geology, road age, construction / maintenance practices and storm history. It directly alters channel morphology by embedding larger gravels as well as filling pools. It can also have the opposite effect of increasing peak discharges and scouring channels, which can lead to disconnection of the channel and floodplain, and lowered base flows (Furniss et al. 1991; Joslin and Youmans 1999). The width/depth ratio of the stream changes which then can trigger changes in water temperature, sinuosity and other geomorphic factors important for aquatic species survival (Joslin and Youmans 1999; Trombulak and Frissell 2000).

Roads also can modify flowpaths in the larger drainage network. Roads intercept subsurface flow as well as concentrate surface flow, which results in new flowpaths that otherwise would not exist, and the extension of the drainage network into previously unchannelized portions of the hillslope (Gucinski et al. 2000; Joslin and Youmans 1999). Severe aggradation of sediment at stream structures or confluences can force streams to actually go subsurface or make them too shallow for fish passage (Endicott 2008; Furniss et al. 1991).

Impacts on aquatic habitat and fish

Roads can have dramatic and lasting impacts on fish and aquatic habitat. Increased sedimentation in stream beds has been linked to decreased fry emergence, decreased juvenile densities, loss of winter carrying capacity, and increased predation of fishes, and reductions in macro-invertebrate populations that are a food source to many fish species (Rhodes et al. 1994, Joslin and Youmans 1999, Gucinski et al. 2000, Endicott 2008). On a landscape scale, these effects can add up to: changes in the frequency, timing and magnitude of disturbance to aquatic habitat and changes to aquatic habitat structures (e.g., pools, riffles, spawning gravels and in-channel debris), and conditions (food sources, refugi, and water temperature) (Gucinski et al. 2000).

Roads can also act as barriers to migration (Gucinski et al. 2000). Where roads cross streams, road engineers usually place culverts or bridges. Culverts in particular can and often interfere with sediment transport and channel processes such that the road/stream crossing becomes a barrier for fish and aquatic species movement up and down stream. For instance, a culvert may scour on the downstream side of the crossing, actually forming a waterfall up which fish cannot move. Undersized culverts and bridges can infringe upon the channel or floodplain and trap sediment causing the stream to become too shallow and/or warm such that fish will not migrate past the structure. This is problematic for many aquatic species but especially for anadromous species that must migrate upstream to spawn. Well-known native aquatic species affected by roads include salmon such as coho (*Oncorhynchus kisutch*), chinook (*O. tshawytscha*), and chum (*O. keta*); steelhead (*O. mykiss*); and a variety of trout species including bull trout (*Salvelinus confluentus*) and cutthroat trout (*O. clarki*), as well as other native fishes and amphibians (Endicott 2008).

Impacts on terrestrial habitat and wildlife

Roads and trails impact wildlife through a number of mechanisms including: direct mortality (poaching, hunting/trapping) changes in movement and habitat use patterns (disturbance/avoidance), as well as indirect impacts including alteration of the adjacent habitat and interference with predatory/prey relationships (Wisdom et al. 2000, Trombulak and Frissell 2000). Some of these impacts result from the road itself, and some result from the uses on and around the roads (access). Ultimately, roads have been found to reduce the abundance and distribution of several forest species (Fayrig and Ritwinski 2009, Benítez-López et al. 2010).

Table 1: Road- and recreation trail-associated factors for wide-ranging carnivores (Reprinted from Gaines et al. (2003)[2]

[2] For a list of citations see Gaines et al. (2003)

Focal species	Road-associated factors	Motorized trail-associated factors	Nonmotorized trail-associated factors
Grizzly bear	Poaching	Poaching	Poaching
	Collisions	Negative human interactions	Negative human interactions
	Negative human interactions	Displacement or avoidance	Displacement or avoidance
	Displacement or avoidance		
Lynx	Down log reduction	Disturbance at a specific site	Disturbance at a specific site
	Trapping	Trapping	
	Collisions		
	Disturbance at a specific site		
Gray wolf	Trapping	Trapping	Trapping
	Poaching	Disturbance at a specific site	Disturbance at a specific site
	Collisions		
	Negative human interactions		
	Disturbance at a specific site		
	Displacement or avoidance		
Wolverine	Down log reduction	Trapping	Trapping
	Trapping	Disturbance at a specific site	Disturbance at a specific site
	Disturbance at a specific site		
	Collisions		

Direct mortality and disturbance from road and trail use impacts many different types of species. For example, wide-ranging carnivores can be significantly impacted by a number of factors including trapping, poaching, collisions, negative human interactions, disturbance and displacement (Gaines et al. 2003, Table 1). Hunted game species such as elk (*Cervus canadensis*), become more vulnerable from access allowed by roads and motorized trails resulting in a reduction in effective habitat among other impacts (Rowland et al. 2005, Switalski and Jones 2012). Slow-moving migratory animals such as amphibians, and reptiles who use roads to regulate temperature are also vulnerable (Gucinski et al. 2000, Brehme et al. 2013).

Habitat alteration is a significant consequence of roads as well. At the landscape scale, roads fragment habitat blocks into smaller patches that may not be able to support successfully interior forest species. Smaller habitat patches also results in diminished genetic variability, increased inbreeding, and at times local extinctions (Gucinski et al. 2000; Trombulak and Frissell 2000). Roads also change the composition and structure of ecosystems along buffer zones, called edge-affected zones. The width of edge-affected zones varies by what metric is being discussed; however, researchers have documented road-avoidance zones a kilometer or more away from a road (Table 2). In heavily roaded landscapes, edge-affected acres can be a significant fraction of total acres. For example, in a landscape area where the road density is 3 mi/mi^2 (not an uncommon road density in national forests) and where the edge-affected zone is estimated to be 500 ft from the center of the road to each side, the edge-affected zone is 56% of the total acreage.

Table 2: A summary of some documented road-avoidance zones for various species (adapted from Robinson et al. 2010).

Species	Avoidance zone m (ft)	Type of disturbance	Reference
Snakes	650 (2133)	Forestry roads	Bowles (1997)
Salamander	35 (115)	Narrow forestry road, light traffic	Semlitsch (2003)
Woodland birds	150 (492)	Unpaved roads	Ortega and Capen (2002)
Spotted owl	400 (1312)	Forestry roads, light traffic	Wasser et al. (1997)
Marten	<100 (<328)	Any forest opening	Hargis et al. (1999)
Elk	500–1000 (1640-3281)	Logging roads, light traffic	Edge and Marcum (1985)
	100–300 (328-984)	Mountain roads depending on traffic volume	Rost and Bailey (1979)
Grizzly bear	3000 (9840)	Fall	Mattson et al. (1996)
	500 (1640)	Spring and summer	
	883 (2897)	Heavily traveled trail	Kasworm and Manley (1990)
	274 (899)	Lightly traveled trail	
	1122 (3681)	Open road	Kasworm and Manley (1990)
	665 (2182)	Closed road	
Black bear	274 (899)	Spring, unpaved roads	Kasworm and Manley (1990)
	914 (2999)	Fall, unpaved roads	

Roads and trails also affect ecosystems and habitats because they are also a major vector of non-native plant and animal species. This can have significant ecological and economic impacts when the invading species are aggressive and can overwhelm or significantly alter native species and systems. In addition, roads can increase harassment, poaching and collisions with vehicles, all of which lead to stress or mortality (Wisdom et al. 2000).

Recent reviews have synthesized the impacts of roads on animal abundance and distribution. Fahrig and Rytwinski (2009) did a complete review of the empirical literature on effects of roads and traffic on animal abundance and distribution looking at 79 studies that addressed 131 species and 30 species groups. They found that the number of documented negative effects of roads on animal abundance outnumbered the number of positive effects by a factor of 5. Amphibians, reptiles, most birds tended to show negative effects. Small mammals generally showed either positive effects or no effect, mid-sized mammals showed either negative effects or no effect, and large mammals showed predominantly negative effects. Benítez-López et al. (2010) conducted a meta-analysis on the effects of roads and infrastructure proximity on mammal and bird populations. They found a significant pattern of avoidance and a reduction in bird and mammal populations in the vicinity of infrastructure.

Road density[3] thresholds for fish and wildlife

[3] We intend the term "road density" to refer to the density all roads within national forests, including system roads, closed roads, non-system roads administered by other jurisdictions (private, county, state), temporary roads and motorized trails. Please see Attachment 2 for the relevant existing scientific information supporting this approach.

It is well documented that beyond specific road density thresholds, certain species will be negatively affected, and some will be extirpated. Most studies that look into the relationship between road density and wildlife focus on the impacts to large endangered carnivores or hunted game species, although high road densities certainly affect other species – for instance, reptiles and amphibians. Gray wolves (*Canis lupus*) in the Great Lakes region and elk in Montana and Idaho have undergone the most long-term and in depth analysis. Forman and Hersperger (1996) found that in order to maintain a naturally functioning landscape with sustained populations of large mammals, road density must be below 0.6 km/km² (1.0 mi/mi²). Several studies have since substantiated their claim (Robinson et al. 2010, Table 3).

A number of studies at broad scales have also shown that higher road densities generally lead to greater impacts to aquatic habitats and fish density (Table 3). Carnefix and Frissell (2009) provide a concise review of studies that correlate cold water fish abundance and road density, and from the cited evidence concluded that "1) no truly "safe" threshold road density exists, but rather negative impacts begin to accrue and be expressed with incursion of the very first road segment; and 2) highly significant impacts (e.g., threat of extirpation of sensitive species) are already apparent at road densities on the order of 0.6 km/km^2 (1.0 mi/mi²) or less" (p. 1).

Table 3: A summary of some road-density thresholds and correlations for terrestrial and aquatic species and ecosystems (reprinted from Robinson et al. 2010).

Species (Location)	Road density (mean, guideline, threshold, correlation)	Reference
Wolf (Minnesota)	0.36 km/km2 (mean road density in primary range); 0.54 km/km^2 (mean road density in peripheral range)	Mech et al. (1988)
Wolf	>0.6 km/km^2 (absent at this density)	Jalkotzy et al. (1997)
Wolf (Northern Great Lakes region)	>0.45 km/km^2 (few packs exist above this threshold); >1.0 km/km^2 (no pack exist above this threshold)	Mladenoff et al. (1995)
Wolf (Wisconsin)	0.63 km/km^2 (increasing due to greater human tolerance	Wydeven et al. (2001)
Wolf, mountain lion (Minnesota, Wisconsin, Michigan)	0.6 km/km^2 (apparent threshold value for a naturally functioning landscape containing sustained populations)	Thiel (1985); van Dyke et al. (1986); Jensen et al. (1986); Mech et al. (1988); Mech (1989)
Elk (Idaho)	1.9 km/km^2 (density standard for habitat effectiveness)	Woodley 2000 cited in Beazley et al. 2004
Elk (Northern US)	1.24 km/km^2 (habitat effectiveness decline by at least 50%)	Lyon (1983)
Elk, bear, wolverine, lynx, and others	0.63 km/km^2 (reduced habitat security and increased mortality)	Wisdom et al. (2000)
Moose (Ontario)	0.2-0.4 km/km2 (threshold for pronounced response)	Beyer et al. (2013)
Grizzly bear (Montana)	>0.6 km/km^2	Mace et al. (1996); Mattson et al. (1996)
Black bear (North Carolina)	>1.25 km/km^2 (open roads); >0.5 km/km2 (logging roads); (interference with use of habitat)	Brody and Pelton (1989)
Black bear	0.25 km/km^2 (road density should not exceed)	Jalkotzy et al. (1997)
Bobcat (Wisconsin)	1.5 km/km^2 (density of all road types in home range)	Jalkotzy et al. (1997)

Large mammals	>0.6 km/km^2 (apparent threshold value for a naturally functioning landscape containing sustained populations)	Forman and Hersperger (1996)
Bull trout (Montana)	Inverse relationship of population and road density	Rieman et al. (1997); Baxter et al. (1999)
Fish populations (Medicine Bow National Forest)	(1) Positive correlation of numbers of culverts and stream crossings and amount of fine sediment in stream channels (2) Negative correlation of fish density and numbers of culverts	Eaglin and Hubert (1993) cited in Gucinski et al. (2001)
Macroinvertebrates	Species richness negatively correlated with an index of road density	McGurk and Fong (1995)
Non-anadromous salmonids (Upper Columbia River basin)	(1) Negative correlation likelihood of spawning and rearing and road density (2) Negative correlation of fish density and road density	Lee et al. (1997)

Where both stream and road densities are high, the incidence of connections between roads and streams can also be expected to be high, resulting in more common and pronounced effects of roads on streams (Gucinski et al. 2000). For example, a study on the Medicine Bow National Forest (WY) found as the number of culverts and stream crossings increased, so did the amount of sediment in stream channels (Eaglin and Hubert 1993). They also found a negative correlation with fish density and the number of culverts. Invertebrate communities can also be impacted. McGurk and Fong (1995) report a negative correlation between an index of road density with macroinvertebrate diversity.

The U.S. Fish and Wildlife Service's Final Rule listing bull trout as threatened (USDI Fish and Wildlife Service 1999) addressed road density, stating:

> "… assessment of the interior Columbia Basin ecosystem revealed that increasing road densities were associated with declines in four non-anadromous salmonid species (bull trout, Yellowstone cutthroat trout, westslope cutthroat trout, and redband trout) within the Columbia River Basin, likely through a variety of factors associated with roads (Quigley & Arbelbide 1997). Bull trout were less likely to use highly roaded basins for spawning and rearing, and if present, were likely to be at lower population levels (Quigley and Arbelbide 1997). Quigley et al. (1996) demonstrated that when average road densities were between 0.4 to 1.1 km/km^2 (0.7 and 1.7 mi/mi^2) on USFS lands, the proportion of subwatersheds supporting "strong" populations of key salmonids dropped substantially. Higher road densities were associated with further declines" (USDI Fish and Wildlife Service 1999, p. 58922).

Anderson et al. (2012) also showed that watershed conditions tend to be best in areas protected from road construction and development. Using the US Forest Service's Watershed Condition Framework assessment data, they showed that National Forest lands that are protected under the Wilderness Act, which provides the strongest safeguards, tend to have the healthiest watersheds. Watersheds in Inventoried Roadless Areas – which are protected from road building and logging by the Roadless Area Conservation Rule – tend to be less healthy than watersheds in designated Wilderness, but they are considerably healthier than watersheds in the managed landscape.

Impacts on other resources

Roads and motorized trails also play a role in affecting wildfire occurrence. Research shows that human-ignited wildfires, which account for more than 90% of fires on national lands, is almost five times more likely in areas with roads (USDA Forest Service 1996a; USDA Forest Service 1998). Furthermore, Baxter (2002) found that off-road vehicles (ORVs) can be a significant source of fire ignitions on forestlands. Roads can affect where and how forests burn and, by extension, the vegetative condition of the forest. See Attachment 1 for more information documenting the relationship between roads and wildfire occurrence.

Finally, access allowed by roads and trails can increase of ORV and motorized use in remote areas threatening archaeological and historic sites. Increased visitation has resulted in intentional and unintentional damage to many cultural sites (USDI Bureau of Land Management 2000, Schiffman 2005).

II. Climate Change and Transportation Infrastructure including the value of roadless areas for climate change adaptation

As climate change impacts grow more profound, forest managers must consider the impacts on the transportation system as well as from the transportation system. In terms of the former, changes in precipitation and hydrologic patterns will strain infrastructure at times to the breaking point resulting in damage to streams, fish habitat, and water quality as well as threats to public safety. In terms of the latter, the fragmenting effect of roads on habitat will impede the movement of species which is a fundamental element of adaptation. Through planning, forest managers can proactively address threats to infrastructure, and can actually enhance forest resilience by removing unneeded roads to create larger patches of connected habitat.

Impact of climate change and roads on transportation infrastructure

It is expected that climate change will be responsible for more extreme weather events, leading to increasing flood severity, more frequent landslides, changing hydrographs (peak, annual mean flows, etc.), and changes in erosion and sedimentation rates and delivery processes. Roads and trails in national forests, if designed by an engineering standard at all, were designed for storms and water flows typical of past decades, and hence may not be designed for the storms in future decades. Hence, climate driven changes may cause transportation infrastructure to malfunction or fail (ASHTO 2012, USDA Forest Service 2010). The likelihood is higher for facilities in high-risk settings—such as rain-on-snow zones, coastal areas, and landscapes with unstable geology (USDA Forest Service 2010).

Forests fragmented by roads will likely demonstrate less resistance and resilience to stressors, like those associated with climate change (Noss 2001). First, the more a forest is fragmented (and therefore the higher the edge/interior ratio), the more the forest loses its inertia characteristic, and becoming less resilient and resistant to climate change. Second, the more a forest is fragmented characterized by isolated patches, the more likely the fragmentation will interfere with the ability of species to track shifting climatic conditions over time and space. Noss (2001) predicts that weedy species with effective dispersal mechanisms might benefit from fragmentation at the expense of native species.

Modifying infrastructure to increase resilience

To prevent or reduce road failures, culvert blow-outs, and other associated hazards, forest managers will need to take a series of actions. These include replacing undersized culverts with larger ones, prioritizing maintenance and upgrades (e.g., installing drivable dips and more outflow structures), and obliterating roads that are no longer needed and pose erosion hazards (USDA Forest Service 2010, USDA Forest Service 2012a, USDA Forest Service 2011, Table 4).

Olympic National Forest has developed a number of documents oriented at oriented at protecting watershed health and species in the face of climate change, including a 2003 travel management strategy and a report entitled Adapting to Climate Change in Olympic National Park and National Forest. In the travel management strategy, Olympic National Forest recommended that 1/3rd of its road system be decommissioned and obliterated (USDA Forest Service 2011a). In addition, the plan called for addressing fish migration barriers in a prioritized and strategic way – most of these are associated with roads. The report calls for road decommissioning, relocation of roads away from streams, enlarging culverts as well as replacing culverts with fish-friendly crossings (USDA Forest Service 2011a, Table 4).

Table 4: Current and expected sensitivities of fish to climate change on the Olympic Peninsula, associated adaptation strategies and action for fisheries and fish habitat management and relevant to transportation management at Olympic National Forest and Olympic National Park (excerpt reprinted from USDA Forest Service 2011a).

Current and expected sensitivites	Adaptation strategies and actions
Changes in habitat quantity and quality	• Implement habitat restoration projects that focus on re-creating watershed processes and functions and that create diverse, resilient habitat.
Increase in culvert failures, fill-slope failures, stream adjacent road failures, and encroachment from stream-adjacent road segments	• Decommission unneeded roads. • Remove sidecast, improve drainage, and increase culvert sizing on remaining roads. • Relocate stream-adjacent roads.
Greater difficulty disconnecting roads from stream channels	• Design more resilient stream crossing structures.
Major changes in quantity and timing of streamflow in transitional watersheds	• Make road and culvert designs more conservative in transitional watersheds to accommodate expected changes.
Decrease in area of headwater streams	• Continue to correct culvert fish passage barriers. • Consider re-prioritizing culvert fish barrier correction projects.
Decrease in habitat quantity and connectivity for species that use headwater streams	• Restore habitat in degraded headwater streams that are expected to retain adequate summer streamflow (ONF).

In December 2012, the USDA Forest Service published a report entitled “Assessing the Vulnerability of Watersheds to Climate Change.” This document reinforces the concept expressed by Olympic National Forest that forest managers need to be proactive in reducing erosion potential from roads:

> "Road improvements were identified as a key action to improve condition and resilience of watersheds on all the pilot Forests. In addition to treatments that reduce erosion, road improvements can reduce the delivery of runoff from road segments to channels, prevent diversion of flow during large events, and restore aquatic habitat connectivity by providing for passage of aquatic organisms. As stated previously, watershed sensitivity is determined by both inherent and management-related factors. Managers have no control over the inherent factors, so to improve resilience, efforts must be directed at anthropogenic influences such as instream flows, roads, rangeland, and vegetation management….
>
> [Watershed Vulnerability Analysis] results can also help guide implementation of travel management planning by informing priority setting for decommissioning roads and road reconstruction/maintenance. As with the Ouachita NF example, disconnecting roads from the stream network is a key objective of such work. Similarly, WVA analysis could also help prioritize aquatic organism passage projects at road-stream crossings to allow migration by aquatic residents to suitable habitat as streamflow and temperatures change" (USDA Forest Service 2012a, p. 22-23).

Reducing fragmentation to enhance aquatic and terrestrial species adaptation

Decommissioning and upgrading roads and thus reducing the amount of fine sediment deposited on salmonid nests can increase the likelihood of egg survival and spawning success (McCaffery et al. 2007). In addition, this would reconnect stream channels and remove barriers such as culverts. Decommissioning roads in riparian areas may provide further benefits to salmon and other aquatic organisms by permitting reestablishment of streamside vegetation, which provides shade and maintains a cooler, more moderated microclimate over the stream (Battin et al. 2007).

One of the most well documented impacts of climate change on wildlife is a shift in the ranges of species (Parmesan 2006). As animals migrate, landscape connectivity will be increasingly important (Holman et al. 2005). Decommissioning roads in key wildlife corridors will improve connectivity and be an important mitigation measure to increase resiliency of wildlife to climate change. For wildlife, road decommissioning can reduce the many stressors associated with roads. Road decommissioning restores habitat by providing security and food such as grasses and fruiting shrubs for wildlife (Switalski and Nelson 2011).

Forests fragmented by roads and motorized trail networks will likely demonstrate less resistance and resilience to stressors, such as weeds. As a forest is fragmented and there is more edge habitat, Noss (2001) predicts that weedy species with effective dispersal mechanisms will increasingly benefit at the expense of native species. However, decommissioned roads when seeded with native species can reduce the spread of invasive species (Grant et al. 2011), and help restore fragmented forestlands. Off-road vehicles with large knobby tires and large undercarriages are also a key vector for weed spread (e.g., Rooney 2006). Strategically closing and decommissioning motorized routes, especially in roadless areas, will reduce the spread of weeds on forestlands (Gelbard and Harrison 2003).

Transportation infrastructure and carbon sequestration

The topic of the relationship of road restoration and carbon has only recently been explored. There is the potential for large amounts of carbon (C) to be sequestered by reclaiming roads. When roads are decompacted during reclamation, vegetation and soils can develop more

rapidly and sequester large amounts of carbon. A recent study estimated total soil C storage increased 6 fold to 6.5 x 107g C/km (to 25 cm depth) in the northwestern US compared to untreated abandoned roads (Lloyd et al. 2013). Another recent study concluded that reclaiming 425 km of logging roads over the last 30 years in Redwood National Park in Northern California resulted in net carbon savings of 49,000 Mg carbon to date (Madej et al. 2013, Table 5).

Kerekvliet et al. (2008) published a Wilderness Society briefing memo on the impact to carbon sequestration from road decommissioning. Using Forest Service estimates of the fraction of road miles that are unneeded, the authors calculated that restoring 126,000 miles of roads to a natural state would be equivalent to revegetating an area larger than Rhode Island. In addition, they calculate that the net economic benefit of road treatments are always positive and range from US$0.925-1.444 billion.

Table 5. Carbon budget implications in road decommissioning projects (reprinted from Madej et al. 2013).

Road Decommissioning Activities and Processes	Carbon Cost	Carbon Savings
Transportation of staff to restoration sites (fuel emissions)	X	
Use of heavy equipment in excavations (fuel emissions)	X	
Cutting trees along road alignment during hillslope recontouring	X	
Excavation of road fill from stream crossings		X
Removal of road fill from unstable locations		X
Reduces risk of mass movement		X
Post-restoration channel erosion at excavation sites	X	
Natural revegetation following road decompaction		X
Replanting trees		X
Soil development following decompaction		X

Benefits of roadless areas and roadless area networks to climate change adaptation

Undeveloped natural lands provide numerous ecological benefits. They contribute to biodiversity, enhance ecosystem representation, and facilitate connectivity (Loucks et al. 2003; Crist and Wilmer 2002, Wilcove 1990, The Wilderness Society 2004, Strittholt and Dellasala 2001, DeVelice and Martin 2001), and provide high quality or undisturbed water, soil and air (Anderson et al. 2012, Dellasalla et al. 2011). They also can serve as ecological baselines to help us better understand our impacts to other landscapes, and contribute to landscape resilience to climate change.

Forest Service roadless lands, in particular, are heralded for the conservation values they provide. These are described at length in the preamble of the Roadless Area Conservation Rule (RACR)[4] as well as in the Final Environmental Impact Statement (FEIS) for the RACR[5], and

[4] Federal Register .Vol. 66, No. 9. January 12, 2001. Pages 3245-3247.

include: high quality or undisturbed soil, water, and air; sources of public drinking water; diversity of plant and animal communities; habitat for threatened, endangered, proposed, candidate, and sensitive species and for those species dependent on large, undisturbed areas of land; primitive, semi-primitive non- motorized, and semi-primitive motorized classes of dispersed recreation; reference landscapes; natural appearing landscapes with high scenic quality; traditional cultural properties and sacred sites; and other locally identified unique characteristics (e.g., include uncommon geological formations, unique wetland complexes, exceptional hunting and fishing opportunities).

The Forest Service, National Park Service, and US Fish and Wildlife Service recognize that protecting and connecting roadless or lightly roaded areas is an important action agencies can take to enhance climate change adaptation. For example, the Forest Service National Roadmap for Responding to Climate Change (USDA Forest Service 2011b) establishes that increasing connectivity and reducing fragmentation are short and long term actions the Forest Service should take to facilitate adaptation to climate change.[6] The National Park Service also identifies connectivity as a key factor for climate change adaptation along with establishing "blocks of natural landscape large enough to be resilient to large-scale disturbances and long-term changes" and other factors. The agency states that: "The success of adaptation strategies will be enhanced by taking a broad approach that identifies connections and barriers across the landscape. Networks of protected areas within a larger mixed landscape can provide the highest level of resilience to climate change."[7] Similarly, the National Fish, Wildlife and Plants Climate Adaptation Partnership's Adaptation Strategy (2012) calls for creating an ecologically-connected network of conservation areas.[8]

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[5] Final Environmental Impact Statement, Vol. 1, 3–3 to 3–7

[6] Forest Service, 2011. *National Roadmap for Responding to Climate Change*. US Department of Agriculture. FS-957b. Page 26.

[7] National Park Service. *Climate Change Response Program Brief*. http://www.nature.nps.gov/climatechange/adaptationplanning.cfm. Also see: National Park Service, 2010. *Climate Change Response Strategy*. http://www.nature.nps.gov/climatechange/docs/NPS_CCRS.pdf. Objective 6.3 is to "Collaborate to develop cross-jurisdictional conservation plans to protect and restore connectivity and other landscape-scale components of resilience."

[8] See http://www.wildlifeadaptationstrategy.gov/pdf/NFWPCAS-Chapter-3.pdf. Pages 55- 59. The first goal and related strategies are:

> Goal 1: Conserve habitat to support healthy fish, wildlife, and plant populations and ecosystem functions in a changing climate.
>
> > Strategy 1.1: identify areas for an ecologically-connected network of terrestrial, freshwater, coastal, and marine conservation areas that are likely to be resilient to climate change and to support a broad range of fish, wildlife, and plants under changed conditions.
> >
> > Strategy 1.2: Secure appropriate conservation status on areas identified in Strategy 1.1 to complete an ecologically-connected network of public and private conservation areas that will be resilient to climate change and support a broad range of species under changed conditions.
> >
> > Strategy 1.4: Conserve, restore, and as appropriate and practicable, establish new ecological connections among conservation areas to facilitate fish, wildlife, and plant migration, range shifts, and other transitions caused by climate change.

Crist and Wilmer (2002) looked at the ecological value of roadless lands in the Northern Rockies and found that protection of national forest roadless areas, when added to existing federal conservation lands in the study area, would 1) increase the representation of virtually all land cover types on conservation lands at both the regional and ecosystem scales, some by more than 100%; 2) help protect rare, species-rich, and often-declining vegetation communities; and 3) connect conservation units to create bigger and more cohesive habitat "patches."

Roadless lands also are responsible for higher quality water and watersheds. Anderson et al. (2012) assessed the relationship of watershed condition and land management status and found a strong spatial association between watershed health and protective designations. Dellasalla et al. (2011) found that undeveloped and roadless watersheds are important for supplying downstream users with high-quality drinking water, and developing these watersheds comes at significant costs associated with declining water quality and availability. The authors recommend a light-touch ecological footprint to sustain the many values that derive from roadless areas including healthy watersheds.

III. Sustainable Transportation Management in National Forests as Part of Ecological Restoration

At 375,000 miles strong, the Forest Service road system is one of the largest in the world – it is eight times the size of the National Highway System. It is also indisputably unsustainable – that is, roads are not designed, located, or maintained according to best management practices, and environmental impacts are not minimized. It is largely recognized that forest roads, especially unpaved ones, are a primary source of sediment pollution to surface waters (Endicott 2008, Gucinski et al. 2000), and that the system has about 1/3rd more miles than it needs (USDA Forest Service 2001). In addition, the majority of the roads were constructed decades ago when road design and management techniques did not meet current standards (Gucinski et al. 2000, Endicott 2008), making them more vulnerable to erosion and decay than if they had been designed today. Road densities in national forests often exceed accepted thresholds for wildlife.

Only a small portion of the road system is regularly used. All but 18% of the road system is inaccessible to passenger vehicles. Fifty-five percent of the roads are accessible only by high clearance vehicles and 27% are closed. The 18% that is accessible to cars is used for about 80% of the trips made within National Forests.[9] Most of the road maintenance funding is directed to the passenger car roads, while the remaining roads suffer from neglect. As a result, the Forest Service currently has a $3.7 billion road maintenance backlog that grows every year. In other words, only about 1/5th of the roads in the national forest system are used most of the time, and the fraction that is used often is the best designed and maintained because they are higher level access roads. The remaining roads sit generally unneeded and under-maintained – arguably a growing ecological and fiscal liability.

Current Forest Service management direction is to identify and implement a sustainable transportation system.[10] The challenge for forest managers is figuring out what is a sustainable road system and how to achieve it – a challenge that is exacerbated by climate change. It is

[9] USDA Forest Service. Road Management Website Q&As. Available online at http://www.fs.fed.us/eng/road_mgt/qanda.shtml.

[10] See Forest Service directive memo dated March 29, 2012 entitled "Travel Management, Implementation of 36 CFR, Part 202, Subpart A (36 CFR 212.5(b))"

reasonable to define a sustainable transportation system as one where all the routes are constructed, located, and maintained with best management practices, and social and environmental impacts are minimized. This, of course, is easier said than done, since the reality is that even the best roads and trail networks can be problematic simply because they exist and usher in land uses that without the access would not occur (Trombulak and Frissell 2000, Carnefix and Frissell 2009, USDA Forest Service 1996b), and when they are not maintained to the designed level they result in environmental problems (Endicott 2008; Gucinski et al. 2000). Moreover, what was sustainable may no longer be sustainable under climate change since roads designed to meet older climate criteria may no longer hold up under new climate scenarios (USDA Forest Service 2010, USDA Forest Service 2011b, USDA Forest Service 2012a, AASHTO 2012).

Forest Service efforts to move toward a more sustainable transportation system

The Forest Service has made efforts to make its transportation system more sustainable, but still has considerable work to do. In 2001, the Forest Service tried to address the issue by promulgating the Roads Rule[11] with the purpose of working toward a sustainable road system (USDA 2001). The Rule directed every national forest to identify a minimum necessary road system and identify unneeded roads for decommissioning. To do this, the Forest Service developed the Roads Analysis Process (RAP), and published Gucinski et al. (2000) to provide the scientific foundation to complement the RAP. In describing the RAP, Gucinski et al. (2000) writes:

> "Roads Analysis is intended to be an integrated, ecological, social, and economic approach to transportation planning. It uses a multiscale approach to ensure that the identified issues are examined in context. Roads Analysis is to be based on science. Analysts are expected to locate, correctly interpret, and use relevant existing scientific literature in the analysis, disclose any assumptions made during the analysis, and reveal the limitations of the information on which the analysis is based. The analysis methods and the report are to be subjected to critical technical review" (p. 10).

Most national forests have completed RAPs, although most only looked at passenger vehicle roads which account for less than 20% of the system's miles. The Forest Service Washington Office in 2010 directed that forests complete a Travel Analysis Process (TAP) by the end of fiscal year 2015, which must address all roads and create a map and list of roads identifying which are likely needed and which are not. Completed TAPs will provide a blueprint for future road decommissioning and management, they will not constitute compliance with the Roads Rule, which clearly requires the identification of the minimum roads system and roads for decommissioning. Almost all forests have yet to comply with subpart A.

The Forest Service in 2005 then tried to address the off-road portion of this issue by promulgating subpart B of the Travel Managemenr Rule,[12] with the purpose of curbing the most serious impacts associated with off-road vehicle use. Without a doubt, securing summer-time travel management plans was an important step to curbing the worst damage. However, much work remains to be done to approach sustainability, especially since many national forests used the travel management planning process to simply freeze the footprint of motorized routes, and did not try to re-design the system to make it more ecologically or socially sustainable. Adams

[11] 36 CFR 215 subpart A
[12] 36 CFR 212 subpart B

and McCool (2009) considered this question of how to achieve sustainable motorized recreation and concluded that:

> As the agencies move to revise [off-road vehicle] allocations, they need to clearly define how they intend to locate routes so as to minimize impacts to natural resources and other recreationists in accordance with Executive Order 11644....[13]
>
> …As they proceed with designation, the FS and BLM need to acknowledge that current allocations are the product of agency failure to act, not design. Ideally, ORV routes would be allocated as if the map were currently empty of ORV routes. Reliance on the current baseline will encourage inefficient allocations that likely disproportionately impact natural resources and non-motorized recreationists. While acknowledging existing use, the agencies need to do their best to imagine the best possible arrangement of ORV routes, rather than simply tinkering around the edges of the current allocations.[14]

The Forest Service only now is contemplating addressing the winter portion of the issue, forced by a lawsuit challenging the Forest Service's inadequate management of snowmobiles. The agency is expected to issue a third rule in the fall of 2014 that will trigger winter travel management planning.

Strategies for identifying a minimum road system and prioritizing restoration

Transportation Management plays an integral role in the restoration of Forestlands. Reclaiming and obliterating roads is key to developing a sustainable transportation system. Numerous authors have suggested removing roads 1) to restore water quality and aquatic habitats Gucinski et al. 2000), and 2) to improve habitat security and restore terrestrial habitat (e.g., USDI USFWS 1993, Hebblewhite et al. 2009).

Creating a minimum road system through road removal will increase connectivity and decrease fragmentation across the entire forest system. However, at a landscape scale, certain roads and road segments pose greater risks to terrestrial and aquatic integrity than others. Hence, restoration strategies must focus on identifying and removing/mitigating the higher risk roads. Additionally, areas with the highest ecological values, such as being adjacent to a roadless area, may also be prioritized for restoration efforts. Several methods have been developed to help prioritize road reclamation efforts including GIS-based tools and best management practices (BMPs). It is our hope that even with limited resources, restoration efforts can be prioritized and a more sustainable transportation system created.

GIS-based tools

[13] Recent court decisions have made it clear that the minimization requirements in the Executive Orders are not discretionary and that the Executive Orders are enforceable. See

- *Idaho Conservation League v. Guzman ,* 766 F. Supp. 2d 1056 (D. Idaho 2011) (Salmon-Challis National Forest TMP) .
- *The Wilderness Society v. U.S. Forest Service*, CV 08-363 (D. Idaho 2012) (Sawtooth-Minidoka district National Forest TMP).
- *Central Sierra Environmental Resource Center v. US Forest Service*, CV 10-2172 (E.D. CA 2012) (Stanislaus National Forest TMP).

[14] Page 105.

Girvetz and Shilling (2003) developed a novel and inexpensive way to analyze environmental impacts from road systems using the Ecosystem Management Decision Support program (EMDS). EMDS was originally developed by the United States Forest Service, as a GIS-based decision support tool to conduct ecological analysis and planning (Reynolds 1999). Working in conjunction with Tahoe National Forest managers, Girvetz and Shilling (2003) used spatial data on a number of aquatic and terrestrial variables and modeled the impact of the forest's road network. The network analysis showed that out of 8233 km of road analyzed, only 3483 km (42%) was needed to ensure current and future access to key points. They found that the modified network had improved patch characteristics, such as significantly fewer "cherry stem" roads intruding into patches, and larger roadlessness.

Shilling et al. (2012) later developed a recreational route optimization model using a similar methodology and with the goal of identifying a sustainable motorized transportation system for the Tahoe National Forest (Figure 2). Again using a variety of environmental factors, the model identified routes with high recreational benefits, lower conflict, lower maintenance and management requirements, and lower potential for environmental impact operating under the presumption that such routes would be more sustainable and preferable in the long term. The authors combined the impact and benefit analyses into a recreation system analysis "that was effectively a cost-benefit accounting, consistent with requirements of both the federal Travel Management Rule (TMR) and the National Environmental Policy Act" (p. 392**).**

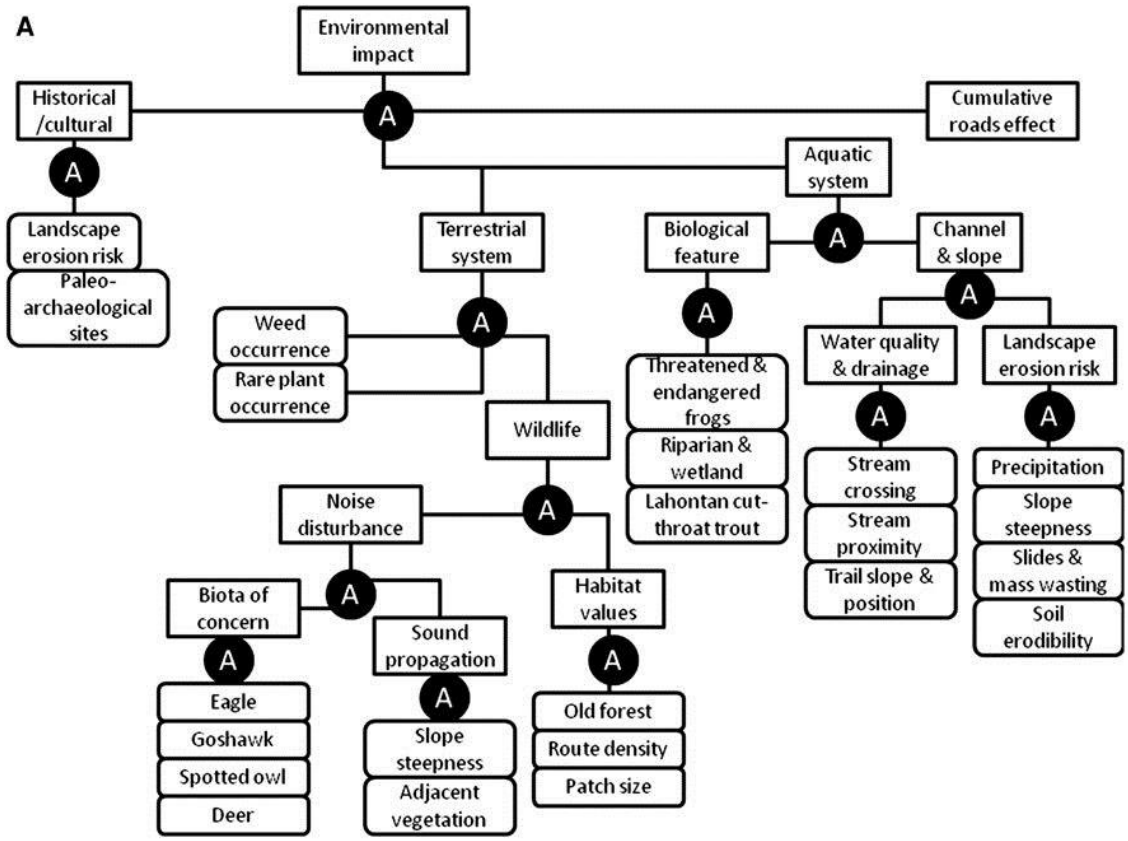

Figure 2: A knowledge base of contributions of various environmental conditions to the concept ''environmental impact'' [of motorized trails]. Rectangles indicate concepts, circles indicate Boolean logic operators, and rounded rectangles indicate sources of environmental data. (Reprinted from Shilling et al. 2012)

The Wilderness Society in 2012 also developed a GIS decision support tool called "RoadRight" that identifies high risk road segments to a variety of forest resources including water, wildlife, and roadlessness (The Wilderness Society 2012, The Wilderness Society 2013). The GIS system is designed to provide information that will help forest planners identify and minimize road related environmental risks. See the summary of and user guide for RoadRight that provides more information including where to access the open source software.[15]

[15] The Wilderness Society, 2012. Rightsizing the National Forest Road System: A Decision Support Tool. Available at http://www.landscapecollaborative.org/download/attachments/12747016/Road+decommissioning+model+-overview+2012-02-29.pdf?version=1&modificationDate=1331595972330.

The Wilderness Society, 2013.
RoadRight: A Spatial Decision Support System to Prioritize Decommissioning and Repairing Roads in

Best management practices (BMPs)

BMPs have also been developed to help create more sustainable transportation systems and identify restoration opportunities. BMPs provide science-based criteria and standards that land managers follow in making and implementing decisions about human uses and projects that affect natural resources. Several states have developed BMPs for road construction, maintenance and decommissioning practices (e.g., Logan 2001, Merrill and Cassaday 2003, USDA Forest Service 2012b).

Recently, BMPs have been developed for addressing motorized recreation. Switalski and Jones (2012) published, "*Off-Road Vehicle Best Management Practices for Forestlands: A Review of Scientific Literature and Guidance for Managers*." This document reviews the current literature on the environmental and social impacts of off-road vehicles (ORVs), and establishes a set of Best Management Practices (BMPs) for the planning and management of ORV routes on forestlands. The BMPs were designed to be used by land managers on all forestlands, and is consistent with current forest management policy and regulations. They give guidance to transportation planners on where how to place ORV routes in areas where they will reduce use conflicts and cause as little harm to the environment as possible. These BMPs also help guide managers on how to best remove and restore routes that are redundant or where there is an unacceptable environmental or social cost.

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Attachments

Attachment 1: Wildfire and Roads Fact Sheet

Attachment 2: Using Road Density as a Metric for Ecological Health in National Forests: What Roads and Routes should be Included? Summary of Scientific Information

Roads and Fire: A Proven Relationship

Photo: Lou Anegli Digital

Roaded Forests Are at a Greater Risk of Experiencing Wildfires than Unroaded Forests

- A wildland fire ignition is almost twice as likely to occur in a roaded area than in a roadless area. (USDA 2000, Table 3-18)
- The location of large wildfires is often correlated with proximity to busy roads. (Sierra Nevada Ecosystem Project, 1996)
- High road density increases the probability of fire occurrence due to human-caused ignitions. (Hann, W.J., et al. 1997)
- Unroaded areas have lower potential for high-intensity fires than roaded areas because they are less prone to human-caused ignitions. (DellaSala, et al. 1995)
- The median size of large fires on national forests is greater outside of roadless areas. (USDA 2000, Table 3-22)
- A positive correlation exists between lightning fire frequency and road density due to increased availability of flammable fine fuels near roads. (Arienti, M. Cecilia, et al. 2009)
- Human caused wildfires are strongly associated with access to natural landscapes, with the proximity to urban areas and roads being the most important factor (Romero-Calcerrada, et al. 2008)

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Human Activity and Wildfire

- Sparks from cars, off-road vehicles, and neglected campfires caused nearly 50,000 wildfire ignitions in 2000. (USDA 2000, Fuel Management and Fire Suppression Specialist Report, Table 4.)
- More than 90% of fires on national lands are caused by humans (USDA 1996 and 1998)
- Human-ignited wildfire is almost 5 times more likely to occur in a roaded area than in a roadless area (USDA 2000, Table 3-19).

There are 375,000 miles of roads in our national forests.

Roads and Fire: A Proven Relationship

Photo: USDA Forest Service, Coconino National Forest

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Attachment 2: Using Road Density as a Metric for Ecological Health in National Forests: What Roads and Routes should be Included?
Summary of Scientific Information
Last Updated, November 22, 2012

I. Density analysis should include closed roads, non-system roads administered by other jurisdictions (private, county, state), temporary roads and motorized trails.

Typically, the Forest Service has calculated road density by looking only at open system road density. From an ecological standpoint, this approach may be flawed since it leaves out of the density calculations a significant percent of the total motorized routes on the landscape. For instance, the motorized route system in the entire National Forest System measures well over 549,000 miles.[1] By our calculation, a density analysis limited to open system roads would consider less than 260,000 miles of road, which accounts for less than half of the entire motorized transportation system estimated to exist on our national forests.[2] These additional roads and motorized trails impact fish, wildlife, and water quality, just as open system roads do. In this section, we provide justification for why a road density analysis used for the purposes of assessing ecological health and the effects of proposed alternatives in a planning document should include closed system roads, non-system roads administered by other jurisdictions, temporary roads, and motorized trails.

Impacts of closed roads

It is crucial to distinguish the density of roads physically present on the landscape, whether closed to vehicle use or not, from "open-road density" (Pacific Rivers Council, 2010). An open-road density of 1.5 mi/mi² has been established as a standard in some national forests as protective of some terrestrial wildlife species. However, many areas with an open road density of 1.5 mi/mi² have a much higher inventoried or extant hydrologically effective road density, which may be several-fold as high with significant aquatic impacts. This higher density occurs because many road "closures" block vehicle access, but do nothing to mitigate the hydrologic alterations that the road causes. The problem is

[1] The National Forest System has about 372,000 miles of system roads. The forest service also has an estimated 47,000 miles of motorized trails. As of 1998, there were approximately 130,000 miles of non-system roads in our forests. Non-system roads include public roads such as state, county, and local jurisdiction and private roads. (USFS, 1998) The Forest Service does not track temporary roads but is reasonable to assume that there are likely several thousand miles located on National Forest System lands.

[2] About 30% of system roads, or 116,108 miles, are in Maintenance Level 1 status, meaning they are closed to all motorized use. (372,000 miles of NFS roads - 116,108 miles of ML 1 roads = 255,892). This number is likely conservative given that thousands of more miles of system roads are closed to public motorized use but categorized in other Maintenance Levels.

further compounded in many places by the existence of "ghost" roads that are not captured in agency inventories, but that are nevertheless physically present and causing hydrologic alteration (Pacific Watershed Associates, 2005).

Closing a road to public motorized use can mitigate the impacts on water, wildlife, and soils only if proper closure and storage technique is followed. Flow diversions, sediment runoff, and illegal incursions will continue unabated if necessary measures are not taken. The Forest Service's National Best Management Practices for non-point source pollution recommends the following management techniques for minimizing the aquatic impacts from closed system roads: eliminate flow diversion onto the road surface, reshape the channel and streambanks at the crossing-site to pass expected flows without scouring or ponding, maintain continuation of channel dimensions and longitudinal profile through the crossing site, and remove culverts, fill material, and other structures that present a risk of failure or diversion. Despite good intentions, it is unlikely given our current fiscal situation and past history that the Forest Service is able to apply best management practices to all stored roads,[3] and that these roads continue to have impacts. This reality argues for assuming that roads closed to the public continue to have some level of impact on water quality, and therefore, should be included in road density calculations.

As noted above, many species benefit when roads are closed to public use. However, the fact remains that closed system roads are often breached resulting in impacts to wildlife. Research shows that a significant portion of off-road vehicle (ORV) users violates rules even when they know what they are (Lewis, M.S., and R. Paige, 2006; Frueh, LM, 2001; Fischer, A.L., et. al, 2002; USFWS, 2007.). For instance, the Rio Grande National Forest's Roads Analysis Report notes that a common travel management violation occurs when people drive around road closures on Level 1 roads (USDA Forest Service, 1994). Similarly, in a recent legal decision from the Utah District Court , *Sierra Club v. USFS*, Case No. 1:09-cv-131 CW (D. Utah March 7, 2012), the court found that, as part of analyzing alternatives in a proposed travel management plan, the Forest Service failed to take a hard look at the impact of continued illegal use. In part, the court based its decision on the Forest Service's acknowledgement that illegal motorized use is a significant problem and that the mere presence of roads is likely to result in illegal use.

In addition to the disturbance to wildlife from ORVs, incursions and the accompanying human access can also result in illegal hunting and trapping of animals. The Tongass National Forest refers to this in its EIS to amend the Land and Resources Management Plan. Specifically, the Forest Service notes in the EIS that Alexander Archipelego wolf mortality due to legal and illegal hunting and trapping is related not only to roads open to motorized access, but to all roads, and that *total road densities* of 0.7-1.0 mi/mi² or less may be necessary (USDA Forest Service, 2008).

As described below, a number of scientific studies have found that ORV use on roads and trails can have serious impacts on water, soil and wildlife resources. It should be expected that ORV use will continue to

[3] The Forest Service generally reports that it can maintain 20-30% of its open road system to standard.

some degree to occur illegally on closed routes and that this use will affect forest resources. Given this, roads closed to the general public should be considered in the density analysis.

Impacts of non-system roads administered by other jurisdictions (private, county, state)

As of 1998, there were approximately 130,000 miles of non-system roads in national forests (USDA Forest Service, 1998). These roads contribute to the environmental impacts of the transportation system on forest resources, just as forest system roads do. Because the purpose of a road density analysis is to measure the impacts of roads at a landscape level, the Forest Service should include all roads, including non-system, when measuring impacts on water and wildlife. An all-inclusive analysis will provide a more accurate representation of the environmental impacts of the road network within the analysis area.

Impacts of temporary roads

Temporary roads are not considered system roads. Most often they are constructed in conjunction with timber sales. Temporary roads have the same types environmental impacts as system roads, although at times the impacts can be worse if the road persists on the landscape because they are not built to last.

It is important to note that although they are termed temporary roads, their impacts are not temporary. According to Forest Service Manual (FSM) 7703.1, the agency is required to "Reestablish vegetative cover on any unnecessary roadway or area disturbed by road construction on National Forest System lands within 10 years after the termination of the activity that required its use and construction." Regardless of the FSM 10-year rule, temporary roads can remain for much longer. For example, timber sales typically last 3-5 years or more. If a temporary road is built in the first year of a six year timber sale, its intended use does not end until the sale is complete. The timber contract often requires the purchaser to close and obliterate the road a few years after the Forest Service completes revegetation work. The temporary road, therefore, could remain open 8-9 years before the ten year clock starts ticking per the FSM. Therefore, temporary roads can legally remain on the ground for up to 20 years or more, yet they are constructed with less environmental safeguards than modern system roads.

Impacts of motorized trails

Scientific research and agency publications generally do not decipher between the impacts from motorized trails and roads, often collapsing the assessment of impacts from unmanaged ORV use with those of the designated system of roads and trails. The following section summarizes potential impacts resulting from roads and motorized trails and the ORV use that occurs on them.

Aquatic Resources

While driving on roads has long been identified as a major contributor to stream sedimentation (for review, see Gucinski, 2001), recent studies have identified ORV routes as a significant cause of stream sedimentation as well (Sack and da Luz, 2004; Chin et al.; 2004, Ayala et al.; 2005, Welsh et al;. 2006). It has been demonstrated that sediment loss increases with increased ORV traffic (Foltz, 2006). A study by

Sack and da Luz (2004) found that ORV use resulted in a loss of more than 200 pounds of soil off of every 100 feet of trail each year. Another study (Welsh et al., 2006) found that ORV trails produced five times more sediment than unpaved roads. Chin et al. (2004) found that watersheds with ORV use as opposed to those without exhibited higher percentages of channel sands and fines, lower depths, and lower volume – all characteristics of degraded stream habitat.

Soil Resources [4]

Ouren, et al. (2007), in an extensive literature review, suggests ORV use causes soil compaction and accelerated erosion rates, and may cause compaction with very few passes. Weighing several hundred pounds, ORVs can compress and compact soil (Nakata et al., 1976; Snyder et al., 1976; Vollmer et al., 1976; Wilshire and Nakata, 1976), reducing its ability to absorb and retain water (Dregne, 1983), and decreasing soil fertility by harming the microscopic organisms that would otherwise break down the soil and produce nutrients important for plant growth (Wilshire et al., 1977). An increase in compaction decreases soil permeability, resulting in increased flow of water across the ground and reduced absorption of water into the soil. This increase in surface flow concentrates water and increases erosion of soils (Wilshire, 1980; Webb, 1983; Misak et al., 2002).

Erosion of soil is accelerated in ORV-use areas directly by the vehicles, and indirectly by increased runoff of precipitation and the creation of conditions favorable to wind erosion (Wilshire, 1980). Knobby and cup-shaped protrusions from ORV tires that aid the vehicles in traversing steep slopes are responsible for major direct erosional losses of soil. As the tire protrusions dig into the soil, forces far exceeding the strength of the soil are exerted to allow the vehicles to climb slopes. The result is that the soil and small plants are thrown downslope in a "rooster tail" behind the vehicle. This is known as mechanical erosion, which on steep slopes (about 15° or more) with soft soils may erode as much as 40 tons/mi (Wilshire, 1992). The rates of erosion measured on ORV trails on moderate slopes exceed natural rates by factors of 10 to 20 (Iverson et al., 1981; Hinckley et al., 1983), whereas use on steep slopes has commonly removed the entire soil mantle exposing bedrock. Measured erosional losses in high use ORV areas range from 1.4-242 lbs/ft^2 (Wilshire et al., 1978) and 102-614 lbs/ft^2 (Webb et al., 1978). A more recent study by Sack and da Luz (2003) found that ORV use resulted in a loss of more than 200 lbs of soil off of every 100 feet of trail each year.

Furthermore, the destruction of cryptobiotic soils by ORVs can reduce nitrogen fixation by cyanobacteria, and set the nitrogen economy of nitrogen-limited arid ecosystems back decades. Even small reductions in crust can lead to diminished productivity and health of the associated plant community, with cascading effects on plant consumers (Davidson et al., 1996). In general, the deleterious effects of ORV use on cryptobiotic crusts is not easily repaired or regenerated. The recovery time for the lichen component of crusts has been estimated at about 45 years (Belnap, 1993). After this time the crusts may appear to have regenerated to the untrained eye. However, careful observation will reveal that the 45 year-old crusts will not have recovered their moss component, which will take an additional 200 years to fully come back (Belnap and Gillette, 1997).

[4] For a full review see Switalski, T. A. and A. Jones (2012).

Wildlife Resources [5]

Studies have shown a variety of possible wildlife disturbance vectors from ORVs. While these impacts are difficult to measure, repeated harassment of wildlife can result in increased energy expenditure and reduced reproduction. Noise and disturbance from ORVs can result in a range of impacts including increased stress (Nash et al., 1970; Millspaugh et al., 2001), loss of hearing (Brattstrom and Bondello, 1979), altered movement patterns (e.g., Wisdom et al. 2004; Preisler et al. 2006), avoidance of high-use areas or routes (Janis and Clark 2002; Wisdom 2007), and disrupted nesting activities (e.g., Strauss 1990).

Wisdom et al. (2004) found that elk moved when ORVs passed within 2,000 yards but tolerated hikers within 500 ft. Wisdom (2007) reported preliminary results suggesting that ORVs are causing a shift in the spatial distribution of elk that could increase energy expenditures and decrease foraging opportunities for the herd. Elk have been found to readily avoid and be displaced from roaded areas (Irwin and Peek, 1979; Hershey and Leege, 1982; Millspaugh, 1995). Additional concomitant effects can occur, such as major declines in survival of elk calves due to repeated displacement of elk during the calving season (Phillips, 1998). Alternatively, closing or decommissioning roads has been found to decrease elk disturbance (Millspaugh et al., 2000; Rowland et al., 2005).

Disruption of breeding and nesting birds is particularly well-documented. Several species are sensitive to human disturbance with the potential disruption of courtship activities, over-exposure of eggs or young birds to weather, and premature fledging of juveniles (Hamann et al., 1999). Repeated disturbance can eventually lead to nest abandonment. These short-term disturbances can lead to long-term bird community changes (Anderson et al., 1990). However when road densities decrease, there is an observable benefit. For example, on the Loa Ranger District of the Fishlake National Forest in southern Utah, successful goshawk nests occur in areas where the localized road density is at or below 2-3 mi/mi^2 (USDA, 2005).

Examples of Forest Service planning documents that use total motorized route density or a variant

Below, we offer examples of where total motorized route density or a variant has been used by the Forest Service in planning documents.

- The Mt. Taylor RD of the Cibola NF analyzed open and closed system roads and motorized trails together in a single motorized *route* density analysis. Cibola NF: Mt. Taylor RD Environmental Assessment for Travel Management Planning, Ch.3, p 55. http://prdp2fs.ess.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5282504.pdf.

- The Grizzly Bear Record of Decision (ROD) for the Forest Plan Amendments for Motorized Access

[5] For a full review see:Switalski, T. A. and A. Jones (2012).

Management within the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones (Kootenai, Lolo, and Idaho Panhandle National Forests) assigned route densities for the designated recovery zones. One of the three densities was for Total Motorized Route Density (TMRD) which includes open roads, restricted roads, roads not meeting all reclaimed criteria, and open motorized trails. The agency's decision to use TMRD was based on the Endangered Species Act's requirement to use best available science, and monitoring showed that both open and closed roads and motorized trails were impacting grizzly. Grizzly Bear Plan Amendment ROD. Online at cache.ecosystem-management.org/48536_FSPLT1_009720.pdf.

- The Chequamegon-Nicolet National Forest set forest-wide goals in its forest plan for both open road density and total road density to improve water quality and wildlife habitat.

> *I decided to continue reducing the amount of total roads and the amount of open road to resolve conflict with quieter forms of recreation, impacts on streams, and effects on some wildlife species.* ROD, p 13.

Chequamegon-Nicolet National Forest Land and Resource Management Plan Record of Decision. Online at http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5117609.pdf.

- The Tongass National Forest's EIS to amend the forest plan notes that Alexander Archipelago wolf mortality due to legal and illegal hunting and trapping is related not only to roads open to motorized access, but to all roads, and that *total road densities* of 0.7-1.0 mi/mi² or less may be necessary.

> *Another concern in some areas is the potentially unsustainable level of hunting and trapping of wolves, when both legal and illegal harvest is considered. The 1997 Forest Plan EIS acknowledged that open road access contributes to excessive mortality by facilitating access for hunters and trappers. Landscapes with open-road densities of 0.7 to 1.0 mile of road per square mile were identified as places where human-induced mortality may pose risks to wolf conservation. The amended Forest Plan requires participation in cooperative interagency monitoring and analysis to identify areas where wolf mortality is excessive, determine whether the mortality is unsustainable, and identify the probable causes of the excessive mortality.*
>
> *More recent information indicates that wolf mortality is related not only to roads open to motorized access, but to all roads, because hunters and trappers use all roads to access wolf habitat, by vehicle or on foot. Consequently, this decision amends the pertinent standard and guideline contained in Alternative 6 as displayed in the Final EIS in areas where road access and associated human caused mortality has been determined to be the significant contributing factor to unsustainable wolf mortality. The standard and guideline has been modified to ensure that a range of options to reduce mortality risk will be considered in these areas, and to specify that total road densities of 0.7 to 1.0 mile per square mile or less may be necessary.* ROD, p 24.

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Achieving Compliance with the Executive Order "Minimization Criteria" for Off-Road Vehicle Use on Federal Public Lands:

Background, Case Studies, and Recommendations

The Wilderness Society

May 2016

Executive Summary

In response to the growing use of dirt bikes, snowmobiles, all-terrain vehicles, and other off-road vehicles (ORVs)[1] on federal public lands and corresponding environmental damage, social conflicts, and public safety concerns, Presidents Nixon and Carter issued Executive Orders 11644 and 11989 in 1972 and 1977, respectively, requiring federal land management agencies to plan for ORV use based on protecting resources and other recreational uses. Specifically, the executive orders require that areas and trails designated for ORV use be located to *minimize*: damage to soil, watershed, vegetation, and other public lands resources; harassment of wildlife and significant disruption of wildlife habitat; and conflicts between ORV use and other existing or proposed recreational uses. While the Bureau of Land Management (BLM) and U.S. Forest Service travel management regulations echo the executive order "minimization criteria," they do not provide guidance to field managers on how to apply the criteria.

It has been over four decades since Presidents Nixon and Carter obligated federal agencies to designate a system of ORV areas and trails that minimize impacts. Yet the agencies consistently struggle to satisfy that obligation, resulting in unnecessary damage to water, fish, wildlife, and the experience of other visitors. This is evidenced by a series of court rulings finding agency failures to comply with the minimization criteria. Those cases confirm the agencies' substantive obligation to meaningfully apply and implement – not just identify or consider – the minimization criteria when designating each area or trail, and to show in the record how they did so.

In this report, we provide the policy framework for designating ORV trails and areas on federal lands, along with a series of recommendations based on recent case law and ten case studies from the Forest Service, BLM, and National Park Service that demonstrate both agency failures to comply with the executive order minimization criteria and good planning practices that could be incorporated into a model for application of the criteria.

We recommend that agencies issue guidance to clarify their obligations under the Executive Orders. Specifically, when designating ORV trails and areas, agencies must:

> (1) Actually ***minimize*** impacts – not just identify or consider them – and show how they did so in the administrative record; and
>
> (2) Apply a transparent and common-sense methodology for meaningful application of the minimization criteria that provides opportunities for public participation, incorporates the best available scientific information and best management practices, addresses site-specific and larger-scale impacts, and accounts for monitoring and enforcement needs and available resources.

The substantive obligation to minimize impacts applies to both ORV area allocations (typically made in land management plans) and specific route designations (often made in travel plans). Guidance should

[1] The Bureau of Land Management generally uses the term "off-highway vehicle" or "OHV," which is synonymous with off-road vehicle. For consistency across agencies and with the governing executive orders, this white paper uses the term ORV.

also clarify that agency attempts to *mitigate* impacts associated with an existing ORV system are insufficient to fully satisfy the executive order minimization criteria, which requires areas and trails to be *located* to minimize impacts in the first instance.

There is an immediate need for agency leadership and direction to assist field managers with proper implementation of the executive order minimization criteria and to provide necessary and appropriate protection for our nation's natural and cultural resources, ensure rewarding and safe recreational experiences for all, and cure legal vulnerabilities. Guidance will also assist with implementation of President Obama's policy on mitigating impacts on natural resources, which complements and reinforces the minimization criteria by requiring agencies to prioritize avoidance and minimization of harmful effects to land, water, wildlife, and other ecological resources. The call for immediate action is acute given that the Forest Service is embarking on comprehensive winter-time travel management planning and the BLM hopes to complete hundreds of travel plans over the next five years.

Our hope is that this white paper serves to initiate a needed dialogue within and between land management agencies that will result in enhanced agency commitment to and application of the executive order minimization criteria. The Wilderness Society stands ready to collaborate to advance these objectives.

Overview

Presidents Nixon and Carter issued Executive Orders 11644 and 11989 in 1972 and 1977, respectively, requiring federal land management agencies to minimize environmental impacts and conflicts associated with the use of dirt bikes, snowmobiles, all-terrain vehicles, and other off-road vehicles (ORVs)[2] on federal public lands. Forty years later, the agencies continue to struggle to comply with the executive order "minimization criteria," as evidenced by a series of court rulings finding agency failures to satisfy those criteria.

This white paper provides: (1) pertinent background information on ORV impacts and the agencies' legal obligations; (2) selected case studies from the U.S. Forest Service, Bureau of Land Management (BLM), and National Park Service (NPS) highlighting lessons-learned from instances where the agencies have failed to satisfy their duty to minimize impacts associated with ORV use, as well as instances of successful planning practices, approaches, or outcomes that could be incorporated into a model for application of the minimization criteria; and (3) recommendations for ensuring effective compliance in the future, including suggestions for crafting clarifying guidance on proper application of the minimization criteria.

It is important that the agencies address this issue as soon as possible to provide necessary and appropriate protection for our nation's natural and cultural resources, ensure rewarding and safe recreational experiences for all, and cure legal vulnerabilities. The call for immediate action is acute given that the Forest Service is embarking on comprehensive winter-time travel management planning and the BLM hopes to complete hundreds of travel plans over the next five years.

The Wilderness Society is committed to identifying and implementing ways to advance land management strategies to better protect and inspire Americans to care for our public lands. With this white paper, we hope to initiate a needed dialogue within and between land management agencies that will result in enhanced agency commitment to and application of the executive order minimization criteria. As always, we stand ready to collaborate to advance these objectives.

I. Background

A. Impacts from ORV use

While ORVs can provide important access and recreational enjoyment, over four decades of research has documented significant adverse environmental and social impacts associated with their use on the public lands. As the Council on Environmental Quality recognized in a 1979 Report, "ORVs have damaged every kind of ecosystem found in the United States," and "[f]ederal lands have borne a disproportionate share of the damage."

[2] The Bureau of Land Management generally uses the term "off-highway vehicle" or "OHV," which is synonymous with off-road vehicle. For consistency across agencies and with the governing executive orders, this white paper uses the term ORV.

Impacts include physical resource damage such as soil and snow compaction, erosion, crushing of vegetation, spread of invasive species, stream sedimentation, and air pollution. ORV use also degrades and fragments wildlife habitat, diminishing resilience to climate change, while ORV noise, dust, emissions, and the presence of humans disrupt wildlife processes such as breeding, feeding, migration, and nesting. Damage to cultural and archaeological resources, including unintentional crushing of artifacts and increased vandalism and looting, is also associated with ORV use. Finally, ORV use poses public safety and user conflict concerns. In particular, the noise, dust, fumes, and physical resource damage associated with ORV use can seriously impair the experience of the majority of public lands visitors engaging in non-motorized forms of recreation.[3]

Advancements in ORV technology and changes in use patterns have exacerbated these impacts. In addition, climate change is making public lands resources increasingly vulnerable to ORV-related impacts, with changing and in many cases more intense storm events, altered wildlife habitat and migration patterns, and other stressors intensifying resource damage.

B. Legal obligation to minimize impacts and conflicts with other uses

In response to the growing use of ORVs and corresponding environmental damage and conflict, Presidents Nixon and Carter issued executive orders to "establish policies and provide for procedures that will ensure that the use of [ORVs] on public lands will be controlled and directed so as to protect the resources of those lands, to promote the safety of all users of those lands, and to minimize conflicts among the various uses of those lands."[4] To that end, the orders require federal agencies to plan for motorized use based on protecting resources and other recreational uses.[5] When designating areas or trails available for ORV use, agencies must locate them to:

(1) minimize damage to soil, watershed, vegetation, or other resources of the public lands;
(2) minimize harassment of wildlife or significant disruption of wildlife habitats; and

[3] For a selection of scientific studies, literature reviews, and other publications documenting these impacts, *see, e.g.*, S.C. Trombulak & C.A. Frissel, Review of Ecological Effects of Roads on Terrestrial and Aquatic Communities, *Conservation Biology* 14:18-30 (2000), *available at* http://onlinelibrary.wiley.com/doi/10.1046/j.1523-1739.2000.99084.x/pdf; The Wilderness Society, Science and Policy Brief, *Habitat Fragmentation from Roads: Travel Planning Methods to Safeguard Bureau of Land Management Land*s (May 2006, No. 2), *available at* https://partners.tws.org/wildscience/Publications1/Habitat%20Fragmentation%20from%20Roads.pdf; U.S. Government Accountability Office, GAO-09-509, *Enhanced Planning Could Assist Agencies in Managing Increased Use of Off-Highway Vehicles* (2009), *available at* http://www.gao.gov/assets/300/291861.pdf; T. Adam Switalski & Allison Jones, Off-road Vehicle Best Management Practices for Forestlands: A Review of Scientific Literature and Guidance for Managers, *Journal of Conservation Planning* 8:12-24 (2012), *available at* http://www.journalconsplanning.org/2012/JCP_v8_2_Switalski.pdf; Adam Switalski, *Snowmobile Best Management Practices for Forest Service Travel Planning: A Comprehensive Literature Review and Recommendations for Management* (2014), *available at* http://winterwildlands.org/wp-content/uploads/2015/02/BMP-Report.pdf; Saul L. Hedquist *et al.*, Public Lands and Cultural Resource Protection: A Case Study of Unauthorized Damage to Archaeological Sites on the Tonto National Forest, Arizona, *Advances in Archaeological Practice* 2(4): 298-310 (2014).

[4] Exec. Order No. 11644, § 1, 37 Fed. Reg. 2877 (Feb. 8, 1972), *as amended by* Exec. Order No. 11989, 42 Fed. Reg. 26,959 (May 24, 1977).

[5] *Id.* § 3.

(3) minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands.[6]

The BLM and Forest Service travel management regulations echo these "minimization criteria" (although they do not provide guidance to field managers on how to apply the criteria).[7] The plain language of the executive orders and agency regulations make clear that the criteria apply *both* to designations of areas available for cross-country ORV travel and to designations of specific routes open to ORV use.[8]

Despite their long-standing legal obligation, the Forest Service, BLM, and NPS have struggled to properly apply and implement the minimization criteria in their ORV planning decisions, prompting a suite of federal court cases. Since 2009, federal courts have repeatedly invalidated travel management decisions for agency failure to correctly apply the criteria to minimize resource damage and conflicts with other recreational uses when designating ORV areas or trails:

- *Center for Biological Diversity v. BLM*, 746 F. Supp. 2d 1055, 1071-81 (N.D. Cal. 2009) (record provided no indication that BLM considered or applied the minimization criteria when designating ORV routes in the West Mojave Desert).
- *Idaho Conservation League v. Guzman*, 766 F. Supp. 2d 1056, 1071-74 (D. Idaho 2011) (record did not reflect whether or how the Forest Service applied the minimization criteria in its travel plan for the Salmon-Challis National Forest).
- *Defenders of Wildlife v. Salazar*, 877 F. Supp. 2d 1271, 1304 (M.D. Fla. 2012) (NPS failed to articulate or document whether or how it applied the minimization criteria to ORV route designations in Big Cypress Preserve).
- *Central Sierra Environmental Resource Center v. U.S. Forest Service*, 916 F. Supp. 2d 1078, 1094-98 (E.D. Cal. 2013) (Forest Service failed to show that it actually aimed to minimize environmental damage when designating ORV routes in the Stanislaus National Forest).
- *The Wilderness Society v. U.S. Forest Service*, No. CV08-363-E-EJL, 2013 U.S. Dist. LEXIS 153036, at *22-32 (D. Idaho Oct. 22, 2013) (remanding the travel plan for a portion of the Sawtooth National Forest where the agency relied on an unsupported conclusion that route closures and elimination of cross-country travel minimized impacts).

[6] *Id.* § 3(a). Section 3(a) also provides that "[a]reas and trails shall not be located in officially designated Wilderness Areas or Primitive Areas" and "shall be located in areas of the National Park system, Natural Areas, or National Wildlife Refuges and Game Ranges only if the respective agency head determines that ORV use will not adversely affect their natural, aesthetic, or scenic values."

[7] 43 C.F.R. § 8342.1 (BLM); 36 C.F.R. § 212.55(b) (Forest Service). NPS regulations provide that "[r]outes and areas designated for off-road motor vehicle use [in national recreation areas, seashores, lakeshores, and preserves] shall be promulgated as special regulations" and "shall comply with . . . E.O. 11644." 36 C.F.R. § 4.10(b).

[8] Exec. Order 11644, § 3(a); 43 C.F.R. § 8342.1; 36 C.F.R. § 212.55(b); *see also WildEarth Guardians v. U.S. Forest Serv.*, 790 F.3d 920, 932 (9th Cir. 2015) (agency must apply the criteria "with the objective of minimizing . . . the effects of each particularized area and trail designation"); BLM Manual 1626.06(A)(2)(a) & (B) (agency must pay "[p]articular attention . . . to documentation of how the [minimization criteria] were considered in making [ORV] area designation decisions" *and* "in making individual road, primitive road, and trail designation decisions").

- *Southern Utah Wilderness Alliance v. Burke*, 981 F. Supp. 2d 1099, 1104-06 (D. Utah 2013) (agency acknowledgment of the minimization criteria was insufficient where the record showed no analysis of specific impacts of designated ORV routes in BLM's Richfield Field Office).
- *Friends of the Clearwater v. U.S. Forest Service*, No. 3:13-CV-00515-EJL, 2015 U.S. Dist. LEXIS 30671, at *37-52 (D. Idaho Mar. 11, 2015) (Forest Service's conclusory statements failed to show how it selected ORV routes with the objective of minimizing their impacts in the Clearwater National Forest).
- *WildEarth Guardians v. U.S. Forest Service*, 790 F.3d 920, 929-32 (9th Cir. 2015) (Forest Service failed to "apply the minimization criteria to *each area* it designated for snowmobile use" on the Beaverhead-Deerlodge National Forest and to provide the "more granular analysis [necessary] to fulfill the objectives of Executive Order 11644").

Collectively, these cases confirm the agencies' substantive obligation to meaningfully apply and implement – not just identify or consider – the minimization criteria when designating each area or trail, and to show in the record how they did so.

President Obama's November 2015 memorandum on mitigating impacts on natural resources complements and reinforces the minimization criteria. The memo articulates a policy for the Departments of Interior and Agriculture "to avoid and then minimize harmful effects to land, water, wildlife, and other ecological resources (natural resources) caused by land- or water-disturbing activities, and to ensure that any remaining harmful effects are effectively addressed, consistent with existing mission and legal authorities."[9] The memo requires each agency to develop and implement guidance that establishes "a clear and consistent approach for avoidance and minimization of, and compensatory mitigation for, the impacts of their activities and the projects they approve" that accomplishes a "net benefit goal" (or, at a minimum, a no net loss) for important, scarce, or sensitive natural resources.[10]

C. Immediate need for leadership and direction

It has been over four decades since Presidents Nixon and Carter obligated federal agencies to designate a system of areas and trails that minimizes impacts from ORV use. Yet the agencies still struggle to satisfy that obligation. In 2004, then Forest Service Chief Dale Bosworth identified unmanaged recreation as one of the "top four threats" to the national forests, and the next year promulgated regulations requiring National Forest System units to restrict ORVs to a designated system of routes and areas. This prompted the Forest Service to move quickly to complete summer-time ORV planning on all but a handful of national forests; the agency is just now starting to tackle winter-time ORV planning.[11]

[9] Presidential Memorandum: Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment, § 1 (Nov. 3, 2015), *available at* https://www.whitehouse.gov/the-press-office/2015/11/03/mitigating-impacts-natural-resources-development-and-encouraging-related.

[10] *Id.* §§ 1, 3(b), 4.

[11] In 2013, a federal court found that the Forest Service regulation allowing but not requiring designation of a system for over-snow vehicle use was inconsistent with the executive order requirement "to ensure that *all* [public] lands are designated for *all* off-road vehicles" in a way that minimizes resource damage and conflicts with

While the agency deserves kudos for expeditiously ending cross-country driving and, in certain instances, elevating resource protection needs in its ORV designation decisions, it has generally failed to apply and implement the minimization criteria. That failure has resulted in avoidable resource damage and conflicts with other recreational uses.

In the BLM's case, the agency has yet to develop ORV travel management plans for the majority of its units. The agency, however, is embarking on an ambitious plan to complete nearly 500 travel plans by 2020.[12] Like the Forest Service, the BLM has lost court challenges to early decisions based on its failure to apply the minimization criteria. While the agency has generally failed to apply and implement the minimization criteria, its ORV designation decisions in certain national monument units do appear to minimize impacts to monument objects including cultural and archaeological resources and provide examples of good planning practice that may be transferable.

On the Park Service side, dozens of national recreation areas, seashores, lakeshores, and preserves that permit ORV use have yet to comply with the requirement to promulgate special regulations designating areas and trails to minimize resource damage and recreational use conflicts, consistent with the executive orders.[13] As with the Forest Service and BLM, NPS ORV management has not escaped litigation, and the agency's special regulations often minimize impacts to park resources only where the agency is under significant legal and political pressure.

Despite the string of court losses, the agencies have generally declined to issue clarifying guidance to ensure that future ORV plans satisfy the substantive duty to minimize impacts and conflicts, as well as to reduce their legal vulnerability.[14] In the meantime, mismanaged ORV use continues to degrade soil, air, and water quality, threaten imperiled wildlife species, impair climate change adaptation, and diminish the experience of the majority of public lands visitors who enjoy the natural landscape through quiet, non-motorized forms of recreation. The resulting resource damage, public safety concerns, and conflicts also diminish the experience of ORV recreationists who do not want their use to unnecessarily harm the

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other recreational uses. *Winter Wildlands Alliance v. U.S. Forest Service*, No. 1:11-CV-586-REB, 2013 U.S. Dist. LEXIS 47728, at *27-36 (D. Idaho, Mar. 29, 2013). In response, the Forest Service finalized a winter travel management rule in January 2015. The rule is codified at 36 C.F.R. part 212, subpart C and requires forests to designate a system of areas and trails for over-snow vehicle use that satisfies the minimization criteria.

[12] *See* BLM, *2020 Travel and Transportation Management Vision* (April 2015), *available at* http://www.blm.gov/style/medialib/blm/wo/Information_Resources_Management/policy/im_attachments/2015.Par.52719.File.dat/IM2015-060_att2.pdf.

[13] 36 C.F.R. § 4.10(b). On the winter-time side, NPS regulations prohibit snowmobile use except on designated routes and water surfaces that are used by motor vehicles during other seasons, and where those routes and water surfaces are designated for snowmobile use by special regulation. *Id. §* 2.18(c).

[14] The agencies' current directives governing travel management planning fail to provide any meaningful direction on application of the minimization criteria. For example, Forest Service Handbook 7709.55, ch. 10 does not address the minimization criteria, and Forest Service Manual 7715 lists "consider[ation of] the [minimization] criteria in 36 CFR 212.55" as one of seven "policy" objectives for travel management decisions, but then simply recites the language of the regulation. Forest Service Manual 7715.5(2). Similarly, BLM's Travel and Transportation Management Manual 1626 simply cites 43 C.F.R. § 8342.1 [the minimization criteria] as providing the relevant criteria for designation of areas and routes and states that "the decision-making process must be thoroughly documented in the administrative record." BLM Manual 1606.06(A)(2)(a) & (B).

environment or others' enjoyment, and are concerned about being unfairly blamed for problems resulting from mismanagement.

In this context, there is an immediate need for leadership and direction to assist field managers with proper implementation of the executive order minimization criteria. This need is particularly urgent given upcoming agency planning and policy initiatives. As mentioned above, the Forest Service is commencing winter travel management planning under a new rule and is currently revising its directives to reflect the mandate to plan for snowmobile use. It is important to make sure that the agency's approach to summer-time ORV planning is not a harbinger for similar non-compliance in upcoming winter travel management planning. On the BLM side, the agency hopes to complete hundreds of new travel management plans over the next five years. BLM is also currently revising its Travel and Transportation Management Manual and Handbook and anticipates a 2016 rollout of its "Planning 2.0," which likely will adopt the common practice of severing land use planning (where ORV areas generally are designated) from travel management planning (where ORV routes typically are designated).

These initiatives each provide an immediate need and important opportunity for additional agency guidance on application of the minimization criteria. More detailed guidance on how to apply the minimization criteria will lead to better environmental protection, more rewarding and safer recreational experiences for all, and more efficient and less expensive planning. Guidance will also assist with implementation of President Obama's mitigation policy, which complements and is consistent with the executive order direction to minimize impacts. Agency guidance on application of the minimization criteria and on implementation of the mitigation policy should reflect and reinforce one another.

The following case studies – which highlight both successes and failures – and recommendations offer take-aways and next steps for correcting course and institutionalizing policies and practices to finally satisfy the legal obligation first articulated by President Nixon over forty years ago.

II. Case Studies

The following case studies from the Forest Service, BLM, and NPS highlight individual elements of selected travel or resource management plans that make ORV area and/or trail designations. The case studies are not intended to be comprehensive or representative either in the selection of plans or in the description of plan elements. Rather, they are intended to highlight: (1) problematic approaches that fail to comply with the ORV executive orders and must be avoided in the future, and (2) examples of good planning practices that could be incorporated into a model for application of the minimization criteria. Importantly, the case studies highlighting good planning practices are not the result of the agencies' application of the minimization criteria. In fact, The Wilderness Society and partner organizations have struggled to identify *any* Forest Service or BLM ORV designation decisions that show effective application of the minimization criteria. Nevertheless, the case studies highlight some positive trends, practices, approaches, or outcomes that may be transferable to agency efforts to correct course and finally achieve compliance with the executive orders.

The case studies, which are attached as an appendix, are as follows:

A. Forest Service

1. Salmon-Challis National Forest Travel Management Plan, pp. A-1 – A-2
2. Clearwater National Forest Travel Management Plan, pp. A-3 – A-4
3. White River National Forest Travel Management Plan, pp. A-5 – A-7
4. Sawtooth National Forest, Minidoka Ranger District Travel Management Plan, pp. A-8 – A-10
5. Beaverhead-Deerlodge National Forest Land & Resource Management Plan, pp. A-11 – A-12

B. BLM

6. Richfield Field Office Resource Management Plan and Travel Management Plan, pp. A-13 – A-15
7. West Mojave Resource Management Plan Amendment and Route Designation Project, California Desert Conservation Area, pp. A-16 – A-17
8. Sonoran Desert and Ironwood Forest National Monument Resource Management Plans, pp. A-18 – A-19

C. National Park Service

9. Yellowstone National Park Winter Use Plan and Special Regulation, pp. A-20 – A-22
10. Cape Hatteras National Seashore ORV Management Plan and Special Regulation, pp. A-23 – A-24

III. Recommendations

There is an immediate need for agency leadership and direction to ensure that ongoing and future travel management planning efforts satisfy the executive order obligation to minimize resource damage and recreational use conflicts associated with ORV use. The most obvious and effective approach is for the agencies to issue guidance that clarifies their obligation to: (1) actually ***minimize*** impacts – not just identify or consider them – when designating areas and trails for ORV use, and show how they did so in the administrative record; and (2) apply a transparent and common-sense methodology for meaningful application of the minimization criteria that provides opportunities for public participation, incorporates the best available scientific information and best management practices, addresses site-specific and larger-scale impacts, and accounts for monitoring and enforcement needs and available resources. We address each of these elements below, capitalizing on the take-aways from the case studies.

A. Substantive duty to minimize impacts and conflicts

As a threshold matter, agency guidance should clarify that agencies must ***minimize*** impacts – not just identify or consider them – when designating areas or trails for ORV use, and demonstrate in the

administrative record how they did so.[15] In other words, the record must show how the minimization criteria were "implemented into the decision process."[16] As the Ninth Circuit recently held, "[w]hat is required is that the [agency] document how it evaluated and applied [relevant] data on an area-by-area [or route-by-route] basis *with the objective of minimizing impacts*."[17] This substantive obligation is consistent with President Obama's mitigation policy requiring agencies to avoid and minimize harmful impacts to achieve no net loss of – and ideally a net benefit to – important natural resources.[18]

As the case studies and litigation outcomes highlight, there are few examples of agency compliance with that substantive mandate – and numerous examples of agency failures. The NPS's ORV designations and management in Yellowstone National Park and Cape Hatteras National Seashore, however, provide examples of what it might look like to minimize impacts to sensitive wildlife, air quality, and non-motorized uses. And while not an application of the minimization criteria, the BLM's impacts analysis and designation of ORV routes to protect and enhance certain natural and cultural resources in the Sonoran Desert and Ironwood Forest National Monuments also provide examples of what compliance with the substantive duty to minimize impacts might look like. Finally, the Clearwater National Forest's analysis and decision to close recommended wilderness areas to ORV use demonstrates minimization of impacts to the forest's wilderness resources and associated values and uses.

B. Mitigation of impacts

Guidance should also clarify that agency attempts to *mitigate* impacts associated with an existing ORV system are insufficient to fully satisfy the duty to *minimize* impacts, as specified in the executive orders. The language of the executive orders makes this clear: "[a]reas and trails shall be *located* to minimize" impacts and conflicts.[19] Thus, application of the minimization criteria should be approached in two steps: first, the agency locates areas and routes to minimize impacts, and second, the agency establishes site-specific management actions to further reduce impacts. The best available science confirms this tiered approach, as does President Obama's mitigation policy, which articulates a hierarchy of first

[15] As the courts have routinely held, agencies must document in the administrative record how their ORV designation decisions minimize resource damage and conflicts with other recreational uses. Importantly, that procedural duty – which is grounded in the Administrative Procedure Act – is both related and *in addition* to the substantive duty to minimize impacts. In other words, agencies may not remedy substantive violations of the executive orders simply by providing additional explanation in the record to justify the same designation decisions. Unfortunately, that approach is something we have seen on remand from court decisions finding such violations, including in BLM's Richfield Field Office, on the Minidoka Ranger District of the Sawtooth National Forest, and on the Beaverhead-Deerlodge National Forest.

[16] *Idaho Conservation League*, 766 F. Supp. 2d at 1072-74 (explaining that "[t]he whole goal or purpose of the exercise is to select routes in order to minimize impacts"); *see also, e.g.*, *Center for Biological Diversity*, 746 F. Supp. 2d at 1080-81 ("BLM is required to place routes specifically to minimize" impacts).

[17] *WildEarth Guardians*, 790 F.3d at 931 (emphasis added); *see also id.* at 932 ("consideration" of the minimization criteria is insufficient; rather, the agency "must apply the data it has compiled to show how it designed the areas open to snowmobile use 'with the objective of minimizing'" impacts).

[18] Presidential Mitigation Memorandum, §§ 1, 3(b).

[19] Exec. Order 11644, § 3(a); *see also Center for Biological Diversity*, 746 F. Supp. 2d at 1080-81 ("'Minimize' as used in the regulation . . . refers to the *effects* of route designations, i.e. the BLM is required to place routes specifically to minimize 'damage' to public resources, 'harassment' and 'disruption' of wildlife and its habitat, and minimize 'conflicts' of uses." (footnote and citations omitted)).

avoiding and minimizing impacts through proper project siting and design, and only then considering additional measures to mitigate any remaining harmful effects.[20]

The relative importance of the two steps may vary according to the specific circumstances of the land management unit. In some instances, the implementation of mitigation measures may be very important to the overall minimization effort, while in others the initial placement and designation of ORV areas and routes may dominate. Examples of the former include the Park Service's science-based, adaptive management approaches at Yellowstone National Park and Cape Hatteras National Seashore. An example of the latter is the Clearwater National Forest, where the agency decided to remove ORVs from recommended wilderness altogether.

The distinction between mitigation and minimization has generally eluded the agencies. For example, the instruction memorandum from BLM's Utah State Office appears to sanction an inappropriate mitigation approach, directing agency staff to identify "recommended mitigation measures to minimize user and resource conflicts for each alternative."[21] Similarly, on remand from a court decision overturning its 2008 travel plan, the Minidoka Ranger District of the Sawtooth National Forest – rather than revisiting its designation decisions – has focused exclusively on monitoring and maintenance of the designated system.[22]

C. Application of minimization criteria to area allocations

Guidance should also clarify that the agencies must satisfy their substantive duty to minimize impacts when making *both* ORV area allocations (typically made in land management plans) and specific route designations (often made in travel plans). The plain language of the executive orders and agency regulations clearly require this, yet we have seen the agencies make area allocations with even more disregard for the minimization criteria than in the route designation context.[23] Minimization of impacts associated with area designations is particularly important in winter travel management planning, where snowmobiles are often permitted to travel freely throughout large open areas, rather than being confined to specific routes.[24] In overturning the Forest Service's land management plan decision to

[20] *See* Switalski and Jones, 2012 (cataloguing best management practices for: (1) siting/locating routes to minimize impacts; (2) implementation, including maintenance, restoration, adaptive management, and other mitigation measures; and (3) monitoring); Presidential Mitigation Memorandum, §§ 1, 2(f).
[21] *See* Richfield Field Office case study, pp. A-13 – A-15 of this report.
[22] *See* Sawtooth National Forest, Minidoka Ranger District case study, pp. A-8 – A-10 of this report. BLM's proposed route network in the West Mojave Desert is a particularly egregious example: it would designate a massive and damaging ORV route network and then attempt to mitigate the impacts associated with its over 10,000-mile network if and when a complicated set of triggers are met. *See* West Mojave case study, pp. A-16 – A-17 of this report.
[23] For example, BLM's 2011 Resource Management Plan for the Little Snake Field Office designated as open to cross-country ORV travel nearly 20,000 acres in the South Sand Wash Basin Special Recreation Management Area despite the presence of significant cultural sites vulnerable to ORV damage and other sensitive resources including a wild horse herd.
[24] The Forest Service's winter travel management rule permits open area designations to be significantly larger than in the summer travel planning context, and it does not explicitly require analysis of individual routes within those large open areas. *See* 36 C.F.R. § 212.1 (definition of "area").

allocate over 60% of the Beaverhead-Deerlodge National Forest to snowmobile use, the Ninth Circuit Court of Appeals recently confirmed that the agency is required "to apply the minimization criteria to *each area* it designate[s] for snowmobile use."[25]

We also understand that BLM's upcoming Planning 2.0 likely will sever land use planning (and associated ORV area allocations) from travel management planning designed to designate specific routes – an approach that is already commonplace. With area allocation decisions made in land use plans setting the framework for where route designations will occur in travel plans (and often leaving large swaths of land open to cross-country motorized travel, with no future decision-making required to authorize that use), proper application of the minimization criteria at both scales is important and required.

D. Key elements of recommended methodology

In order to achieve compliance with the substantive duty to minimize impacts associated with area and trail designations, the agencies must apply a transparent and common-sense methodology for meaningful application of each minimization criterion. Federal court decisions and the case studies in this white paper highlight necessary elements of that methodology, which are described below and should be included in agency guidance.

First, application of the minimization criteria is not solely an office exercise. As the courts have repeatedly made clear, use of cryptic spreadsheets or matrices that favor ORV use and do not facilitate implementation of the substantive duty to minimize impacts is inadequate.[26] Rather, agencies should get out on the ground, gather site- and resource-specific information, ground-truth desk-top analyses, and then utilize that data to actually apply the criteria to minimize resource damage and use conflicts associated with each designated area and route.

The Salmon-Challis National Forest provides a telling example. There, the court invalidated the agency's route designations that failed to utilize monitoring and other site-specific data showing resource damage.[27] On remand, however, the agency used existing data and gathered additional site-specific information to actually assess the impacts of each route, resulting in closures of routes causing resource damage. The story on the Sawtooth National Forest is not as promising. There, the agency has taken the troubling approach on remand that it need not apply each minimization criterion to each designated route and instead may rely on compliance with the governing land and resource management plan as a proxy for satisfying its obligations under the executive orders.[28] A federal court recently invalidated that approach in a challenge to another travel management plan: "[m]erely concluding that the proposed action is consistent with the Forest Plan does not . . . satisfy the requirement that the Forest Service

[25] *WildEarth Guardians*, 790 F.3d at 930.
[26] *See, e.g.*, *Idaho Conservation League*, 766 F. Supp. 2d at 1071-74 (agency may not rely on "Route Designation Matrices" that fail to show if or how the agency selected routes with the objective of minimizing their impacts); *S. Utah Wilderness Alliance*, 981 F. Supp. 2d at 1105 ("cryptic spreadsheet for each route segment provides inadequate information . . . for someone other than the BLM to know why or how the routes were chosen").
[27] *Idaho Conservation League*, 766 F. Supp. 2d at 1074-77.
[28] Land and resource management plans are designed to provide long-term, forest-wide management direction – not to satisfy the executive order minimization criteria. *See* 16 U.S.C. § 1604; 36 C.F.R. part 219, subpart A.

provide some explanation or analysis showing that it considered the minimizing criteria and took some action to minimize environmental damage when designating routes."[29] This is just one example where clear agency guidance could avoid duplicative mistakes.

The type of site-specific information will vary depending on the area and resources at stake. For example, at Cape Hatteras National Seashore, the National Park Service conducts daily monitoring of sea turtle and bird nesting sites along designated ORV routes, and implements temporary route closures as necessary to protect those resources. In the Ironwood Forest National Monument, BLM conducted on-the-ground inventories for archaeological and cultural resources along routes proposed for designation to gather the information necessary to determine which routes to designate as open and which to close. By contrast, a federal court invalidated BLM's route designations in the Richfield Field Office in part because the agency failed to conduct such inventories.[30] Absent inventory data, agencies lack the information necessary to locate designated routes to minimize impacts to cultural resources.

Second, effective application of the minimization criteria must include meaningful opportunities for public participation and input early in the planning process.[31] In many cases, public lands users and other stakeholders are the best source of information for identifying resource and recreational use conflicts. As illustrated in the litigation over the Salmon-Challis National Forest travel plan, agencies disregard site-specific information submitted by the public at their peril. At the same time, it is important that agencies assess the reliability and accuracy of information they receive, and independently verify the information as needed. In certain circumstances, collaborative processes such as the Vail Pass Task Force on the White River National Forest may provide valuable recommendations or information.

Third, application of the minimization criteria should be informed by the best available scientific information and associated strategies and methodologies for minimizing impacts to particular resources.[32] In 2012, the Journal of Conservation Planning published a literature review and best management practices (BMPs) for ORVs on national forest lands.[33] The BMPs provide guidelines, based on peer-reviewed science, for ORV designation decisions, implementation actions, and monitoring activities that are intended to minimize impacts to soils, water quality, vegetation, and wildlife, and conflicts with other recreational uses. Winter Wildlands Alliance recently published a similar literature review and BMPs for winter travel planning on national forest system lands, which is currently undergoing peer review.[34] Agency decision-making processes – and ideally agency guidance addressing

[29] *Friends of the Clearwater*, 2015 U.S. Dist. LEXIS 30671, at *46.
[30] The court's decision that BLM's failure to conduct on-the-ground inventories violated the National Historic Preservation Act is currently on appeal.
[31] *See* 36 C.F.R. § 212.52(a) (Forest Service); 43 C.F.R. § 8342.2(a) (BLM).
[32] *See Friends of the Clearwater*, 2015 U.S. Dist. LEXIS 30671, at *24-30, 40-52 (agency failed to consider best available science on impacts of motorized routes on elk habitat effectiveness or to select routes with the objective of minimizing impacts to that habitat and other forest resources).
[33] Switalski and Jones, 2012.
[34] Switalski, 2014.

the minimization criteria – should reference and incorporate these BMPs.[35] Although they were formulated for national forest lands, many of the BMPs may be applicable to ORV designation decisions on BLM and NPS lands as well.

In addition to generalized BMPs, application of the minimization criteria should incorporate any relevant site- or resource-specific scientific information or analysis. For example, Yellowstone National Park not only compiled and incorporated the best available scientific information related to snowmobile use and park resources – even convening a scientific advisory team to provide guidance on those efforts – but it also conducted additional scientific studies to fill information gaps on air quality, soundscapes, snowpack chemistry, and socioeconomic impacts. The ORV management plan for Cape Hatteras National Seashore incorporates management strategies to minimize impacts to imperiled sea turtles and birds based on standards contained in state and federal recovery plans and other peer-reviewed, scientific studies. And the White River National Forest conducted a detailed analysis of recreational use conflicts that assessed factors such as the quality of recreational experiences, average travel distances and terrain needs for motorized versus non-motorized users, crowding, user trends and demands, and locations and availability of access points and staging areas.

Fourth, proper application of the minimization criteria must address both site-specific and larger-scale impacts.[36] For example, agencies should assess and minimize landscape-scale impacts such as habitat fragmentation, cumulative noise and air and water quality impacts, and degradation of wilderness-quality lands and associated opportunities for primitive forms of recreation. Even to the extent they have considered or applied the minimization criteria, the agencies have generally failed to assess and minimize these larger-scale impacts. The Clearwater National Forest's analysis of ORV impacts on recommended wilderness areas, however, did address landscape-scale impacts such as disturbance of long-term ecological processes and sights and sounds that degrade the areas' naturalness and opportunities for solitude. Similarly, Yellowstone National Park analyzed the effects of snowmobile use on park resources at the site-specific and landscape scales and in the short- and long-term, looking, for example, at long-term population dynamics and range-wide displacement of bison and elk, in addition to shorter-term behavioral and physiological responses.

Finally, proper application of the minimization criteria should take into account available resources for monitoring and enforcement, as well as any measures designed to further reduce and mitigate impacts.[37] For example, the chaotic and damaging situation in the West Mojave Desert highlights the

[35] The Bitterroot National Forest recently referenced and applied BMPs from Switalski and Jones, 2012 in its Decision Notice/Finding of No Significant Impact for a project involving the designation of ORV trails. *See* Darby Lumber Lands Phase I – Decision Notice and Finding of No Significant Impact, pp. 13-14.

[36] *See, e.g.*, *Idaho Conservation League*, 766 F. Supp. 2d at 1066-68, 1074-77 (invaliding travel plan that failed to consider aggregate impacts of short motorized routes on wilderness values or site-specific erosion and other impacts of particular routes).

[37] As described above, adopting measures designed to *mitigate* impacts associated with ORV use alone is insufficient to satisfy the agencies' obligation under the executive orders to locate designated areas and trails to *minimize* resource damage and conflicts with other recreational uses. Where mitigation measures assist the agency in satisfying its minimization duty under the executive orders, however, the agency should demonstrate a reasonable expectation that resources will be available to ensure their implementation.

importance of designating an ORV system that the agency is capable of enforcing and maintaining. Conversely, the Park Service devotes significant resources to monitoring and enforcement at Cape Hatteras National Seashore – including daily patrols for nesting sea turtles and birds and associated temporary closures that are posted on-site and regularly updated on an interactive, online Google Earth map. To ease enforcement obligations and ensure user compliance in the first place, ORV designation decisions should establish clear boundaries and simple restrictions (posted on-site *and* depicted on a widely available ORV area and route map) designed to minimize resource damage and conflicts with other recreational uses, and should follow a consistent rubric that areas and routes are closed unless marked open on a map. The clear delineations between motorized and non-motorized areas and trails in the management plan for the Vail Pass Winter Recreation Area on the White River National Forest provide a good example. The clear management direction at Vail Pass is further reinforced by robust monitoring and enforcement by seasonal rangers funded through permit fees.

We recommend that the agencies explore and develop policies, guidance documents, and other tools that incorporate these recommendations and ensure future compliance with the executive orders. The Forest Service's ongoing effort to update its directives to be consistent with the new winter travel management planning rule, BLM's ongoing revision of its Travel and Transportation Management Manual and Handbook, the anticipated 2016 rollout of BLM's Planning 2.0, and implementation of the presidential memorandum on mitigation each provide immediate opportunities for the agencies to incorporate useful guidance on the minimization criteria into their directives. In the short-term, it also makes sense for agency directors to issue instructive memoranda explaining the agencies' responsibilities under the executive orders.

IV. Conclusion

It has been over four decades since President Nixon obligated the federal land management agencies to minimize resources damage and recreational use conflicts associated with ORV use. With the Forest Service embarking on winter travel planning and the BLM ramping up its travel planning efforts, it is time for the agencies to provide leadership and direction to guide those processes and avoid additional litigation. We look forward to assisting the agencies with that effort and hope that the recommendations in this white paper provide a solid starting point.

Please contact Alison Flint (303.802.1404, alison_flint@tws.org) with any questions.[38]

[38] The following Wilderness Society staff and volunteer interns contributed substantially to the content and production of this white paper: Alison Flint, Vera Smith, Phil Hanceford, Nada Culver, Scott Miller, Barbara Young, Josh Hicks, Brad Brooks, and Louisa Eberle.

APPENDIX – Case Studies

Travel Management Plan
Salmon-Challis National Forest, Idaho
U.S. Forest Service

Idaho's Salmon-Challis National Forest is one of the largest and most remote national forests in the West. Its large roadless areas provide outstanding fish and wildlife habitat and recreational opportunities. The remoteness of the forest's trail network, however, has limited the agency's ability to maintain, monitor, and enforce ORV use, resulting in significant damage to forest resources. The Forest Service's 2009 travel plan ignored the agency's duty to minimize those impacts and designated hundreds of miles of ORV trails causing resource damage and conflicts with non-motorized uses, prompting conservation groups to file – and ultimately win – a lawsuit in federal court. Fortunately, the Forest Service has since taken more seriously its duty to minimize impacts, leading to closure of certain damaging routes.

Pioneer Mountains Recommended Wilderness Area (credit: Brad Smith)

<u>Timeline</u>

- 2008: conservation groups submit site-specific comments and data documenting the condition and impacts of over 400 miles of ORV routes across the forest, including those in sensitive areas.
- September 2009: Forest Service finalizes travel plan, designating more than 3,500 miles of motorized roads and trails.
- January 2010: conservation groups file suit in federal court.
- February 2011: court rules that "the Administrative Record does not demonstrate whether or how [the Forest Service] implemented and incorporated the

> ***"[A]gencies [are] bound by the plain language of the ORV Executive Orders . . . . Simply listing the criteria and noting that they were considered is not sufficient to meet this standard. Instead, the Forest Service must explain how the minimization criteria were applied in the route designation decisions."*** *Idaho Conservation League v. Guzman, 766 F. Supp. 2d 1056, 1074 (D. Idaho 2011).*

minimization criteria into the Travel Plan," among other legal violations, and sends the decision back to the agency. *Idaho Conservation League v. Guzman*, 766 F. Supp. 2d 1056, 1071-74 (D. Idaho 2011).

- November 2011: court enjoins ORV use on six routes causing irreparable resource damage.
- August 2014: Forest Service releases Final Supplemental EIS and Record of Decision, closing approximately 45 miles of routes due to resource impacts from ORV use and imposing certain seasonal restrictions to prohibit ORV use during snowmelt and run-off, when trails are most susceptible to damage.

Damaging ORV route at Swauger Lake within recommended wilderness, closed by the Forest Service in its 2014 decision (credit: Brad Smith)

Damaged trail in Winnemucca Creek (credit: Brad Smith)

Take-Aways

- Agency must do more than just identify or consider the minimization criteria; it must actually apply them on a route-by-route basis.
- Application of minimization criteria is not solely an office exercise: the Forest Service initially failed to utilize monitoring and other site-specific data submitted by conservation groups, but on remand used existing and gathered additional information to assess the impacts of each route, resulting in closures of routes causing resource damage.

Travel Management Plan
Clearwater National Forest, Idaho
U.S. Forest Service

Bear grass within recommended wilderness (credit: John McCarthy)

The remote corners of Idaho's Clearwater National Forest remained largely untouched until the advent of modern ORVs. Expanding use and increased technological capabilities of dirt bikes, four-wheelers, snowmobiles, and even mountain bikes enabled more and more people to access roadless and recommended wilderness areas. These trends have impacted opportunities for primitive, non-motorized recreation in those areas, threatened wildlife habitat security, and caused soil erosion and stream sedimentation. Although deficient in protecting the larger forest matrix, the Forest Service's 2011 travel management plan considered impacts to recommended wilderness areas and took protective action to minimize them by restricting both summer and winter-time ORV use in those areas.

Timeline

- July 2005: Forest Service initiates travel planning process.
- August 2011: Forest Service releases Final EIS.
- November 2011: Forest Service finalizes travel plan closing 200,000 acres of recommended wilderness to ORVs, including snowmobiles, and leaving open only 2 miles of existing trail in the proposed Great Burn Wilderness Area.
- August 2012: Motorized user groups file lawsuit seeking to overturn ORV prohibitions in recommended wilderness areas.
- February 2015: Court approves a settlement agreement requiring the agency to conduct a supplemental NEPA analysis, but leaves

> ***"Restricting almost all motorized (summer and winter) uses . . . would ensure that long-term ecological processes remain intact and operating because the areas would not be subject to current or potentially increased future ground disturbance associated with motorized vehicles in particular. The area would appear more undeveloped than at present because the sights and sounds associated with motorized use would not occur. The opportunity for solitude would be greater . . . because most of the area would be restricted from motorized use."*** *Final EIS, p. 3-137, describing impacts to recommended wilderness.*

prohibitions in recommended wilderness in place.[39]

Take-Aways

- Analysis demonstrated that motorized use was impairing wilderness character of recommended wilderness, resulting in closures. Forest Service recognized that designating motorized use in recommended wilderness impairs its wilderness suitability because Congress is unlikely to designate those areas after motorized uses become established.
- Forest Service took initiative to proactively address winter-time ORV use and minimize impacts associated with snowmobile use in recommended wilderness areas.

Snowmobile "high-marking" in Great Burn Recommended Wilderness Area, now closed to motorized uses (credit: Dick Walker)

Fly fishing on Kelly Creek in the Great Burn Recommended Wilderness Area (credit: ©Krista Schlyer/ILCP)

[39] Another lawsuit challenging other, less protective elements of the forest's 2011 travel plan resulted in a 2015 court decision invalidating the travel plan for failure to apply and implement the minimization criteria and to comply with governing forest plan standards designed to protect wildlife habitat. *Friends of the Clearwater v. U.S. Forest Service*, No. 3:13-CV-00515-EJL, 2015 U.S. Dist. LEXIS 30671 (D. Idaho Mar. 11, 2015). The entire plan is now back before the agency.

Travel Management Plan
White River National Forest, Colorado
U.S. Forest Service

With its spectacular scenery, amenities ranging from developed ski areas to vast roadless and other wild lands, and close proximity to the Denver metro area, the White River National Forest is one of the most visited national forests in the nation and a mecca for both motorized and non-motorized forms of recreation. On snow-abundant and easily accessible Vail Pass, conflicts between snowmobiles and skiers and snowshoers escalated in the 1990s, leading to the formation of a collaborative task force that worked for more than a decade to ameliorate those conflicts. The forest's 2011 travel management plan adopted the task force's recommended management plan for the Vail Pass Winter Recreation Area and generally balanced motorized access with protection of forest resources and quiet recreation opportunities.

Portion of extensive, high-elevation wetland complex in Freeman Creek Watershed, with Gore Range in the background (credit: Will Roush)

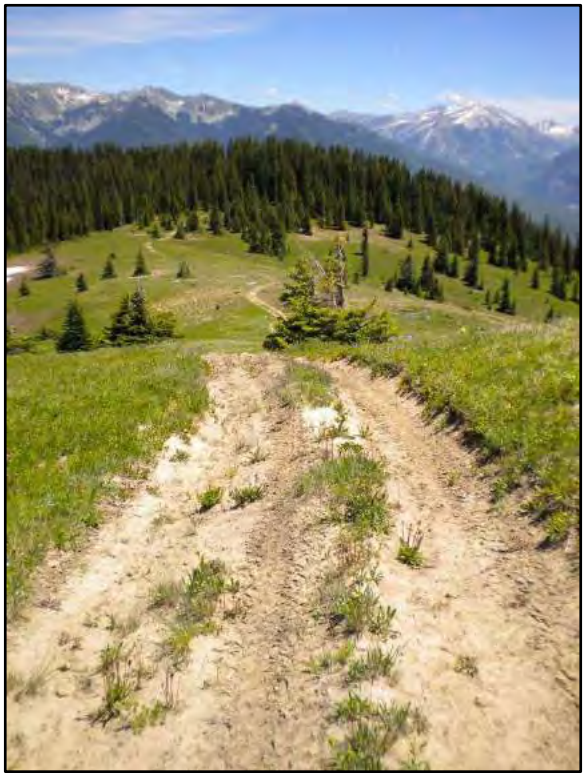
Timeline

- Mid-1990s: Vail Pass Task Force organized, with voluntary members representing motorized and non-motorized users.
- March 2011: Forest Service releases Final EIS and travel management plan:
    - Designates summer and winter areas and routes available for motorized travel;
    - Identifies over 500 miles of system routes and nearly 700 miles of unauthorized routes for closure and decommissioning to reduce resource damage and wildlife fragmentation, concentrate use, remove unnecessary routes, and reflect budgetary constraints (FEIS, pp. 115-135);
    - Provides detailed analysis of recreational use conflicts and recreation planning for motorized and non-motorized uses (FEIS, pp.

> ***"[I]nstead of trying to provide all [recreational] opportunities in all locations possible, the forest will provide opportunities in appropriate locations and of sufficient quantity and quality to be sustainable, manageable, and remain as good visitor experiences."*** *Final EIS, p. 70.*

66-97); and

- Adopts Task Force's recommended management plan for 55,000-acre Vail Pass Winter Recreation Area, dividing the area into motorized/multi-use and non-motorized zones, with designated trails for each, and establishing a permitting system whose funds go to grooming, education, enforcement, and monitoring.

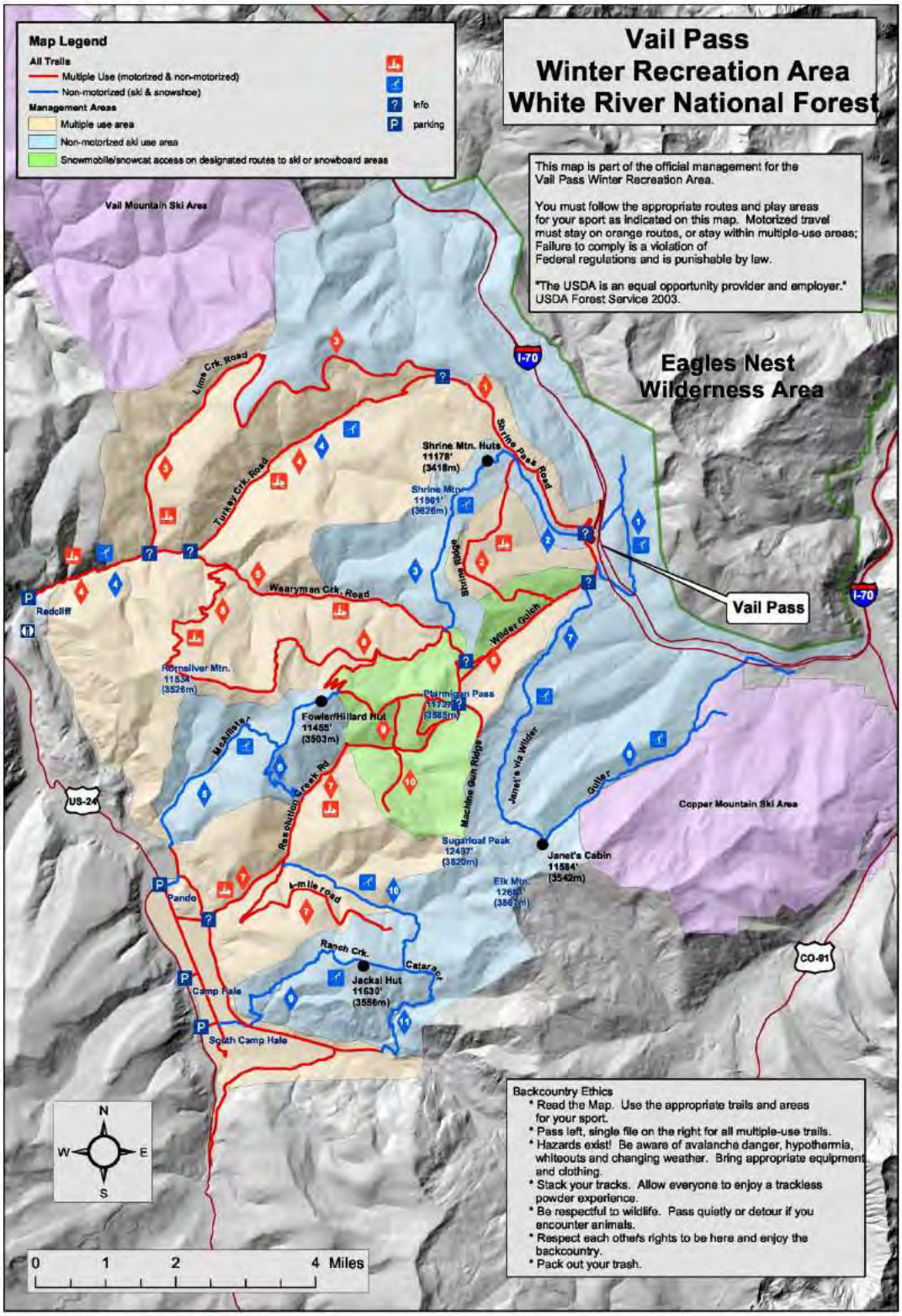


Illegal ORV use beyond a Forest Service motorized trail closure, causing significant damage to alpine meadow ecosystem and detracting from hikers' enjoyment of scenic Huntsman Ridge (credit: Will Roush)

Take-Aways

- Under the right circumstances, collaborative processes that provide motorized, non-motorized, and conservation stakeholders with a co-equal voice, well-defined goals, and shared decision-making can result in effective ORV management decisions.
- To minimize conflicts between uses, ORV designation decisions should establish clear boundaries and expectations and simple restrictions, and should be based on factors such as the quality of recreational experiences, terrain needs, crowding, user trends and demands, and locations and availability of access points and staging areas.
- Agencies should consider fiscal ability to adequately maintain and enforce the designated system to prevent resource damage and conflicts with other uses.

A family enjoying the Vail Pass Winter Recreation Area (credit: www.summitpost.org)


Map Legend
All Trails
Multiple Use (motorized & non-motorized)
Non-motorized (ski & snowshoe)
Management Areas
Multiple use area
Non-motorized ski use area
Snowmobile/snowcat access on designated routes to ski or snowboard areas
info
parking
Vail Pass
Winter Recreation Area
White River National Forest
This map is part of the official management for the Vail Pass Winter Recreation Area.
You must follow the appropriate routes and play areas for your sport as indicated on this map. Motorized travel must stay on orange routes, or stay within multiple-use areas; Failure to comply is a violation of Federal regulations and is punishable by law.
"The USDA is an equal opportunity provider and employer." USDA Forest Service 2003.
Eagles Nest Wilderness Area
Vail Mountain Ski Area
Lime Crk. Road
Turkey Crk. Road
Shrine Mtn. Huts 11178' (3418m)
Shrine Mtn. 11961' (3626m)
Shrine Pass Road
Shrine Ridge
Vail Pass
I-70
Wearyman Crk. Road
Redcliff
Wilder Gulch
Hornsilver Mtn. 11534' (3526m)
Ptarmigan Pass 11729' (3585m)
Fowler/Hillard Hut 11455' (3503m)
McAllister
Resolution Creek Rd
Machine Gun Ridge
Janet's via Wilder
Guller
US-24
Copper Mountain Ski Area
Sugarloaf Peak 12497' (3820m)
Janet's Cabin 11584' (3542m)
Elk Mtn. 12653' (3857m)
Pando
4-mile road
Ranch Crk.
Cataract
Jackal Hut 11630' (3556m)
Camp Hale
South Camp Hale
CO-91
N
W
E
S
0 1 2 4 Miles
Backcountry Ethics
* Read the Map. Use the appropriate trails and areas for your sport.
* Pass left, single file on the right for all multiple-use trails.
* Hazards exist! Be aware of avalanche danger, hypothermia, whiteouts and changing weather. Bring appropriate equipment and clothing.
* Stack your tracks. Allow everyone to enjoy a trackless powder experience.
* Be respectful to wildlife. Pass quietly or detour if you encounter animals.
* Respect each other's rights to be here and enjoy the backcountry.
* Pack out your trash.

Travel Management Plan
Minidoka Ranger District, Sawtooth National Forest, Idaho
U.S. Forest Service

The easily accessible Minidoka Ranger District of southern Idaho's Sawtooth National Forest provides an abundance of recreational opportunities, including fishing, camping, pine nut gathering, hiking, and rock climbing. Despite the fact that less than 3% of recreation visits to the Sawtooth in 2005 were for ORV use, the Forest Service's 2008 travel plan revision for the Minidoka District designated nearly 2,000 miles of ORV routes, including many previously illegal, user-created trails in sensitive and impaired watersheds, riparian areas, and wildlife habitat. The agency's failure to minimize resource damage and comply with the Clean Water Act prompted conservation groups to file – and win – a lawsuit in federal court. Unfortunately, on remand, the Forest Service adopted an ill-conceived and troubling approach that compliance with the governing land and resource management plan necessarily satisfied its duty to minimize impacts associated with ORV use.

Christ's Indian Paintbrush, an exceptionally rare plant species found only on a single mountaintop in the Minidoka Ranger District and threatened by invasive weeds that can be spread by ORV use (credit: U.S. Forest Service)

Timeline

- November 2007: Forest Service releases environmental assessment (EA) for travel plan revisions in three Sawtooth Ranger Districts.
- December 2007: EPA comments that "there is no alternative included that would reflect actual recreation uses and priorities of the public," "[a]ll proposed route designations . . . appear to disproportionately favor motorized recreation," and "the number of miles of roads and trails . . . could . . . have a substantial negative impact on wildlife."

> ***"It goes without saying that reducing ORV use is beneficial to resources. That conclusion, however, has already been reached by the laws and regulations requiring this action. What is required of the agency is an analysis comprised of something more than restating that conclusion."*** *The Wilderness Society v. U.S. Forest Service, 850 F. Supp. 2d 1144, 1168 (D. Idaho 2012).*

- February 2008: Forest Service finalizes travel plan revision for Minidoka Ranger District, designating nearly 2,000 miles of roads and trails for ORV use, including the addition of 76 miles of user-created trails.
- August 2008: Conservation groups file suit in federal court.
- February 2012: Court finds numerous deficiencies in travel plan and corresponding NEPA analysis, but reserves judgment on whether the agency satisfied its duty to minimize ORV impacts. *The Wilderness Society v. U.S. Forest Service*, 850 F. Supp. 2d 1144 (D. Idaho 2012).

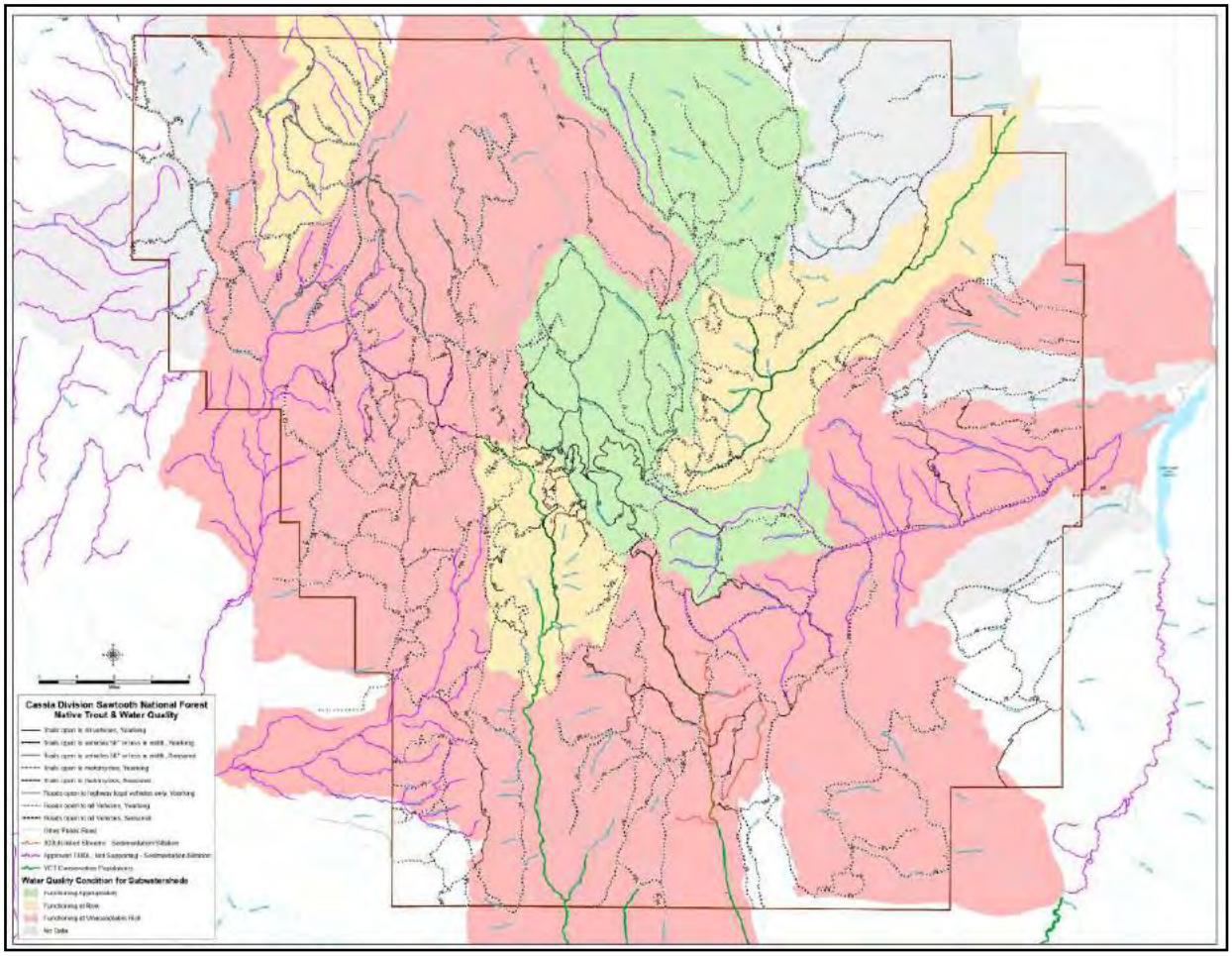
ORV damage on user-created trail (credit: James Prunty)

- February 2013: Sawtooth National Forest Supervisor issues a white paper directing that "the level of acceptable effects to demonstrate compliance with [the minimization criteria] is defined by the Sawtooth Forest Plan, which requires compliance with the Endangered Species Act (ESA), Clean Water Act (CWA), and other resource laws, regulations, and policy" (p. 3).
- October 2013: Court rules that general statements by the Forest Service about impacts to wildlife and water, and reliance on elimination of cross-country ORV travel and certain route closures, are insufficient to satisfy the minimization criteria. *The Wilderness Society v. U.S. Forest Service*, No. CV08-363-E-EJL, 2013 U.S. Dist. LEXIS 153036, at *22-32 (D. Idaho Oct. 22, 2013).
- March 2014: Forest Service releases a supplement to the 2007 EA, highlighting monitoring and maintenance efforts, but adopting the white paper standard that 2008 route designations satisfy the minimization criteria because all action alternatives comply with the Forest Plan (pp. 50-52).
- August 2014: Final decision notice confirms approach from supplemental EA.

Take-Aways

- Making a planning decision that improves environmental conditions (for instance, by eliminating cross-country driving and restricting ORVs to designated routes) does not satisfy the agencies' duty to minimize resource damage and conflicts with other recreational uses associated with the areas and routes that are designated.
- Efforts to *mitigate* impacts associated with the designated ORV system (e.g., through monitoring and maintenance efforts) is insufficient to fully satisfy the executive orders, which require that designated areas and trails be *located* to minimize impacts and conflicts in the first instance.
- Reliance on the forest plan as a proxy for application of the minimization criteria is inappropriate because it conflates separate and distinct legal obligations. Forest plans are not designed to satisfy

the duty to minimize impacts under the executive orders, and compliance with plan direction does not necessarily mean impacts from ORV designations have been minimized.[40]



Map depicting high density of motorized routes and seriously degraded watershed conditions (red = functioning at unacceptable risk; yellow = functioning at risk; green = functioning appropriately; gray = no data) in the Cassia Division of the Minidoka Ranger District, which includes nearly 500 miles of streams

[40] A federal court explicitly rejected this approach in a March 2015 decision invalidating a different travel management plan. *Friends of the Clearwater v. U.S. Forest Service*, No. 3:13-CV-00515-EJL, 2015 U.S. Dist. LEXIS 30671, at *46 (D. Idaho Mar. 11, 2015) ("Merely concluding that the proposed action is consistent with the Forest Plan does not, however, satisfy the requirement that the Forest Service provide some explanation or analysis showing that it considered the minimizing criteria and took some action to minimize environmental damage when designating routes.").

Land & Resource Management Plan
Beaverhead-Deerlodge National Forest, Montana
U.S. Forest Service

Southwestern Montana's Beaverhead-Deerlodge National Forest is nationally renowned for its trout streams, large elk populations, and exceptional backcountry recreation opportunities. As the largest national forest in Montana, its island mountain ranges and diverse ecosystems provide key habitat linkages to the Greater Yellowstone Ecosystem for wide-ranging and imperiled species such as grizzly bear, Canada lynx, and wolverine. As a mecca for winter recreation, the forest has experienced an explosion in snowmobile use over the past decades, with more powerful modern machines able to travel further and faster into previously inaccessible areas. Catering to that use, the Forest Service's 2009 revised forest plan permitted snowmobile travel across more than 2 million acres (or approximately 60% of the forest), including in sensitive wildlife habitat and favorite areas for skiers and snowshoers. Conservation groups successfully challenged that decision, leading to the first appeals court decision invalidating ORV designations that fail to satisfy the executive order duty to minimize resource damage and conflicts with other recreational uses. The seminal court opinion conclusively establishes the substantive nature of the agencies' obligation to meaningfully apply and implement – not just consider – the executive order minimization criteria when designating each area and trail for ORV use.

Miner Ridge in the Hellroaring Basin, Mt. Jefferson Roadless Area (credit: Forrest McCarthy)

Timeline

- 2002: Forest Service initiates forest plan revision.
- January 2009: Forest Service finalizes revised forest plan, acknowledging that "the unmanaged expansion of motorized uses[, including snowmobiles,] has resulted in resource damage, wildlife impacts, and competition and conflict between user groups," yet still allocating over 60% of the forest to

> ***"What is required is that the Forest Service document how it evaluated and applied the [relevant] data on an area-by-area [and route-by-route] basis with the objective of minimizing impacts . . . ."*** *WildEarth Guardians v. U.S. Forest Service, 790 F.3d 920, 931 (9th Cir. 2015).*

cross-country travel by snowmobiles. The plan did close recommended wilderness to motorized uses.[41]

- September 2010: Conservation groups file suit in federal court.
- June 2015: Ninth Circuit Court of Appeals invalidates the 2009 decision, finding no evidence in the record that the agency applied and implemented the minimization criteria when designating areas for snowmobile use. The decision specifically adopts the rationales from earlier district court decisions also invalidating BLM and Forest Service travel management decisions. *WildEarth Guardians v. U.S. Forest Service*, 790 F.3d 920, 929-32 (9th Cir. 2015*).*

Evidence of illegal snowmobile use in the Mt. Jefferson Roadless Area (credit: Forrest McCarthy)

Take-Aways

- Agencies must apply and implement – not just consider – the minimization criteria on an area-by-area and route-by-route basis, providing a "granular" analysis that applies relevant data to show how areas and trails are designed to minimize impacts.
- Agencies may not rely on forest-wide reductions in total open acreage or route mileage, or on plan-wide data or general decision-making principles. Rather, the minimization criteria are concerned with the *effects* of area and trail designations.
- The minimization criteria apply with force to area allocations made in land and resource management plans, as well as to area and trail designations made in specific travel management plans.

Denning wolverine on the Beaverhead Deerlodge (credit: Forrest McCarthy)

[41] A federal court upheld the decision to exclude motorized uses from recommended wilderness. *Beaverhead County Commissioners v. U.S. Forest Service*, No. CV 10-68-BU-SEH, 2013 U.S. Dist. LEXIS 108196 (July 22, 2013).

Resource Management Plan & Travel Management Plan
Richfield Field Office, Utah
Bureau of Land Management

BLM's Richfield Field Office encompasses some of the Utah's most iconic and remote natural landscapes, including the rugged Henry Mountains and the famed Dirty Devil River. The region's fragile desert soils and vegetation, irreplaceable archaeological sites, and scarce water resources are particularly vulnerable to degradation caused by ORV use. A federal court recently overturned BLM's 2008 travel plan designating over 4,000 miles of mostly user-created ORV routes – enough miles to drive from Atlanta, GA to Anchorage, AK – for its failure to minimize impacts to those resources. While BLM's Utah State Office has shown leadership by issuing additional guidance to assist the agency with travel planning for ORVs, that guidance falls short in its interpretation of the legal duty to minimize impacts.

Red rocks in the Dirty Devil region (credit: Ray Bloxham/SUWA)

Timeline

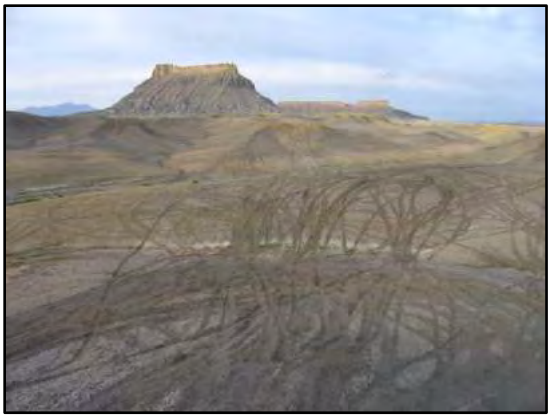
- October 2008: BLM finalizes its resource management plan (RMP) and travel plan, designating over 4,000 miles of ORV routes, with approximately 400 stream crossings, and nearly 10,000 acres of areas open to cross-country ORV travel.
- November 2010: Conservation groups file suit in federal court challenging the RMP and travel plan.[42]
- August 2012: BLM's Utah State Director issues an instruction memorandum (IM 2012-066) providing additional guidance for travel management planning.
- November 2013: Court invalidates travel plan where the record showed no analysis of specific impacts of designated ORV routes. *Southern Utah Wilderness Alliance v. Burke*, 981 F. Supp. 2d 1099, 1104-06, 1107-1110 (D. Utah 2013).

> ***"Acknowledging the minimization standards is not the same as applying them" and "[a]llowing [ORV] routes unless 'significant, undue damage' was 'imminent' is not the standard required by the minimization criteria."*** *Southern Utah Wilderness Alliance v. Burke, 981 F. Supp. 2d 1099, 1104-05 (D. Utah 2013).*

[42] The groups also challenged five other RMPs and travel plans finalized in 2008 that cover most of southern, central, and eastern Utah. The parties litigated the merits of the Richfield plan first as part of a "test-case" approach in the consolidated lawsuit. The remaining five challenges remain pending and unresolved.

- BLM applied the wrong standard by designating existing ORV routes "unless significant undue damage to or disturbance of [natural or cultural resources] or other authorized uses of the public lands is imminent."
- "[C]ryptic spreadsheet for each route segment" provided "no way to know how the BLM used or considered the information it listed" or "why or how the routes were chosen."
- BLM's finding that ORV route designations did not damage archaeological and cultural resources was unsupported where the agency failed to conduct on-the-ground inventories for those resources along designated routes, in violation of the National Historic Preservation Act. This holding is being appealed.

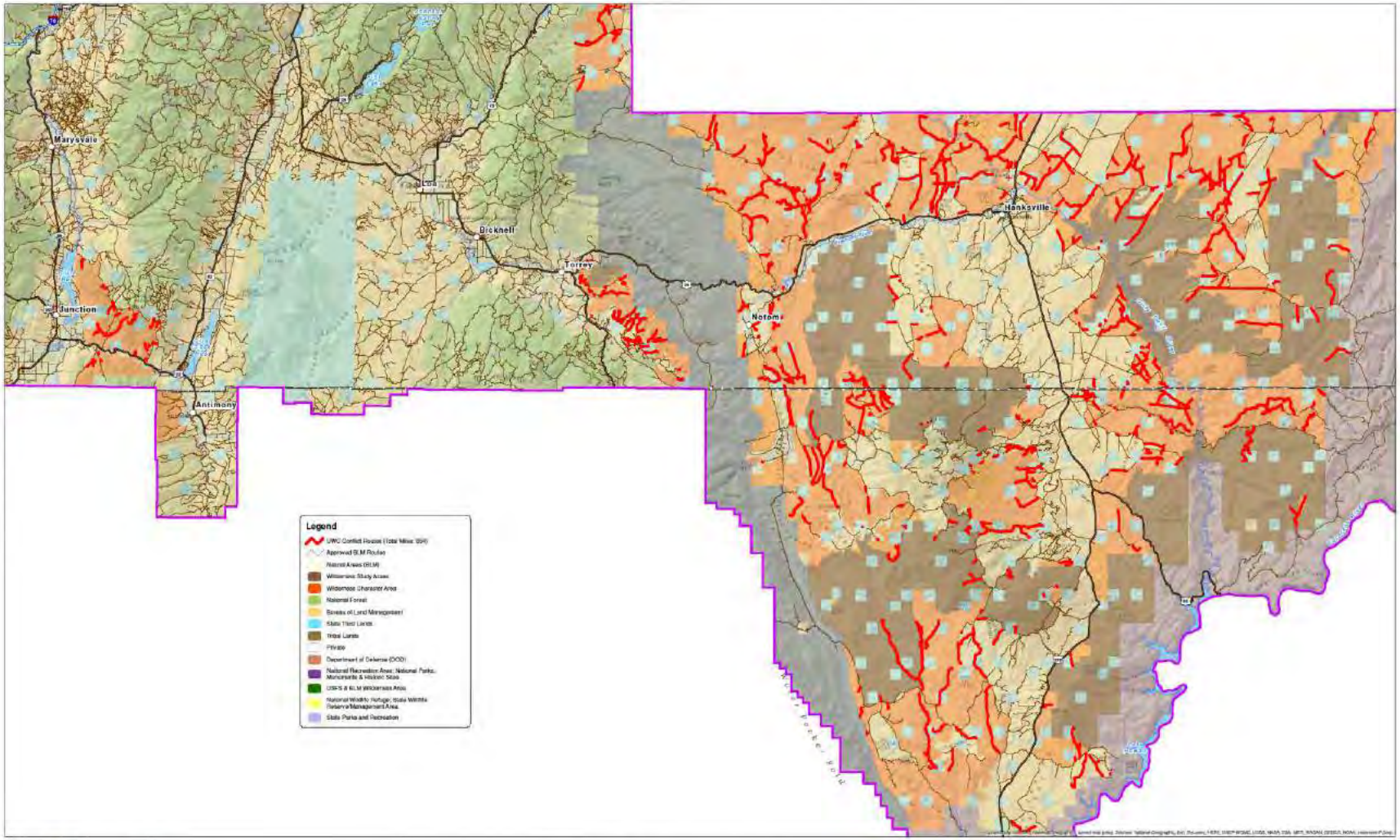
- May 2015: court orders BLM to perform detailed cultural resource inventories along *all* designated routes, apply the minimization criteria, and issue a new decision within 1-3 years, depending on the geographic area. *Southern Utah Wilderness Alliance v. Burke*, No. 2:12CV257DAK, 2015 U.S. Dist. LEXIS 67251 (D. Utah May 22, 2015) (remedy decision also on appeal).



ORV damage in Factory Butte area (credit: Ray Bloxham/SUWA)

Take-Aways

- Agencies may not establish a presumption in favor of designating existing, often user-created routes for ORV use. Instead, they must correctly apply the minimization criteria and document how they did so in the administrative record.
- Absent on-the-ground inventories for cultural resources along designated ORV routes, agencies cannot satisfy their duty under the National Historic Preservation Act to ensure travel planning decisions do not adversely affect cultural resources, and likely cannot satisfy their duty under the ORV executive orders to minimize impacts to those resources.
- While IM 2012-066 shows leadership by BLM's Utah Office and properly recognizes the need to "clearly demonstrate that the agency's decision-making process [is] documented as part of the administrative record," it generally falls short in providing accurate and adequate direction for application of the minimization criteria:
  - The IM improperly treats the minimization criteria as part of a balancing test: BLM staff is "to use the best available data and their best professional judgment when weighing the purpose and need of a route against resource and user conflicts."
  - The IM confuses the duty to *minimize* impacts with an approach that would *mitigate* impacts: BLM staff is to identify "recommended mitigation measures to minimize user and resource conflicts for each alternative."



Richfield RMP

Route Conflicts within WSA, Wilderness Character, Natural Areas

Resource Management Plan Amendment & Route Designation Project
California Desert Conservation Area, West Mojave, California
Bureau of Land Management

Southern California's Mojave Desert is home to iconic Joshua trees, imperiled desert tortoise and bighorn sheep, "cryptobiotic" soil crusts, and other unique and fragile resources. In its 1976 designation of the California Desert Conservation Area, Congress recognized that those resources are "extremely fragile, easily scarred, and slowly healed" and "seriously threatened" by growing and inadequately managed recreational use, including ORV use. 43 U.S.C. § 1781(a). BLM, however, has continued to sanction rampant and irresponsible ORV use and associated resource damage, leading to a 2009 court order requiring the agency to go back and designate ORV routes in a way that satisfies its legal obligation to minimize impacts to sensitive desert resources and conflicts with other uses. Unfortunately, the agency's 2015 proposal to *double* the mileage of its route network to over 10,000 miles utterly fails to satisfy that obligation and blatantly disregards the court's order.

Resident 50-year-old desert tortoise (credit: Peggy Kennedy)

Timeline

- March 2006: BLM finalizes West Mojave Plan, designating over 5,000 miles of ORV routes, including in sensitive wildlife habitat.
- September 2009: Court invalidates route designations where "there is nothing in the record to show that the minimization criteria were in fact applied when O[R]V routes were designated" and "[t]he essence of the BLM's position is that the Court should find that the BLM complied with [the minimization criteria] when it designated thousands of miles of O[R]V routes . . .

> ***"'Minimize' as used in the regulation does not refer to the number of routes, nor their overall mileage. It refers to the effects of route designations, i.e. the BLM is required to place routes specifically to minimize 'damage' to public resources, 'harassment' and 'disruption' of wildlife and its habitat, and minimize 'conflicts' of uses. Thus, simply because the BLM closed two-third of the routes evaluated does not, on its own, compel the conclusion that the minimization criteria were applied."*** *Center for Biological Diversity v. Bureau of Land Management, 746 F. Supp. 2d 1055, 1080-81 (N.D. Cal. 2009) (footnote and citations omitted).*

because the BLM says that it did." *Center for Biological Diversity v. Bureau of Land Management*, 746 F. Supp. 2d 1055, 1071-83 (N.D. Cal. 2009) (quotations and citations omitted).

- January 2011: Court orders BLM to revise its route designations in compliance with the minimization criteria, to conduct interim monitoring, maintenance, and enforcement activities, and to submit quarterly reports documenting its progress. *Center for Biological Diversity v. Bureau of Land Management*, No. C 06-4884 SI, 2011 U.S. Dist. LEXIS 11764, at *7-8, *29-31 (N.D. Cal. Jan. 28, 2011).
- December 2014: BLM field report documents areas overrun with tens of thousands of ORVs over the Thanksgiving holiday weekend, including illegal incursions into wilderness areas and other sensitive biological and cultural sites.

"Closed" ORV route in portion of the Juniper Flats Area of Critical Environmental Concern designated to protect sensitive cultural resources (credit: Jenny Wilder)

- March 2015: BLM's preferred alternative in its draft supplemental EIS would designate over 10,000 miles of mostly user-created routes – twice the mileage in the invalid 2006 plan – and, according to the agency's own impact analysis, have the "*largest* magnitude of adverse impacts" to fragile desert resources, which the agency would then attempt to *mitigate*.

Take-Aways

- Consideration or evaluation of impacts is not the same as *minimizing* those impacts, and agency methodology may not skew route designation decision-making in favor of ORV use.
- Minimizing resource damage and conflicts with other uses requires adequate enforcement and maintenance capability for the designated system.
- A strategy to *mitigate* impacts associated with an otherwise damaging route network does not satisfy the executive orders, which require the agency to *locate* designated routes to minimize impacts in the first instance.

Nov. 31, 2014 dust storm following soil disturbance from extensive ORV use over the Thanksgiving holiday weekend at Coyote Dry Lake (credit: Peggy Kennedy)

National Monument Resource Management Plans
Sonoran Desert and Ironwood Forest National Monuments, AZ
Bureau of Land Management

As crown jewels of our federal public lands, national monuments are established and managed to protect and restore their outstanding cultural, ecological, and scientific values for the benefit of current and future generations. The Sonoran Desert and Ironwood Forest National Monuments (NM) in Arizona – both managed by BLM – contain extraordinary and fragile biological and archaeological resources (known as "monument objects") that are particularly vulnerable to damage caused by ORV use. BLM's recent resource management plans (RMPs) for the two monuments carefully analyzed those impacts and limited ORV use to safeguard monument objects. While BLM's application of the executive order minimization criteria fell significantly short, its methodology for assessing and designating ORV routes to protect monument objects could potentially be carried forward to comply with the executive order duty to minimize impacts and conflicts.

Ironwood Forest National Monument (credit: Phil Hanceford)

Timeline

- June 2000: President Clinton establishes the Ironwood Forest NM to protect outstanding geological, biological, and archaeological resources, including 800-year-old ironwood forest habitat that supports nearly 700 plant and animal species.
- January 2001: President Clinton establishes the Sonoran Desert NM to protect "a magnificent example of untrammeled Sonoran desert landscape," including extraordinary saguaro cactus forests, packrat middens, and archaeological resources.
- 2007-2008: BLM conducts on-the-ground inventories for archaeological and cultural resources along all motorized and some non-motorized routes within the

"Motorized vehicle use off road has led to visible and persistent damage to the soils and vegetation of lands adjacent to primary access routes, to degradation of the natural and cultural resource objects for which the monument was designated . . . , and to degradation of the scenic values of the monument."
BLM Decision Memorandum: Temporary Route Closure, Sonoran Desert National Monument.

Ironwood Forest NM.

- August 2007: BLM issues temporary closure of 88 miles of ORV routes in the Sonoran Desert NM to protect monument objects from "visible and persistent damage" and "degradation."
- September 2011: BLM releases Proposed RMP and Final EIS for Ironwood Forest NM.
- June 2012: BLM releases Proposed RMP and Final EIS for Sonoran Desert NM, assessing the impact of each motorized route and route network alternative on monument objects and assigning a negligible, minor, moderate, or major impact, with "adequate protection" only where impacts are minor or negligible, or where moderate impacts can be mitigated to reduce them to minor (pp. 4-543 – 4-556, 4-561 – 4-568, 4-574 – 4-586, S-4 – S-5).
- September 2012: BLM finalizes RMP and associated travel plan for Sonoran Desert NM, which closes approximately 35% of existing routes to ORV use (travel plan, p. 4).
- February 2013: BLM finalizes RMP for the Ironwood Forest NM, which closes approximately 17 miles of existing routes and over 10,000 acres to ORV use to protect wildlife habitat and cultural resources (pp. 75-81).

Multiple ORV routes causing resource damage leading to closures in the Sonoran Desert NM (credit: BLM)

Sonoran Desert National Monument (credit: Andy Laurenzi)

Take-Aways

- Agencies should obtain necessary, site-specific information – including on-the-ground cultural resource inventories – early in the planning process to inform decision-making about area and trail designations to minimize resource damage and recreational use conflicts.
- Agencies should evaluate the impacts of each ORV route and route network alternative on each relevant resource, and designate only those routes that fall below a defined threshold of minimal impacts.

Winter Use Plan & Special Regulation
Yellowstone National Park, Wyoming, Montana, Idaho
National Park Service

Yellowstone, the nation's first national park, is over 2.2 million acres and sees over 3 million visitors a year – the vast majority during the summer months. The Greater Yellowstone Ecosystem, with Yellowstone National Park at its core, is vaster still, largely intact, and provides critical habitat for grizzly bear, bison, wolverine, and myriad other species. Within the park, winter offers a unique opportunity to view wildlife, geysers, and Yellowstone's other natural wonders by ski, snowshoe, snowmobile, and "snowcoach" on unplowed roads leading into the interior. In the six decades since over-snow vehicles (OSVs) first entered the park, visitation has rapidly expanded – to as high as 140,000, and on average about 90,000 per winter season – primarily via snowmobile and snowcoach. With increasing use came calls for better management to protect natural soundscapes and pristine landscapes, while minimizing impacts to quiet recreation use, wildlife, and other park resources. To inform its winter management plan, NPS conducted monitoring and a number of scientific studies on air quality, soundscape, snowpack chemistry, and socioeconomic impacts. The agency's 2013 Special Regulation and Winter Use Plan represent over a decade of planning and public input and incorporate the best-available science to create a cleaner, quieter Yellowstone for the benefit of winter visitors and wildlife alike.

Buffalo Ford on the Yellowstone River (credit: nps.gov)

Timeline

- 1970s-1980s: Grooming begins, winter lodging opens, and visitation skyrockets, with original Master Plan encouraging OSV use and providing few restrictions.
- 1990s: Visitation continues to grow; ambient air quality issues become a major concern; and NPS completes first formal winter use plan (1990), with some new restrictions and a visitor use monitoring program to address concerns amid growing OSV use.

> ***"Alternative 4 was identified as the preferred alternative due to its potential to make the park cleaner and quieter than what has been authorized in past winter seasons, while at the same time allowing for increases in park visitation. Rather than focusing solely on numbers of OSVs allowed in the park, alternative 4 focuses on the impacts that result from OSV use . . . . This management framework is impact-centric, rather than vehicle number-centric, and is more consistent with the science of winter use, particularly the science related to natural soundscape preservation and wildlife disturbance."*** *Yellowstone National Park Winter Use Plan/SEIS, p. 77.*

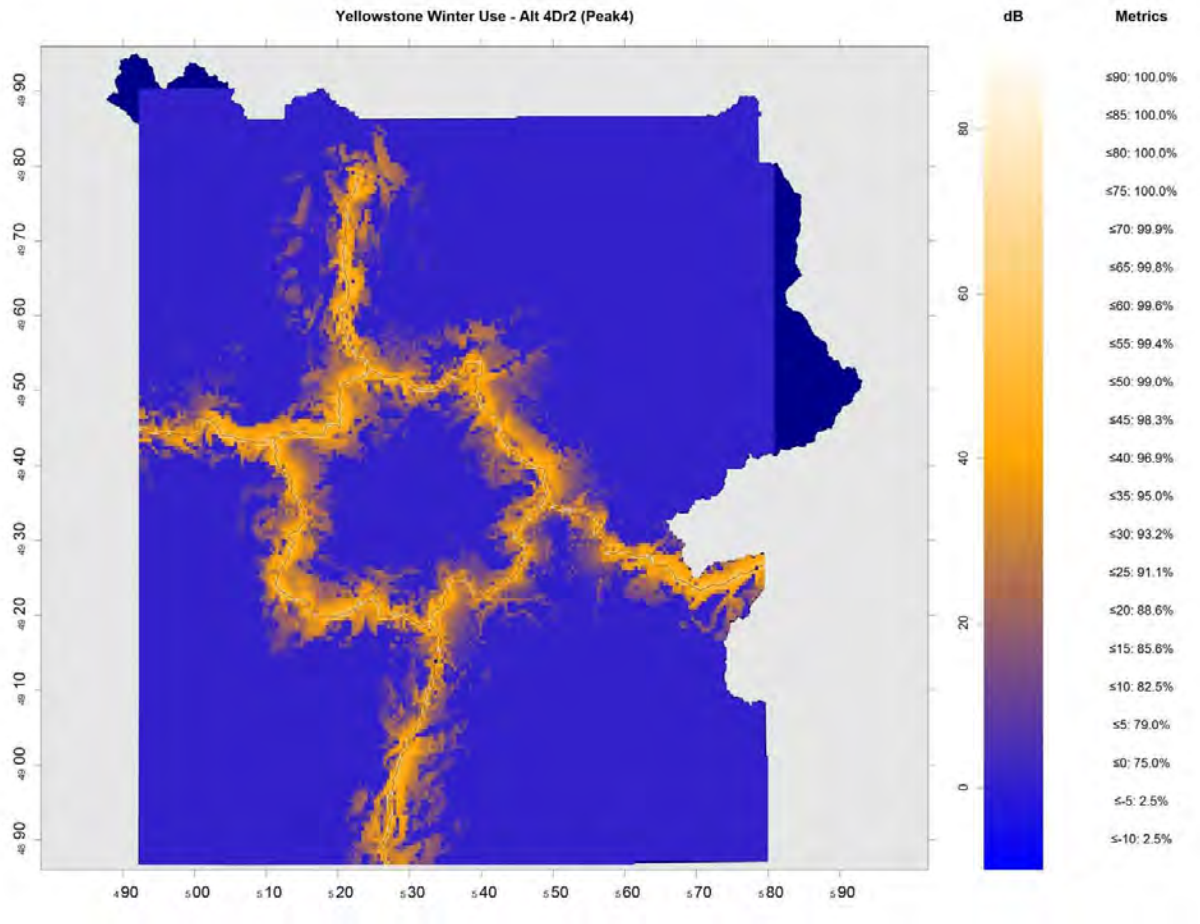
- 2000: NPS attempts to drastically reduce OSV use in Yellowstone and Grand Teton National Parks amid growing concerns and evidence over safety, visitor enjoyment, air quality, natural soundscapes, and wildlife impacts.
- 2001-2010: Under public and litigation pressure, NPS develops a series of winter use plans implementing best-available technology standards and commercial guiding requirements for OSVs. Several plans are invalidated by the courts and remanded, with temporary plans put in place. NPS convenes a scientific advisory team to compile and conduct scientific studies on OSV use and park resources.

Snowmobiles disrupting bison (credit: npr.org)

- 2013: NPS finalizes and publishes Winter Use Plan/SEIS and Special Regulation establishing:
    - Limits on OSV use – both snowmobiles and snowcoaches – based on number of "transportation events," with adjustments to group size and vehicle type permitted based on impact (e.g., larger group size allowable if stricter, voluntary environmental performance standards met);
    - Restriction that OSV use be confined entirely to roads used by motor vehicles to minimize impacts to wildlife and other visitors;
    - 35mph speed limit to minimize noise and protect visitor safety;
    - Phased-in, performance-based best available technology standards for OSVs to reduce impacts while not being overly burdensome on operators; and
    - Adaptive management framework designed to maintain OSV impacts within permissible, identified range, and to gather additional data to inform future planning.

Take-Aways

- To inform plan decisions, agencies should collect and summarize best available science, as well as develop and implement scientific studies as needed to fill information gaps.
- In appropriate circumstances, agencies should consider adaptive management approaches that tie ORV plan designations and restrictions to technological innovations and other factors affecting the type and extent of resource impacts.
- Agencies should assess the effects of ORV use at the site-specific and landscape scales, as well as in the short- and long-term (e.g., analysis of impacts on bison and elk addresses long-term population dynamics and range-wide displacement, in addition to shorter-term displacement and behavioral and physiological responses, SEIS, pp. 216-219).



Noise simulation modeling depicting the distance snowmobile and snowcoach noise travels beyond groomed roads, and accounting for factors such as topography, vehicle speeds, vehicle group size, temperature, relative humidity, snow cover, and ambient sound levels (credit: NPS 2013)

ORV Management Plan & Special Regulation
Cape Hatteras National Seashore, North Carolina
National Park Service

Cape Hatteras, on North Carolina's Outer Banks, was the nation's first national seashore. The seashore's dune, beach, and intertidal habitats provide both outstanding recreational opportunities and critically important nesting, breeding, feeding, and roosting sites for imperiled birds and sea turtles. Though ORV users account for less than 5% of seashore visitors, the demand for motorized access to Cape Hatteras beaches has skyrocketed over the past decades – with as many as 2,000 vehicles on the beaches each day during peak season. Growing ORV use has coincided with precipitous declines in bird species, damage to turtle nests and reduced hatchling survival, and public safety concerns. Following intense legal and political pressure to address these impacts, the Park Service promulgated a special regulation and ORV management plan based on the best available science and significant public input that is tailored to minimize impacts to wildlife, while preserving motorized beach access.

Vehicles on Cape Hatteras National Seashore (credit: outerbanks.org)

Timeline

- July 2007: In a criminal case finding a Cape Hatteras visitor guilty of operating a vehicle without due care, federal district court judge questions the legality of *any* ORV use absent a special regulation designating such use in accordance with executive order minimization criteria. *United States v. Vasile*, No. 2:07-M-1075-BO, 2007 U.S. Dist. LEXIS 52213 (E.D.N.C. July 17, 2007).
- October 2007: Conservation groups file a lawsuit in federal court challenging NPS's failure to issue a long-term management plan and special regulation governing ORV use.
- December 2007: NPS publishes notice of establishment of negotiated rulemaking advisory committee to develop special regulation; after a dozen meetings, the committee of 30 representatives of stakeholder groups was unable to reach consensus, but provided insight for the development of the plan and special regulation.

> ***"[A]reas of high resource sensitivity and high visitor use will generally be designated as [vehicle-free areas] year-round or as seasonal ORV routes, with restrictions based on seasonal resource and visitor use. . . . The year-round designation of [vehicle-free areas] and ORV routes, in conjunction with the species management strategies described in the final plan . . . , will provide for species protection during both the breeding season, using the standard set of buffers . . . , and the nonbreeding season."*** *ORV Management Plan, Record of Decision, pp. 4-5.*

- April 2008: Lawsuit resolved by consent decree establishing deadlines for completion of an ORV management plan and special regulation, and a revised interim management plan.
- December 2010: NPS finalizes ORV management plan.
- January-February 2012: NPS publishes special regulation designating ORV routes and implements 2010 management plan, establishing:
    - Permit requirement and restrictions on permitted types and uses of ORVs;
    - Seasonal and night-time driving restrictions for wildlife protection; and
    - Temporary route closures to implement species management strategies including proactive pre-nesting closures and standard buffers around nesting and fledging sites, resulting in daily updates to an interactive beach access map on Google Earth and on-site signage.[43]

Nesting loggerhead turtle crushed by ORV (credit: National Park Service)

- 2012-2013: Record-breaking numbers of sea turtle nests recorded.
- June 2014: Court upholds management plan and special regulation in challenge by motorized access group. *Cape Hatteras Access Preservation Alliance v. Jewell*, No. 2:13-CV-1-BO, 2014 U.S. Dist. LEXIS 84596 (E.D.N.C. June 19, 2014).

Crowds view turtle hatching (credit: National Park Service)

Take-Aways

- Minimizing impacts to wildlife and other resources, while continuing to permit ORV use, may require significant agency resources in the form of monitoring, enforcement, and iterative processes to ensure resource protection.
- Agencies should utilize the best available scientific information to inform application of the minimization criteria (e.g., management strategies for imperiled species based on U.S. Fish & Wildlife Service recovery plans, U.S. Geological Survey studies, state wildlife agency recommendations, and other peer-reviewed information).
- Agencies should provide significant opportunity for stakeholder and public participation early in the ORV designation process to identify impacts and conflicts, and strategies to minimize them.

[43] Pursuant to the National Defense Authorization Act for Fiscal Year 2015, Public Law No. 113-291, § 3057, the NPS recently adjusted wildlife buffers and is currently considering whether to make other modifications to the ORV management plan and special regulation. Due to this ongoing effort, the interactive map is not currently available, and the NPS is working to finalize a new format for delivering beach access information. *See* https://www.nps.gov/caha/learn/management/2015ndaact.htm.

EXECUTIVE OFFICE OF THE PRESIDENT
COUNCIL ON ENVIRONMENTAL QUALITY
WASHINGTON, D.C. 20503

August 1, 2016

MEMORANDUM FOR HEADS OF FEDERAL DEPARTMENTS AND AGENCIES

FROM: CHRISTINA GOLDFUSS
COUNCIL ON ENVIRONMENTAL QUALITY

SUBJECT: Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews

I. INTRODUCTION

The Council on Environmental Quality (CEQ) issues this guidance to assist Federal agencies in their consideration of the effects of greenhouse gas (GHG) emissions[1] and climate change when evaluating proposed Federal actions in accordance with the National Environmental Policy Act (NEPA) and the CEQ Regulations Implementing the Procedural Provisions of NEPA (CEQ Regulations).[2] This guidance will facilitate compliance with existing NEPA requirements, thereby improving the efficiency and consistency of reviews of proposed Federal actions for agencies, decision makers, project proponents, and the public.[3] The guidance provides Federal agencies a common

[1] For purposes of this guidance, CEQ defines GHGs in accordance with Section 19(m) of Exec. Order No. 13693, Planning for Federal Sustainability in the Next Decade, 80 Fed. Reg. 15869, 15882 (Mar. 25, 2015) (carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, nitrogen trifluoride, and sulfur hexafluoride). Also for purposes of this guidance, "emissions" includes release of stored GHGs as a result of land management activities affecting terrestrial GHG pools such as, but not limited to, carbon stocks in forests and soils, as well as actions that affect the future changes in carbon stocks. The common unit of measurement for GHGs is metric tons of CO_2 equivalent (mt CO_2-e).

[2] *See* 42 U.S.C. 4321 et seq.; 40 CFR Parts 1500–1508.

[3] This guidance is not a rule or regulation, and the recommendations it contains may not apply to a particular situation based upon the individual facts and circumstances. This guidance does not change or substitute for any law, regulation, or other legally binding

approach for assessing their proposed actions, while recognizing each agency's unique circumstances and authorities.[4]

Climate change is a fundamental environmental issue, and its effects fall squarely within NEPA's purview.[5] Climate change is a particularly complex challenge given its global nature and the inherent interrelationships among its sources, causation, mechanisms of action, and impacts. Analyzing a proposed action's GHG emissions and the effects of climate change relevant to a proposed action—particularly how climate change may change an action's environmental effects—can provide useful information to decision makers and the public.

CEQ is issuing the guidance to provide for greater clarity and more consistency in how agencies address climate change in the environmental impact assessment process. This guidance uses longstanding NEPA principles because such an analysis should be similar to the analysis of other environmental impacts under NEPA. The guidance is intended to assist agencies in disclosing and considering the reasonably foreseeable effects of proposed actions that are relevant to their decision-making processes. It confirms that agencies should provide the public and decision makers with explanations of the basis for agency determinations.

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requirement, and is not legally enforceable. The use of non-mandatory language such as "guidance," "recommend," "may," "should," and "can," is intended to describe CEQ policies and recommendations. The use of mandatory terminology such as "must" and "required" is intended to describe controlling requirements under the terms of NEPA and the CEQ regulations, but this document does not affect legally binding requirements.

[4] This guidance also addresses recommendations offered by a number of stakeholders. *See* President's State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience, *Recommendations to the President* (November 2014), p. 20 (recommendation 2.7), *available at* www.whitehouse.gov/sites/default/files/docs/task_force_report_0.pdf; U.S. Government Accountability Office, *Future Federal Adaptation Efforts Could Better Support Local Infrastructure Decision Makers*, (Apr. 2013), *available at* http://www.gao.gov/assets/660/653741.pdf. Public comments on drafts of this guidance document are available at http://www.whitehouse.gov/administration/eop/ceq/initiatives/nepa/comments.

[5] NEPA recognizes "the profound impact of man's activity on the interrelations of all components of the natural environment." (42 U.S.C. 4331(a)). It was enacted to, *inter alia,* "promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man." (42 U.S.C. 4321).

Focused and effective consideration of climate change in NEPA reviews[6] will allow agencies to improve the quality of their decisions. Identifying important interactions between a changing climate and the environmental impacts from a proposed action can help Federal agencies and other decision makers identify practicable opportunities to reduce GHG emissions, improve environmental outcomes, and contribute to safeguarding communities and their infrastructure against the effects of extreme weather events and other climate-related impacts.

Agencies implement NEPA through one of three levels of NEPA analysis: a Categorical Exclusion (CE); an Environmental Assessment (EA); or an Environmental Impact Statement (EIS). This guidance is intended to help Federal agencies ensure their analysis of potential GHG emissions and effects of climate change in an EA or EIS is commensurate with the extent of the effects of the proposed action.[7] Agencies have discretion in how they tailor their individual NEPA reviews to accommodate the approach outlined in this guidance, consistent with the CEQ Regulations and their respective implementing procedures and policies.[8] CEQ does not expect that implementation of this guidance will require agencies to develop new NEPA implementing procedures. However, CEQ recommends that agencies review their NEPA procedures and propose any updates they deem necessary or appropriate to facilitate their consideration of GHG emissions and climate change.[9] CEQ will review agency

[6] The term "NEPA review" is used to include the analysis, process, and documentation required under NEPA. While this document focuses on NEPA reviews, agencies are encouraged to analyze GHG emissions and climate-resilient design issues early in the planning and development of proposed actions and projects under their substantive authorities.
[7] *See* 40 CFR 1502.2(b) (Impacts shall be discussed in proportion to their significance); 40 CFR 1502.15 (Data and analyses in a statement shall be commensurate with the importance of the impact…).
[8] *See* 40 CFR 1502.24 (Methodology and scientific accuracy).
[9] *See* 40 CFR 1507.3. Agency NEPA implementing procedures can be, but are not required to be, in the form of regulation. Section 1507.3 encourages agencies to publish explanatory guidance, and agencies also should consider whether any updates to explanatory guidance are necessary. Agencies should review their policies and implementing procedures and revise them as necessary to ensure full compliance with NEPA.

proposals for revising their NEPA procedures, including any revision of CEs, in light of this guidance.

As discussed in this guidance, when addressing climate change agencies should consider: (1) The potential effects of a proposed action on climate change as indicated by assessing GHG emissions (e.g., to include, where applicable, carbon sequestration);[10] and, (2) The effects of climate change on a proposed action and its environmental impacts.

This guidance explains the application of NEPA principles and practices to the analysis of GHG emissions and climate change, and

- Recommends that agencies quantify a proposed agency action's projected direct and indirect GHG emissions, taking into account available data and GHG quantification tools that are suitable for the proposed agency action;
- Recommends that agencies use projected GHG emissions (to include, where applicable, carbon sequestration implications associated with the proposed agency action) as a proxy for assessing potential climate change effects when preparing a NEPA analysis for a proposed agency action;
- Recommends that where agencies do not quantify a proposed agency action's projected GHG emissions because tools, methodologies, or data inputs are not reasonably available to support calculations for a quantitative analysis, agencies include a qualitative analysis in the NEPA document and explain the basis for determining that quantification is not reasonably available;

[10] Carbon sequestration is the long-term carbon storage in plants, soils, geologic formations, and oceans.

- Discusses methods to appropriately analyze reasonably foreseeable direct, indirect, and cumulative GHG emissions and climate effects;
- Guides the consideration of reasonable alternatives and recommends agencies consider the short- and long-term effects and benefits in the alternatives and mitigation analysis;
- Advises agencies to use available information when assessing the potential future state of the affected environment in a NEPA analysis, instead of undertaking new research, and provides examples of existing sources of scientific information;
- Counsels agencies to use the information developed during the NEPA review to consider alternatives that would make the actions and affected communities more resilient to the effects of a changing climate;
- Outlines special considerations for agencies analyzing biogenic carbon dioxide sources and carbon stocks associated with land and resource management actions under NEPA;
- Recommends that agencies select the appropriate level of NEPA review to assess the broad-scale effects of GHG emissions and climate change, either to inform programmatic (e.g., landscape-scale) decisions, or at both the programmatic and tiered project- or site-specific level, and to set forth a reasoned explanation for the agency's approach; and
- Counsels agencies that the "rule of reason" inherent in NEPA and the CEQ Regulations allows agencies to determine, based on their expertise and

experience, how to consider an environmental effect and prepare an analysis based on the available information.

II. BACKGROUND

A. NEPA

NEPA is designed to promote consideration of potential effects on the human environment[11] that would result from proposed Federal agency actions, and to provide the public and decision makers with useful information regarding reasonable alternatives[12] and mitigation measures to improve the environmental outcomes of Federal agency actions. NEPA ensures that the environmental effects of proposed actions are taken into account before decisions are made and informs the public of significant environmental effects of proposed Federal agency actions, promoting transparency and accountability concerning Federal actions that may significantly affect the quality of the human environment. NEPA reviews should identify measures to avoid, minimize, or mitigate adverse effects of Federal agency actions. Better analysis and decisions are the ultimate goal of the NEPA process.[13]

Inherent in NEPA and the CEQ Regulations is a "rule of reason" that allows agencies to determine, based on their expertise and experience, how to consider an environmental effect and prepare an analysis based on the available information. The usefulness of that information to the decision-making process and the public, and the

[11] 40 CFR 1508.14 ("'Human environment' shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment.").
[12] 40 CFR 1508.25(b) ("Alternatives, which include: (1) No action alternative. (2) Other reasonable courses of actions. (3) Mitigation measures (not in the proposed action).").
[13] 40 CFR 1500.1(c) ("Ultimately, of course, it is not better documents but better decisions that count. NEPA's purpose is not to generate paperwork—even excellent paperwork—but to foster excellent action. The NEPA process is intended to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment.").

extent of the anticipated environmental consequences are important factors to consider when applying that "rule of reason."

B. Climate Change

Climate change science continues to expand and refine our understanding of the impacts of anthropogenic GHG emissions. CEQ's first Annual Report in 1970 referenced climate change, indicating that "[m]an may be changing his weather."[14] At that time, the mean level of atmospheric carbon dioxide (CO_2) had been measured as increasing to 325 parts per million (ppm) from an average of 280 ppm pre-Industrial levels.[15] Since 1970, the concentration of atmospheric carbon dioxide has increased to approximately 400 ppm (2015 globally averaged value).[16] Since the publication of CEQ's first Annual Report, it has been determined that human activities have caused the carbon dioxide content of the atmosphere of our planet to increase to its highest level in at least 800,000 years.[17]

It is now well established that rising global atmospheric GHG emission concentrations are significantly affecting the Earth's climate. These conclusions are built upon a scientific record that has been created with substantial contributions from the

[14] *See* CEQ, *Environmental Quality The First Annual Report*, p. 93 (August 1970); *available at* https://ceq.doe.gov/ceq_reports/annual_environmental_quality_reports.html.
[15] *See* USGCRP, *Climate Change Impacts in the United States The Third National Climate Assessment* (Jerry M. Melillo, Terese (T.C.) Richmond, & Gary W. Yohe eds., 2014) [hereinafter "Third National Climate Assessment"], *Appendix 3 Climate Science Supplement*, p. 739; EPA, April 2015: *Inventory of U.S. Greenhouse Emissions and Sinks 1990-2013, available at* https://www3.epa.gov/climatechange/Downloads/ghgemissions/US-GHG-Inventory-2015-Main-Text.pdf. *See also* Hartmann, D.L., A.M.G. Klein Tank, M. Rusticucci, et al., *2013 Observations Atmosphere and Surface. In Climate Change 2013 The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Stocker, T.F., D. Qin, G.-K., et al. (eds)]. Cambridge University Press: Cambridge, United Kingdom and New York, NY, USA. *Available at* http://www.ipcc.ch/pdf/assessment-report/ar5/wg1/WG1AR5_Chapter02_Final.pdf.
[16] *See* Ed Dlugokencky & Pieter Tans, National Oceanic and Atmospheric Administration/Earth System Research Laboratory, http://www.esrl.noaa.gov/gmd/ccgg/trends/global.html.
[17] *See* http://earthobservatory.nasa.gov/Features/CarbonCycle; University of California Riverside, National Aeronautics and Space Administration (NASA), and Riverside Unified School District, *Down to Earth Climate Change*, http://globalclimate.ucr.edu/resources.html; USGCRP, *Third National Climate Assessment, Appendix 3 Climate Science Supplement*, p. 736 ("Although climate changes in the past have been caused by natural factors, human activities are now the dominant agents of change. Human activities are affecting climate through increasing atmospheric levels of heat-trapping gases and other substances, including particles.").

United States Global Change Research Program (USGCRP), which informs the United States' response to global climate change through coordinated Federal programs of research, education, communication, and decision support.[18] Studies have projected the effects of increasing GHGs on many resources normally discussed in the NEPA process, including water availability, ocean acidity, sea-level rise, ecosystem functions, energy production, agriculture and food security, air quality and human health.[19]

Based primarily on the scientific assessments of the USGCRP, the National Research Council, and the Intergovernmental Panel on Climate Change, in 2009 the Environmental Protection Agency (EPA) issued a finding that the changes in our climate caused by elevated concentrations of greenhouse gases in the atmosphere are reasonably anticipated to endanger the public health and public welfare of current and future generations.[20] In 2015, EPA acknowledged more recent scientific assessments that "highlight the urgency of addressing the rising concentration of CO_2 in the atmosphere," finding that certain groups are especially vulnerable to climate-related effects.[21] Broadly

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[18] *See* Global Change Research Act of 1990, Pub. L. 101–606, Sec. 103 (November 16, 1990). For additional information on the United States Global Change Research Program [hereinafter "USGCRP"], visit http://www.globalchange.gov. The USGCRP, formerly the Climate Change Science Program, coordinates and integrates the activities of 13 Federal agencies that conduct research on changes in the global environment and their implications for society. The USGCRP began as a Presidential initiative in 1989 and was codified in the Global Change Research Act of 1990 (Public Law 101–606). USGCRP-participating agencies are the Departments of Agriculture, Commerce, Defense, Energy, Interior, Health and Human Services, State, and Transportation; the U.S. Agency for International Development, the Environmental Protection Agency, NASA, the National Science Foundation, and the Smithsonian Institution.

[19] *See* USGCRP, *Third National Climate Assessment*, *available at* http://nca2014.globalchange.gov/system/files_force/downloads/low/NCA3_Climate_Change_Impacts_in_the_United%20States_LowRes.pdf?download=1; IPCC, *Climate Change 2014 Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* (R.K. Pachauri, & L.A. Meyer eds., 2014), *available at* https://www.ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full.pdf; *see also* http://www.globalchange.gov; 40 CFR 1508.8 (effects include ecological, aesthetic, historic, cultural, economic, social, and health effects); USGCRP, *The Impacts of Climate Change on Human Health in the United States A Scientific Assessment, available at* https://health2016.globalchange.gov/.

[20] *See generally Endangerment and Cause or Contribute Findings for Greenhouse Gases Under Section 202(a) of the Clean Air Act*, 74 Fed. Reg. 66496 (Dec. 15, 2009). (For example, at 66497-98: "[t]he evidence concerning how human-induced climate change may alter extreme weather events also clearly supports a finding of endangerment, given the serious adverse impacts that can result from such events and the increase in risk, even if small, of the occurrence and intensity of events such as hurricanes and floods. Additionally, public health is expected to be adversely affected by an increase in the severity of coastal storm events due to rising sea levels").

[21] *See* EPA, *Final Rule for Carbon Pollution Emission Guidelines for Existing Stationary Sources Electric Utility Generating Units*, 80 Fed. Reg. 64661, 64677 (Oct. 23, 2015) ("Certain groups, including children, the elderly, and the poor, are most vulnerable to climate-related effects. Recent studies also find that certain communities, including low-income communities and some communities of color … are disproportionately affected by certain climate change related impacts—including heat waves, degraded air quality, and

stated, the effects of climate change observed to date and projected to occur in the future include more frequent and intense heat waves, longer fire seasons and more severe wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea-level rise, more intense storms, harm to water resources, harm to agriculture, ocean acidification, and harm to wildlife and ecosystems.[22]

III. CONSIDERING THE EFFECTS OF GHG EMISSIONS AND CLIMATE CHANGE

This guidance is applicable to all Federal actions subject to NEPA, including site-specific actions, certain funding of site-specific projects, rulemaking actions, permitting decisions, and land and resource management decisions.[23] This guidance does not – and cannot – expand the range of Federal agency actions that are subject to NEPA. Consistent with NEPA, Federal agencies should consider the extent to which a proposed action and its reasonable alternatives would contribute to climate change, through GHG emissions, and take into account the ways in which a changing climate may impact the proposed action and any alternative actions, change the action's environmental effects over the lifetime of those effects, and alter the overall environmental implications of such actions.

This guidance is intended to assist agencies in disclosing and considering the effects of GHG emissions and climate change along with the other reasonably foreseeable environmental effects of their proposed actions. This guidance does not establish any

extreme weather events—which are associated with increased deaths, illnesses, and economic challenges. Studies also find that climate change poses particular threats to the health, well-being, and ways of life of indigenous peoples in the U.S.").

[22] *See* http://www.globalchange.gov/climate-change/impacts-society and Third National Climate Assessment, Chapters 3-15 (Sectors) and Chapters 16-25 (Regions), *available at* http://nca2014.globalchange.gov/downloads.

[23] *See* 40 CFR 1508.18.

particular quantity of GHG emissions as "significantly" affecting the quality of the human environment or give greater consideration to the effects of GHG emissions and climate change over other effects on the human environment.

A. GHG Emissions as a Proxy for the Climate Change Impacts of a Proposed Action

In light of the global scope of the impacts of GHG emissions, and the incremental contribution of each single action to global concentrations, CEQ recommends agencies use the projected GHG emissions associated with proposed actions as a proxy for assessing proposed actions' potential effects on climate change in NEPA analysis.[24] This approach, together with providing a qualitative summary discussion of the impacts of GHG emissions based on authoritative reports such as the USGCRP's National Climate Assessments and the Impacts of Climate Change on Human Health in the United States, a Scientific Assessment of the USGCRP, allows an agency to present the environmental and public health impacts of a proposed action in clear terms and with sufficient information to make a reasoned choice between no action and other alternatives and appropriate mitigation measures, and to ensure the professional and scientific integrity of the NEPA review.[25]

Climate change results from the incremental addition of GHG emissions from millions of individual sources,[26] which collectively have a large impact on a global scale.

[24] *See* 40 CFR 1502.16, 1508.9.
[25] *See* 40 CFR 1500.1, 1502.24 (requiring agencies to use high quality information and ensure the professional and scientific integrity of the discussions and analyses in environmental impact statements).
[26] Some sources emit GHGs in quantities that are orders of magnitude greater than others. *See* EPA, *Greenhouse Gas Reporting Program 2014 Reported Data*, Figure 2: Direct GHG Emissions Reported by Sector (2014), *available at* https://www.epa.gov/ghgreporting/ghgrp-2014-reported-data (amounts of GHG emissions by sector); *Final Rule for Carbon Pollution Emission Guidelines for Existing Stationary Sources Electric Utility Generating Units*, 80 Fed. Reg. 64661, 64663, 64689 (Oct. 23, 2015) (regulation of GHG emissions from fossil fuel-fired electricity generating power plants); *Oil and Natural Gas Sector Emission Standards for New, Reconstructed, and Modified Sources*, 81 Fed. Reg. 34824, 35830 (June 3, 2016 (regulation of GHG emissions from oil and gas sector).

CEQ recognizes that the totality of climate change impacts is not attributable to any single action, but are exacerbated by a series of actions including actions taken pursuant to decisions of the Federal Government. Therefore, a statement that emissions from a proposed Federal action represent only a small fraction of global emissions is essentially a statement about the nature of the climate change challenge, and is not an appropriate basis for deciding whether or to what extent to consider climate change impacts under NEPA. Moreover, these comparisons are also not an appropriate method for characterizing the potential impacts associated with a proposed action and its alternatives and mitigations because this approach does not reveal anything beyond the nature of the climate change challenge itself: the fact that diverse individual sources of emissions each make a relatively small addition to global atmospheric GHG concentrations that collectively have a large impact. When considering GHG emissions and their significance, agencies should use appropriate tools and methodologies for quantifying GHG emissions and comparing GHG quantities across alternative scenarios. Agencies should not limit themselves to calculating a proposed action's emissions as a percentage of sector, nationwide, or global emissions in deciding whether or to what extent to consider climate change impacts under NEPA.

1. GHG Emissions Quantification and Relevant Tools

This guidance recommends that agencies quantify a proposed agency action's projected direct and indirect GHG emissions. Agencies should be guided by the principle that the extent of the analysis should be commensurate with the quantity of projected GHG emissions and take into account available data and GHG quantification tools that

are suitable for and commensurate with the proposed agency action.[27] The rule of reason and the concept of proportionality caution against providing an in-depth analysis of emissions regardless of the insignificance of the quantity of GHG emissions that would be caused by the proposed agency action.

Quantification tools are widely available, and are already in broad use in the Federal and private sectors, by state and local governments, and globally.[28] Such quantification tools and methodologies have been developed to assist institutions, organizations, agencies, and companies with different levels of technical sophistication, data availability, and GHG source profiles. When data inputs are reasonably available to support calculations, agencies should conduct GHG analysis and disclose quantitative estimates of GHG emissions in their NEPA reviews. These tools can provide estimates of GHG emissions, including emissions from fossil fuel combustion and estimates of GHG emissions and carbon sequestration for many of the sources and sinks potentially affected by proposed resource management actions.[29] When considering which tool(s) to employ, it is important to consider the proposed action's temporal scale, and the availability of input data.[30] Examples of the kinds of methodologies agencies might consider using are presented in CEQ's 2012 Guidance for Accounting and Reporting GHG Emissions for a wide variety of activities associated with Federal agency operations.[31] When an agency determines that quantifying GHG emissions would not be

[27] *See* 40 CFR 1500.1(b) ("Most important, NEPA documents must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail."); 40 CFR 1502.2(b) (Impacts shall be discussed in proportion to their significance); 40 CFR 1502.15 (Data and analyses in a statement shall be commensurate with the importance of the impact…).
[28] *See* https://ceq.doe.gov/current_developments/GHG-accounting-tools.html.
[29] For example, USDA's COMET-Farm tool can be used to assess the carbon sequestration of existing agricultural activities along with the reduction in carbon sequestration (emissions) of project-level activities, http://cometfarm.nrel.colostate.edu/. Examples of other tools are available at https://ceq.doe.gov/current_developments/GHG-accounting-tools.html.
[30] *See* 40 CFR 1502.22.
[31] *See*
https://www.whitehouse.gov/sites/default/files/microsites/ceq/revised_federal_greenhouse_gas_accounting_and_reporting_guidance_

warranted because tools, methodologies, or data inputs are not reasonably available, the agency should provide a qualitative analysis and its rationale for determining that the quantitative analysis is not warranted. A qualitative analysis can rely on sector-specific descriptions of the GHG emissions of the category of Federal agency action that is the subject of the NEPA analysis.

When updating their NEPA procedures[32] and guidance, agencies should coordinate with CEQ to identify 1) the actions that normally warrant quantification of their GHG emissions, and consideration of the relative GHG emissions associated with alternative actions and 2) agency actions that normally do not warrant such quantification because tools, methodologies, or data inputs are not reasonably available. The determination of the potential significance of a proposed action remains subject to agency practice for the consideration of context and intensity, as set forth in the CEQ Regulations.[33]

2. The Scope of the Proposed Action

In order to assess effects, agencies should take account of the proposed action – including "connected" actions[34] – subject to reasonable limits based on feasibility and practicality. Activities that have a reasonably close causal relationship to the Federal action, such as those that may occur as a predicate for a proposed agency action or as a consequence of a proposed agency action, should be accounted for in the NEPA analysis.

060412.pdf. Federal agencies' Strategic Sustainability Performance Plans reflecting their annual GHG inventories and reports under Executive Order 13514 are available at https://www.performance.gov/node/3406/view?view=public#supporting-info.

[32] *See* 40 CFR 1507.3.

[33] 40 CFR 1508.27 ("'Significantly' as used in NEPA requires considerations of both context and intensity: (a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. . . . (b) Intensity. This refers to the severity of impact.").

[34] 40 CFR 1508.25(a) (Actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements; (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously, or; (iii) Are interdependent parts of a larger action and depend on the larger action for their justification.).

For example, NEPA reviews for proposed resource extraction and development projects typically include the reasonably foreseeable effects of various phases in the process, such as clearing land for the project, building access roads, extraction, transport, refining, processing, using the resource, disassembly, disposal, and reclamation. Depending on the relationship between any of the phases, as well as the authority under which they may be carried out, agencies should use the analytical scope that best informs their decision making.

The agency should focus on significant potential effects and conduct an analysis that is proportionate to the environmental consequences of the proposed action.[35] Agencies can rely on basic NEPA principles to determine and explain the reasonable parameters of their analyses in order to disclose the reasonably foreseeable effects that may result from their proposed actions.[36]

3. Alternatives

Considering alternatives, including alternatives that mitigate GHG emissions, is fundamental to the NEPA process and accords with NEPA Sections 102(2)(C) and 102(2)(E).[37] The CEQ regulations emphasize that the alternatives analysis is the heart of the EIS under NEPA Section 102(2)(C).[38] NEPA Section 102(2)(E) provides an independent requirement for the consideration of alternatives in environmental documents.[39] NEPA calls upon agencies to use the NEPA process to "identify and assess the reasonable alternatives to proposed actions that will avoid or minimize adverse effects of these actions upon the quality of the human environment."[40] The requirement to

[35] *See* 40 CFR 1501.7(a)(3), 1502.2(b), and 1502.15.
[36] *See* 40 CFR 1502.16.
[37] 42 U.S.C. 4332(2)(C), 4332(2)(E); 40 CFR 1502.14, 1508.9(b).
[38] 40 CFR 1502.14.
[39] *See* 40 CFR 1500.2, 1508.9(b).
[40] 40 CFR 1500.2(c).

consider alternatives ensures that agencies account for approaches with no, or less, adverse environmental effects for a particular resource.

Consideration of alternatives also provides each agency decision maker the information needed to examine other possible approaches to a particular proposed action (including the no action alternative) that could alter the environmental impact or the balance of factors considered in making the decision. Agency decisions are aided when there are reasonable alternatives that allow for comparing GHG emissions and carbon sequestration potential, trade-offs with other environmental values, and the risk from – and resilience to – climate change inherent in a proposed action and its design.

Agencies must consider a range of reasonable alternatives consistent with the level of NEPA review (e.g., EA or EIS) and the purpose and need for the proposed action, as well as reasonable mitigation measures if not already included in the proposed action or alternatives.[41] Accordingly, a comparison of these alternatives based on GHG emissions and any potential mitigation measures can be useful to advance a reasoned choice among alternatives and mitigation actions. When conducting the analysis, an agency should compare the anticipated levels of GHG emissions from each alternative – including the no-action alternative – and mitigation actions to provide information to the public and enable the decision maker to make an informed choice.

Agencies should consider reasonable alternatives and mitigation measures to reduce action-related GHG emissions or increase carbon sequestration in the same fashion as they consider alternatives and mitigation measures for any other environmental effects. NEPA, the CEQ Regulations, and this guidance do not require the decision

[41] *See* 42 U.S.C. 4332(2)(C), 4332(2)(E), and 40 CFR 1502.14(f), 1508.9(b). The purpose and need for action usually reflects both the extent of the agency's statutory authority and its policies.

maker to select the alternative with the lowest net level of emissions. Rather, they allow for the careful consideration of emissions and mitigation measures along with all the other factors considered in making a final decision.

4. Direct and Indirect Effects

If the direct and indirect GHG emissions can be quantified based on available information, including reasonable projections and assumptions, agencies should consider and disclose the reasonably foreseeable direct and indirect emissions when analyzing the direct and indirect effects of the proposed action.[42] Agencies should disclose the information and any assumptions used in the analysis and explain any uncertainties.

To compare a project's estimated direct and indirect emissions with GHG emissions from the no-action alternative, agencies should draw on existing, timely, objective, and authoritative analyses, such as those by the Energy Information Administration, the Federal Energy Management Program, or Office of Fossil Energy of the Department of Energy.[43] In the absence of such analyses, agencies should use other available information. When such analyses or information for quantification is unavailable, or the complexity of comparing emissions from various sources would make quantification overly speculative, then the agency should quantify emissions to the extent that this information is available and explain the extent to which quantified emissions information is unavailable while providing a qualitative analysis of those emissions. As

[42] For example, where the proposed action involves fossil fuel extraction, direct emissions typically include GHGs emitted during the process of exploring for or extracting the fossil fuel. The indirect effects of such an action that are reasonably foreseeable at the time would vary with the circumstances of the proposed action. For actions such as a Federal lease sale of coal for energy production, the impacts associated with the end-use of the fossil fuel being extracted would be the reasonably foreseeable combustion of that coal.
[43] For a current example, see Office of Fossil Energy, Nat'l Energy Tech. Lab., U.S. Dep't of Energy, *Life Cycle Greenhouse Gas Perspective on Exporting Liquefied Natural Gas from the United States*, Pub. No. DOE/NETL-2014/1649 (2014), *available at* http://energy.gov/sites/prod/files/2014/05/f16/Life%20Cycle%20GHG%20Perspective%20Report.pdf.

with any NEPA analysis, the level of effort should be proportionate to the scale of the emissions relevant to the NEPA review.

5. Cumulative Effects

"Cumulative impact" is defined in the CEQ Regulations as the "impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions."[44] All GHG emissions contribute to cumulative climate change impacts. However, for most Federal agency actions CEQ does not expect that an EIS would be required based *solely* on the global significance of cumulative impacts of GHG emissions, as it would not be consistent with the rule of reason to require the preparation of an EIS for every Federal action that may cause GHG emissions regardless of the magnitude of those emissions.

Based on the agency identification and analysis of the direct and indirect effects of its proposed action, NEPA requires an agency to consider the cumulative impacts of its proposed action and reasonable alternatives.[45] As noted above, for the purposes of NEPA, the analysis of the effects of GHG emissions is essentially a cumulative effects analysis that is subsumed within the general analysis and discussion of climate change impacts. Therefore, direct and indirect effects analysis for GHG emissions will adequately address the cumulative impacts for climate change from the proposed action and its alternatives and a separate cumulative effects analysis for GHG emissions is not needed.

6. Short- and Long-Term Effects

[44] 40 CFR 1508.7.
[45] *See* 40 CFR 1502.16, 1508.7, 1508.8. *See also* CEQ Memorandum to Heads of Federal Agencies, *Guidance on the Consideration of Past Actions in Cumulative Effects Analysis*, June 24, 2005, *available at* https//ceq.doe.gov/nepa/regs/Guidance_on_CE.pdf.

When considering effects, agencies should take into account both the short- and long-term adverse and beneficial effects using a temporal scope that is grounded in the concept of reasonable foreseeability. Some proposed actions will have to consider effects at different stages to ensure the direct effects and reasonably foreseeable indirect effects are appropriately assessed; for example, the effects of construction are different from the effects of the operations and maintenance of a facility.

Biogenic GHG emissions and carbon stocks from some land or resource management activities, such as a prescribed burn of a forest or grassland conducted to limit loss of ecosystem function through wildfires or insect infestations, may result in short-term GHG emissions and loss of stored carbon, while in the longer term a restored, healthy ecosystem may provide long-term carbon sequestration. Therefore, the short- and long-term effects should be described in comparison to the no action alternative in the NEPA review.

7. Mitigation

Mitigation is an important component of the NEPA process that Federal agencies can use to avoid, minimize, and compensate for the adverse environmental effects associated with their actions. Mitigation, by definition, includes avoiding impacts, minimizing impacts by limiting them, rectifying the impact, reducing or eliminating the impacts over time, or compensating for them.[46] Consequently, agencies should consider reasonable mitigation measures and alternatives as provided for under existing CEQ Regulations and take into account relevant agency statutory authorities and policies. The NEPA process is also intended to provide useful advice and information to State, local

[46] *See* 40 CFR 1508.20, 1508.25 (Alternatives include mitigation measures not included in the proposed action).

and tribal governments and private parties so that the agencies can better coordinate with other agencies and organizations regarding the means to mitigate effects of their actions.[47] The NEPA process considers the effects of mitigation commitments made by project proponents or others and mitigation required under other relevant permitting and environmental review regimes.[48]

As Federal agencies evaluate potential mitigation of GHG emissions and the interaction of a proposed action with climate change, the agencies should also carefully evaluate the quality of that mitigation to ensure it is additional, verifiable, durable, enforceable, and will be implemented.[49] Agencies should consider the potential for mitigation measures to reduce or mitigate GHG emissions and climate change effects when those measures are reasonable and consistent with achieving the purpose and need for the proposed action. Such mitigation measures could include enhanced energy efficiency, lower GHG-emitting technology, carbon capture, carbon sequestration (e.g., forest, agricultural soils, and coastal habitat restoration), sustainable land management practices, and capturing or beneficially using GHG emissions such as methane.

Finally, the CEQ Regulations and guidance recognize the value of monitoring to ensure that mitigation is carried out as provided in a record of decision or finding of no significant impact.[50] The agency's final decision on the proposed action should identify those mitigation measures that the agency commits to take, recommends, or requires

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[47] NEPA directs Federal agencies to make "advice and information useful in restoring, maintaining, and enhancing the quality of the environment" available to States, Tribes, counties, cities, institutions and individuals. NEPA Sec. 102(2)(G).
[48] *See* CEQ Memorandum to Heads of Federal Agencies, *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact*, 76 FR 3843 (Jan. 21, 2011) *available at* https://ceq.doe.gov/current_developments/docs/Mitigation_and_Monitoring_Guidance_14Jan2011.pdf.
[49] *See* Presidential Memorandum: *Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment* (https://www.whitehouse.gov/the-press-office/2015/11/03/mitigating-impacts-natural-resources-development-and-encouraging-related) defining "durability" and addressing additionality.
[50] *See* 40 CFR 1505.2(c), 1505.3. *See also* CEQ Memorandum to Heads of Federal Agencies, *Appropriate Use of Mitigation and Monitoring and Clarifying the Appropriate Use of Mitigated Findings of No Significant Impact*, 76 FR 3843 (Jan. 21, 2011) *available at* https://ceq.doe.gov/current_developments/docs/Mitigation_and_Monitoring_Guidance_14Jan2011.pdf.

others to take. Monitoring is particularly appropriate to confirm the effectiveness of mitigation when that mitigation is adopted to reduce the impacts of a proposed action on affected resources already increasingly vulnerable due to climate change.

B. CONSIDERING THE EFFECTS OF CLIMATE CHANGE ON A PROPOSED ACTION AND ITS ENVIRONMENTAL IMPACTS

According to the USGCRP and others, GHGs already in the atmosphere will continue altering the climate system into the future, even with current or future emissions control efforts.[51] Therefore, a NEPA review should consider an action in the context of the future state of the environment. In addition, climate change adaptation and resilience — defined as adjustments to natural or human systems in response to actual or expected climate changes — are important considerations for agencies contemplating and planning actions with effects that will occur both at the time of implementation and into the future.[52]

1. Affected Environment

An agency should identify the affected environment to provide a basis for comparing the current and the future state of the environment as affected by the proposed action or its reasonable alternatives.[53] The current and projected future state of the environment without the proposed action (i.e., the no action alternative) represents the reasonably foreseeable affected environment, and this should be described based on

[51] *See* Third National Climate Assessment, *Appendix 3 Climate Science Supplement* 753-754, *available at* http://s3.amazonaws.com/nca2014/low/NCA3_Full_Report_Appendix_3_Climate_Science_Supplement_LowRes.pdf?download=1.
[52] *See* Third National Climate Assessment, Chapter 28, "Adaptation" and Chapter 26, "Decision Support: Connecting Science, Risk Perception, and Decisions," *available at* http://www.globalchange.gov/nca3-downloads-materials; see also, Exec. Order No. 13653, 78 Fed. Reg. 66817 (Nov. 6, 2013) and Exec. Order No.13693, *Planning for Federal Sustainability in the Next Decade*, 80 Fed. Reg. 15869 (Mach 25, 2015) (defining "climate-resilient design").
[53] *See* 40 CFR 1502.15 (providing that environmental impact statements shall succinctly describe the environmental impacts on the area(s) to be affected or created by the alternatives under consideration).

authoritative climate change reports,[54] which often project at least two possible future scenarios.[55] The temporal bounds for the state of the environment are determined by the projected initiation of implementation and the expected life of the proposed action and its effects.[56] Agencies should remain aware of the evolving body of scientific information as more refined estimates of the impacts of climate change, both globally and at a localized level, become available.[57]

2. Impacts

The analysis of climate change impacts should focus on those aspects of the human environment that are impacted by both the proposed action and climate change. Climate change can make a resource, ecosystem, human community, or structure more susceptible to many types of impacts and lessen its resilience to other environmental impacts apart from climate change. This increase in vulnerability can exacerbate the effects of the proposed action. For example, a proposed action may require water from a stream that has diminishing quantities of available water because of decreased snow pack in the mountains, or add heat to a water body that is already warming due to increasing atmospheric temperatures. Such considerations are squarely within the scope of NEPA and can inform decisions on whether to proceed with, and how to design, the proposed action to eliminate or mitigate impacts exacerbated by climate change. They can also

[54] *See, e.g.,* Third National Climate Assessment (Regional impacts chapters) *available at* http://www.globalchange.gov/nca3-downloads-materials.
[55] *See, e.g.,* Third National Climate Assessment (Regional impacts chapters, considering a low future global emissions scenario, and a high emissions scenario) *available at* http://www.globalchange.gov/nca3-downloads-materials.
[56] CEQ, *Considering Cumulative Effects Under the National Environmental Policy Act* (1997), https://ceq.doe.gov/publications/cumulative_effects html. Agencies should also consider their work under Exec. Order No. 13653, *Preparing the United States for the Impacts of Climate Change*, 78 Fed. Reg. 66817 (Nov. 6, 2013), that considers how capital investments will be affected by a changing climate over time.
[57] *See, e.g.,* http://nca2014.globalchange.gov/report/regions/coasts.

inform possible adaptation measures to address the impacts of climate change, ultimately enabling the selection of smarter, more resilient actions.

3. Available Assessments and Scenarios

In accordance with NEPA's rule of reason and standards for obtaining information regarding reasonably foreseeable effects on the human environment, agencies need not undertake new research or analysis of potential climate change impacts in the proposed action area, but may instead summarize and incorporate by reference the relevant scientific literature.[58] For example, agencies may summarize and incorporate by reference the relevant chapters of the most recent national climate assessments or reports from the USGCRP.[59] Particularly relevant to some proposed actions are the most current reports on climate change impacts on water resources, ecosystems, agriculture and forestry, health, coastlines, and ocean and arctic regions in the United States.[60] Agencies may recognize that scenarios or climate modeling information (including seasonal, inter-annual, long-term, and regional-scale projections) are widely used, but when relying on a single study or projection, agencies should consider their limitations and discuss them.[61]

4. Opportunities for Resilience and Adaptation

As called for under NEPA, the CEQ Regulations, and CEQ guidance, the NEPA review process should be integrated with agency planning at the earliest possible time that would allow for a meaningful analysis.[62] Information developed during early

[58] *See* 40 CFR 1502.21 (material may be incorporated by reference if it is reasonably available for inspection by potentially interested persons during public review and comment).
[59] *See* http://www.globalchange.gov/browse/reports.
[60] *See* Third National Climate Assessment, *Our Changing Climate*, *available at* http://nca2014.globalchange.gov/report. Agencies should consider the latest final assessments and reports when they are updated.
[61] *See* 40 CFR 1502.22. Agencies can consult www.data.gov/climate/portals for model data archives, visualization tools, and downscaling results.
[62] *See* 42 U.S.C. 4332 ("agencies of the Federal Government shall … utilize a systematic, interdisciplinary approach which will insure the integrated use of the natural and social sciences and the environmental design arts in planning and in decision-making"); 40 CFR 1501.2 ("Agencies shall integrate the NEPA process with other planning at the earliest possible time…"); *See also* CEQ Memorandum

planning processes that precede a NEPA review may be incorporated into the NEPA review. Decades of NEPA practice have shown that integrating environmental considerations with the planning process provides useful information that program and project planners can consider in the design of the proposed action, alternatives, and potential mitigation measures. For instance, agencies should take into account increased risks associated with development in floodplains, avoiding such development wherever there is a practicable alternative, as required by Executive Order 11988 and Executive Order 13690.[63] In addition, agencies should take into account their ongoing efforts to incorporate environmental justice principles into their programs, policies, and activities, including the environmental justice strategies required by Executive Order 12898, as amended, and consider whether the effects of climate change in association with the effects of the proposed action may result in a disproportionate effect on minority and low income communities.[64] Agencies also may consider co-benefits of the proposed action, alternatives, and potential mitigation measures for human health, economic and social stability, ecosystem services, or other benefit that increases climate change preparedness or resilience. Individual agency adaptation plans and interagency adaptation strategies, such as agency Climate Adaptation Plans, the National Fish, Wildlife and Plants Climate Adaptation Strategy, and the National Action Plan: Priorities for Managing Freshwater

for Heads of Federal Departments and Agencies, *Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act*, 77 Fed. Reg. 14473 (Mar. 12, 2012), *available at* https://ceq.doe.gov/current_developments/docs/Improving_NEPA_Efficiencies_06Mar2012.pdf.

[63] *See* Exec. Order No. 11988, "Floodplain Management," 42 Fed. Reg. 26951 (May 24, 1977), *available at* http://www.archives.gov/federal-register/codification/executive-order/11988.html; Exec. Order No. 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, 80 Fed. Reg. 6425 (Jan. 30, 2015), *available at* https://www.gpo.gov/fdsys/pkg/FR-2015-02-04/pdf/2015-02379.pdf.

[64] *See* Exec. Order No. 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*, 59 Fed. Reg. 7629 (Feb. 16, 1994), *available at* https://ceq.doe.gov/nepa/regs/eos/ii-5.pdf; CEQ, *Environmental Justice Guidance Under the National Environmental Policy Act* (Dec. 1997), *available at* http://ceq.doe.gov/nepa/regs/ej/justice.pdf.

Resources in a Changing Climate, provide other good examples of the type of relevant and useful information that can be considered.[65]

Climate change effects on the environment and on the proposed project should be considered in the analysis of a project considered vulnerable to the effects of climate change such as increasing sea level, drought, high intensity precipitation events, increased fire risk, or ecological change. In such cases, a NEPA review will provide relevant information that agencies can use to consider in the initial project design, as well as alternatives with preferable overall environmental outcomes and improved resilience to climate impacts. For example, an agency considering a proposed long-term development of transportation infrastructure on a coastal barrier island should take into account climate change effects on the environment and, as applicable, consequences of rebuilding where sea level rise and more intense storms will shorten the projected life of the project and change its effects on the environment.[66] Given the length of time involved in present sea level projections, such considerations typically will not be relevant to short-term actions with short-term effects.

In addition, the particular impacts of climate change on vulnerable communities may be considered in the design of the action or the selection among alternatives to

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[65] *See* http://sustainability.performance.gov for agency sustainability plans, which contain agency adaptation plans. *See also* http://www.wildlifeadaptationstrategy.gov; http://www.whitehouse.gov/sites/default/files/microsites/ceq/2011_national_action_plan.pdf; and https://www.epa.gov/greeningepa/climate-change-adaptation-plans

[66] *See* U.S. Department of Transportation, Gulf Coast Study, Phase 2, *Assessing Transportation Vulnerability to Climate Change Synthesis of Lessons Learned and Methods Applied*, FHWA-HEP-15-007 (Oct. 2014) (focusing on the Mobile, Alabama region), *available at* http://www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study/phase2_task6/fhwahep15007.pdf; U.S. Climate Change Science Program, Synthesis and Assessment Product 4.7, Impacts of Climate Change and Variability on Transportation Systems and Infrastructure: Gulf Coast Study, Phase I (Mar. 2008) (focusing on a regional scale in the central Gulf Coast), *available at* https://downloads.globalchange.gov/sap/sap4-7/sap4-7-final-all.pdf. Information about the Gulf Coast Study is *available at* *http //www.fhwa.dot.gov/environment/climate_change/adaptation/ongoing_and_current_research/gulf_coast_study*. *See also* Third National Climate Assessment, Chapter 28, "Adaptation," at 675 (noting that Federal agencies in particular can facilitate climate adaptation by "ensuring the establishment of federal policies that allow for "flexible" adaptation efforts and take steps to avoid unintended consequences"), *available at* http://nca2014.globalchange.gov/report/response-strategies/adaptation#intro-section-2.

assess the impact, and potential for disproportionate impacts, on those communities.[67] For example, chemical facilities located near the coastline could have increased risk of spills or leakages due to sea level rise or increased storm surges, putting local communities and environmental resources at greater risk. Increased resilience could minimize such potential future effects. Finally, considering climate change preparedness and resilience can help ensure that agencies evaluate the potential for generating additional GHGs if a project has to be replaced, repaired, or modified, and minimize the risk of expending additional time and funds in the future.

C. Special Considerations for Biogenic Sources of Carbon

With regard to biogenic GHG emissions from land management actions – such as prescribed burning, timber stand improvements, fuel load reductions, scheduled harvesting, and livestock grazing – it is important to recognize that these land management actions involve GHG emissions and carbon sequestration that operate within the global carbon and nitrogen cycle, which may be affected by those actions. Similarly, some water management practices have GHG emission consequences (e.g., reservoir management practices can reduce methane releases, wetlands management practices can enhance carbon sequestration, and water conservation can improve energy efficiency).

Notably, it is possible that the net effect of ecosystem restoration actions resulting in short-term biogenic emissions may lead to long-term reductions of atmospheric GHG concentrations through increases in carbon stocks or reduced risks of future emissions. In the land and resource management context, how a proposed action affects a net carbon sink or source will depend on multiple factors such as the climatic region, the distribution

[67] For an example, *see* https://www.blm.gov/epl-front-office/projects/nepa/5251/42462/45213/NPR-A_FINAL_ROD_2-21-13.pdf.

of carbon across carbon pools in the project area, and the ongoing activities and trends. In addressing biogenic GHG emissions, resource management agencies should include a comparison of estimated net GHG emissions and carbon stock changes that are projected to occur with and without implementation of proposed land or resource management actions.[68] This analysis should take into account the GHG emissions, carbon sequestration potential, and the changes in carbon stocks that are relevant to decision making in light of the proposed actions and timeframes under consideration.

One example of agencies dealing with biogenic emissions and carbon sequestration arises when agencies consider proposed vegetation management practices that affect the risk of wildfire, insect and disease outbreak, or other disturbance. The public and the decision maker may benefit from consideration of the influence of a vegetation management action that affects the risk of wildfire on net GHG emissions and carbon stock changes. NEPA reviews should consider whether to include a comparison of net GHG emissions and carbon stock changes that are anticipated to occur, with and without implementation of the proposed vegetation management practice, to provide information that is useful to the decision maker and the public to distinguish between alternatives. The analysis would take into account the estimated GHG emissions (biogenic and fossil), carbon sequestration potential, and the net change in carbon stocks relevant in light of the proposed actions and timeframes under consideration. In such cases the agency should describe the basis for estimates used to project the probability or likelihood of occurrence or changes in the effects or severity of wildfire. Where such

[68] One example of a tool for such calculations is the Carbon On Line Estimator (COLE), which uses data based on USDA Forest Service Forest Inventory & Analysis and Resource Planning Assessment data and other ecological data. COLE began as a collaboration between the National Council for Air and Stream Improvement, Inc. (NCASI) and USDA Forest Service, Northern Research Station. It currently is maintained by NCASI. It is available at http://www.fs.usda.gov/ccrc/tools/cole.

tools, methodologies, or data are not yet available, the agency should provide a qualitative analysis and its rationale for determining that the quantitative analysis is not warranted. As with any other analysis, the rule of reason and proportionality should be applied to determine the extent of the analysis.

CEQ acknowledges that Federal land and resource management agencies are developing agency-specific principles and guidance for considering biological carbon in management and planning decisions.[69] Such guidance is expected to address the importance of considering biogenic carbon fluxes and storage within the context of other management objectives and ecosystem service goals, and integrating carbon considerations as part of a balanced and comprehensive program of sustainable management, climate change mitigation, and climate change adaptation.

IV. TRADITIONAL NEPA TOOLS AND PRACTICES

A. Scoping and Framing the NEPA Review

To effectuate integrated decision making, avoid duplication, and focus the NEPA review, the CEQ Regulations provide for scoping.[70] In scoping, the agency determines the issues that the NEPA review will address and identifies the impacts related to the proposed action that the analyses will consider.[71] An agency can use the scoping process to help it determine whether analysis is relevant and, if so, the extent of analysis

[69] *See* Council on Climate Change Preparedness and Resilience, *Priority Agenda Enhancing the Climate Resilience of America's Natural Resources*, at 52 (Oct. 2014), *available at* http://www.whitehouse.gov/sites/default/files/docs/enhancing_climate_resilience_of_americas_natural_resources.pdf.
[70] *See* 40 CFR 1501.7 ("There shall be an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. This process shall be termed scoping."); *see also* CEQ Memorandum for Heads of Federal Departments and Agencies, *Improving the Process for Preparing Efficient and Timely Environmental Reviews under the National Environmental Policy Act*, March 6, 2012, *available at* https://ceq.doe.gov/current_developments/docs/Improving_NEPA_Efficiencies_06Mar2012.pdf (the CEQ Regulations explicitly require scoping for preparing an EIS, however, agencies can also take advantage of scoping whenever preparing an EA).
[71] *See* 40 CFR 1500.4(b), 1500.4(g), 1501.7.

appropriate for a proposed action.[72] When scoping for the climate change issues associated with the proposed agency action, the nature, location, timeframe, and type of the proposed action and the extent of its effects will help determine the degree to which to consider climate projections, including whether climate change considerations warrant emphasis, detailed analysis, and disclosure.

Consistent with this guidance, agencies may develop their own agency-specific practices and guidance for framing the NEPA review. Grounded on the principles of proportionality and the rule of reason, such aids can help an agency determine the extent to which an analysis of GHG emissions and climate change impacts should be explored in the decision-making process and will assist in the analysis of the no action and proposed alternatives and mitigation.[73] The agency should explain such a framing process and its application to the proposed action to the decision makers and the public during the NEPA review and in the EA or EIS document.

B. Frame of Reference

When discussing GHG emissions, as for all environmental impacts, it can be helpful to provide the decision maker and the public with a recognizable frame of reference for comparing alternatives and mitigation measures. Agencies should discuss relevant approved federal, regional, state, tribal, or local plans, policies, or laws for GHG emission reductions or climate adaptation to make clear whether a proposed project's

[72] *See* 40 CFR 1501.7 (The agency preparing the NEPA analysis must use the scoping process to, among other things, determine the scope and identify the significant issues to be analyzed in depth) and CEQ, *Memorandum for General Counsels, NEPA Liaisons, and Participants in Scoping*, April 30, 1981, *available at* https://ceq.doe.gov/nepa/regs/scope/scoping.htm.

[73] *See, e.g.,* Matthew P. Thompson, Bruce G. Marcot, Frank R. Thompson, III, Steven McNulty, Larry A. Fisher, Michael C. Runge, David Cleaves, and Monica Tomosy, *The Science of Decisionmaking Applications for Sustainable Forest and Grassland Management in the National Forest System* (2013), *available at* http://www.fs.fed.us/rm/pubs_other/rmrs_2013_thompson_m004.pdf; U.S. Forest Service Comparative Risk Assessment Framework And Tools, *available at* www.fs.fed.us/psw/topics/fire_science/craft/craft; and Julien Martin, Michael C. Runge, James D. Nichols, Bruce C. Lubow, and William L. Kendall, *Structured decision making as a conceptual framework to identify thresholds for conservation and management* (2009), Ecological Applications 19:1079–1090, *available at* http://www.esajournals.org/doi/abs/10.1890/08-0255.1.

GHG emissions are consistent with such plans or laws.[74] For example, the Bureau of Land Management has discussed how agency actions in California, especially joint projects with the State, may or may not facilitate California reaching its emission reduction goals under the State's Assembly Bill 32 (Global Warming Solutions Act).[75] This approach helps frame the policy context for the agency decision based on its NEPA review.

C. Incorporation by Reference

Incorporation by reference is of great value in considering GHG emissions or where an agency is considering the implications of climate change for the proposed action and its environmental effects. Agencies should identify situations where prior studies or NEPA analyses are likely to cover emissions or adaptation issues, in whole or in part. When larger scale analyses have considered climate change impacts and GHG emissions, calculating GHG emissions and carbon stocks for a specific action may provide only limited information beyond the information already collected and considered in the larger scale analyses. The NEPA reviews for a specific action can incorporate by reference earlier programmatic studies or information such as management plans, inventories, assessments, and research that consider potential changes in carbon stocks, as well as any relevant programmatic NEPA reviews.[76]

Accordingly, agencies should use the scoping process to consider whether they should incorporate by reference GHG analyses from other programmatic studies, action

[74] *See* 40 CFR 1502.16(c), 1506.2(d) (where an inconsistency exists, agencies should describe the extent to which the agency will reconcile its proposed action with the plan or law). *See also* Exec. Order No. 13693, 80 Fed. Reg. 15869 (Mar. 25, 2015) (establishing GHG emission and related goals for agency facilities and operations. Scope 1, 2, and 3 emissions are typically separate and distinct from analyses and information used in an EA or EIS.).
[75] *See*, *e.g.*, U.S. Bureau of Land Management, Desert Renewable Energy Conservation Plan Proposed Land Use Plan Amendment and Final Environmental Impact Statement, Vol. I, § I.3.3.2, at 12, *available at* http://drecp.org/finaldrecp/.
[76] *See* 40 CFR 1502.5, 1502.21.

specific NEPA reviews, or programmatic NEPA reviews to avoid duplication of effort. Furthermore, agencies should engage other agencies and stakeholders with expertise or an interest in related actions to participate in the scoping process to identify relevant GHG and adaptation analyses from other actions or programmatic NEPA documents.

D. Using Available Information

Agencies should make decisions using current scientific information and methodologies. CEQ does not expect agencies to fund and conduct original climate change research to support their NEPA analyses or for agencies to require project proponents to do so. Agencies should exercise their discretion to select and use the tools, methodologies, and scientific and research information that are of high quality and available to assess the impacts.[77]

Agencies should be aware of the ongoing efforts to address the impacts of climate change on human health and vulnerable communities.[78] Certain groups, including children, the elderly, and the poor, are more vulnerable to climate-related health effects, and may face barriers to engaging on issues that disproportionately affect them. CEQ recommends that agencies periodically engage their environmental justice experts, and the Federal Interagency Working Group on Environmental Justice, [79] to identify approaches to avoid or minimize impacts that may have disproportionately high and

[77] *See* 40 CFR 1502.24 (requiring agencies to ensure the professional and scientific integrity of the discussions and analyses in environmental impact statements).
[78] USGCRP, *The Impacts of Climate Change on Human Health in the United States A Scientific Assessment* (Apr. 2016), *available at* https://health2016.globalchange.gov/downloads.
[79] For more information on the Federal Interagency Working Group on Environmental Justice co-chaired by EPA and CEQ, *see* http://www.epa.gov/environmentaljustice/interagency/index.html.

adverse human health or environmental effects on minority and low-income populations.[80]

E. Programmatic or Broad-Based Studies and NEPA Reviews

Agency decisions can address different geographic scales that can range from the programmatic or landscape level to the site- or project-specific level. Agencies sometimes conduct analyses or studies that are not NEPA reviews at the national level or other broad scale level (e.g., landscape, regional, or watershed) to assess the status of one or more resources or to determine trends in changing environmental conditions.[81] In the context of long-range energy, transportation, and resource management strategies an agency may decide that it would be useful and efficient to provide an aggregate analysis of GHG emissions or climate change effects in a programmatic analysis and then incorporate by reference that analysis into future NEPA reviews.

A tiered, analytical decision-making approach using a programmatic NEPA review is used for many types of Federal actions[82] and can be particularly relevant to addressing proposed land, aquatic, and other resource management plans. Under such an approach, an agency conducts a broad-scale programmatic NEPA analysis for decisions such as establishing or revising USDA Forest Service land management plans, Bureau of Land Management resource management plans, or Natural Resources Conservation Service conservation programs. Subsequent NEPA analyses for proposed site-specific

[80] *President's Memorandum for the Heads of All Departments and Agencies, Executive Order on Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (Feb. 11, 1994), *available at* https://ceq.doe.gov/nepa/regs/eos/ii-5.pdf; CEQ, *Environmental Justice Guidance Under the National Environmental Policy Act*, *available at* https://ceq.doe.gov/nepa/regs/ej/justice.pdf.

[81] Such a programmatic study is distinct from a programmatic NEPA review which is appropriate when the action under consideration is itself subject to NEPA requirements. *See* CEQ, *Memorandum for Heads of Federal Departments and Agencies, Effective Use of Programmatic NEPA Reviews*, Dec. 18, 2014, § I(A), p. 9, *available at* https://www.whitehouse.gov/sites/default/files/docs/effective_use_of_programmatic_nepa_reviews_final_dec2014_searchable.pdf (discussing non-NEPA types of programmatic analyses such as data collection, assessments, and research, which previous NEPA guidance described as joint inventories or planning studies).

[82] *See* 40 CFR 1502.20, 1508.28. A programmatic NEPA review may be appropriate when a decision is being made that is subject to NEPA, such as establishing formal plans, programs, and policies, and when considering a suite of similar projects.

decisions – such as proposed actions that implement land, aquatic, and other resource management plans – may be tiered from the broader programmatic analysis, drawing upon its basic framework analysis to avoid repeating analytical efforts for each tiered decision. Examples of project- or site-specific actions that may benefit from being able to tier to a programmatic NEPA review include: constructing transmission lines; conducting prescribed burns; approving grazing leases; granting rights-of-way; issuing leases for oil and gas drilling; authorizing construction of wind, solar or geothermal projects; and approving hard rock mineral extraction.

A programmatic NEPA review may also serve as an efficient mechanism in which to assess Federal agency efforts to adopt broad-scale sustainable practices for energy efficiency, GHG emissions avoidance and emissions reduction measures, petroleum product use reduction, and renewable energy use, as well as other sustainability practices.[83] While broad department- or agency-wide goals may be of a far larger scale than a particular program, policy, or proposed action, an analysis that informs how a particular action affects that broader goal can be of value.

F. Monetizing Costs and Benefits

NEPA does not require monetizing costs and benefits. Furthermore, the weighing of the merits and drawbacks of the various alternatives need not be displayed using a monetary cost-benefit analysis and should not be when there are important qualitative considerations.[84] When an agency determines that a monetized assessment of the impacts of greenhouse gas emissions or a monetary cost-benefit analysis is appropriate and

[83] *See* Exec. Order No. 13693, 80 Fed. Reg. 15869 (Mar. 25, 2015).
[84] *See* 40 CFR 1502.23.

relevant to the choice among different alternatives being considered, such analysis may be incorporated by reference[85] or appended to the NEPA document as an aid in evaluating the environmental consequences.[86] For example, a rulemaking could have useful information for the NEPA review in an associated regulatory impact analysis which could be incorporated by reference.[87] When using a monetary cost-benefit analysis, just as with tools to quantify emissions, the agency should disclose the assumptions, alternative inputs, and levels of uncertainty associated with such analysis. Finally, if an agency chooses to monetize some but not all impacts of an action, the agency providing this additional information should explain its rationale for doing so.[88]

V. CONCLUSION AND EFFECTIVE DATE

Agencies should apply this guidance to all new proposed agency actions when a NEPA review is initiated. Agencies should exercise judgment when considering whether to apply this guidance to the extent practicable to an on-going NEPA process. CEQ does not expect agencies to apply this guidance to concluded NEPA reviews and actions for

[85] *See* 40 CFR 1502.21 (material may be cited if it is reasonably available for inspection by potentially interested persons within the time allowed for public review and comment).

[86] When conducting a cost-benefit analysis, determining an appropriate method for preparing a cost-benefit analysis is a decision left to the agency's discretion, taking into account established practices for cost-benefit analysis with strong theoretical underpinnings (for example, see OMB Circular A-4 and references therein). For example, the Federal social cost of carbon (SCC) estimates the marginal damages associated with an increase in carbon dioxide emissions in a given year. Developed through an interagency process committed to ensuring that the SCC estimates reflect the best available science and methodologies and used to assess the social benefits of reducing carbon dioxide emissions across alternatives in rulemakings, it provides a harmonized, interagency metric that can give decision makers and the public useful information for their NEPA review. For current Federal estimates, *see* Interagency Working Group on Social Cost of Carbon, United States Government, *Technical Support Document Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* (revised July 2015), *available at* https://www.whitehouse.gov/omb/oira/social-cost-of-carbon.

[87] For example, the regulatory impact analysis was used as a source of information and aligned with the NEPA review for Corporate Average Fuel Economy (CAFÉ) standards, *see* National Highway Traffic Safety Administration, Corporate Average Fuel Economy Standards, Passenger Cars and Light Trucks, Model Years 2017-2025, Final Environmental Impact Statement, Docket No. NHTSA-2011-0056 (July 2012), § 5.3.2, *available at* http://www.nhtsa.gov/Laws+&+Regulations/CAFE+-+Fuel+Economy/Environmental+Impact+Statement+for+CAFE+Standards,+2017-2025.

[88] For example, the information may be responsive to public comments or useful to the decision maker in further distinguishing between alternatives and mitigation measures. In all cases, the agency should ensure that its consideration of the information and other factors relevant to its decision is consistent with applicable statutory or other authorities, including requirements for the use of cost-benefit analysis.

which a final EIS or EA has been issued. Agencies should consider applying this guidance to projects in the EIS or EA preparation stage if this would inform the consideration of differences between alternatives or address comments raised through the public comment process with sufficient scientific basis that suggest the environmental analysis would be incomplete without application of the guidance, and the additional time and resources needed would be proportionate to the value of the information included.

# # #

Forest Service | **Washington Office** | **1400 Independence Avenue, SW Washington, DC 20250**

File Code: 2300/2500/7700 **Date:** March 29, 2012
Route To:

Subject: Travel Management, Implementation of 36 CFR, Part 202, Subpart A (36 CFR 212.5(b))

To: Regional Foresters, Station Directors, Area Director, IITF Director, Deputy Chiefs and WO Directors

This letter is to reaffirm agency commitment to completing a travel analysis report for Subpart A of the travel management rule by 2015 and update and clarify Agency guidance. This letter replaces the November 10, 2010, letter on the same topic.

The Agency expects to maintain an appropriately sized and environmentally sustainable road system that is responsive to ecological, economic, and social concerns. The national forest road system of the future must continue to provide needed access for recreation and resource management, as well as support watershed restoration and resource protection to sustain healthy ecosystems.

Forest Service regulations at 36 CFR 212.5(b)(1) require the Forest Service to identify the minimum road system needed for safe and efficient travel and for administration, utilization, and protection of National Forest System (NFS) lands. In determining the minimum road system, the responsible official must incorporate a science-based roads analysis at the appropriate scale. Forest Service regulations at 36 CFR 212.5(b)(2) require the Forest Service to identify NFS roads that are no longer needed to meet forest resource management objectives.

Process

Travel analysis requires a process that is dynamic, interdisciplinary, and integrated with all resource areas. With this letter, I am directing the use of the travel analysis process (TAP) described in Forest Service Manual 7712 and Forest Service Handbook (FSH) 7709.55, Chapter 20. The TAP is a science-based process that will inform future travel management decisions. Travel analysis serves as the basis for developing proposed actions, but does not result in decisions. Therefore, travel analysis does not trigger the National Environmental Policy Act (NEPA). The completion of the TAP is an important first step towards the development of the future minimum road system (MRS). All NFS roads, maintenance levels 1-5, must be included in the analysis.

For units that have previously conducted their travel or roads analysis process (RAP), the appropriate line officer should review the prior report to assess the adequacy and the relevance of their analysis as it complies with Subpart A. This analysis will help determine the appropriate scope and scale for any new analysis and can build on previous work. A RAP completed in accordance with publication FS-643, "Roads Analysis: Informing Decisions about Managing the

National Forest Transportation System," will also satisfy the roads analysis requirement of Subpart A.

Results from the TAP must be documented in a **travel analysis report**, which shall include:

- A map displaying the roads that can be used to inform the proposed action for identifying the MRS and unneeded roads.
- Information about the analysis as it relates to the criteria found in 36 CFR 212.5(b)(1).

Units should seek to integrate the steps contained in the Watershed Condition Framework (WCF) with the six TAP steps contained in FSH 7709.55, Chapter 20, to eliminate redundancy and ensure an iterative and adaptive approach for both processes. We expect the WCF process and the TAP will complement each other. The intent is for each process to inform the other so that they can be integrated and updated with new information or where conditions change. The travel analysis report described above must be completed by the end of FY 2015.

The next step in identification of the MRS is to use the travel analysis report to develop proposed actions to identify the MRS. These proposed actions generally should be developed at the scale of a 6th code subwatershed or larger. Proposed actions and alternatives are subject to environmental analysis under NEPA. Travel analysis should be used to inform the environmental analysis.

The administrative unit must analyze the proposed action and alternatives in terms of whether, per 36 CFR 212.5(b)(1), the resulting road system is needed to:

- Meet resource and other management objectives adopted in the relevant land and resource management plan;
- Meet applicable statutory and regulatory requirements;
- Reflect long-term funding expectations;
- Ensure that the identified system minimizes adverse environmental impacts associated with road construction, reconstruction, decommissioning, and maintenance.

The resulting decision identifies the MRS and unneeded roads for each subwatershed or larger scale. The NEPA analysis for each subwatershed must consider adjacent subwatersheds for connected actions and cumulative effects. The MRS for the administrative unit is complete when the MRS for each subwatershed has been identified, thus satisfying Subpart A. To the extent that the subwatershed NEPA analysis covers specific road decisions, no further NEPA analysis will be needed. To the extent that further smaller-scale, project-specific decisions are needed, more NEPA analysis may be required.

A flowchart displaying the process for identification of the MRS is enclosed with this letter.

Timing

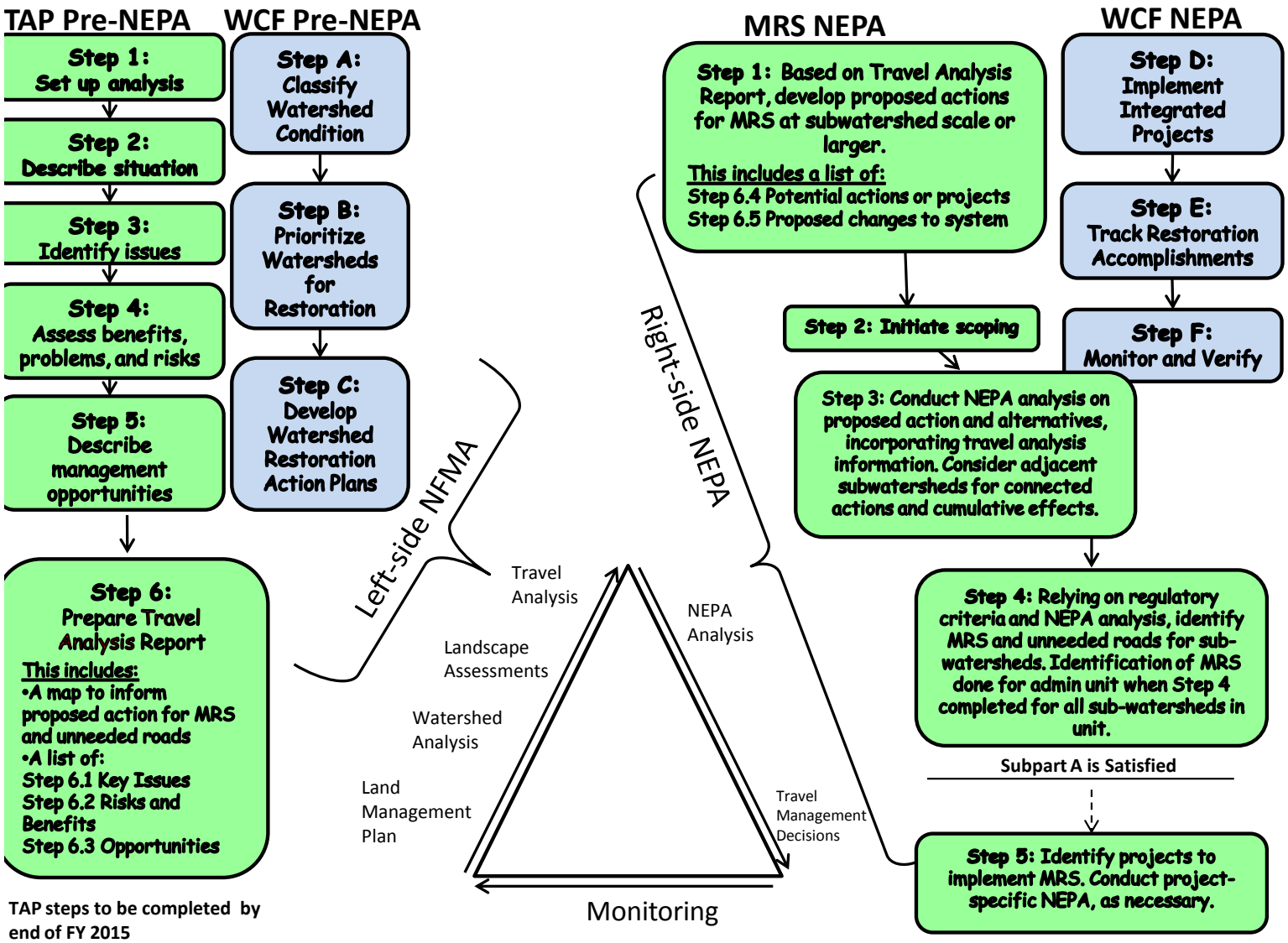
The travel analysis report **must be completed by the end of FY 2015**. Beyond FY 2015, no Capital Improvement and Maintenance (CMCM) funds may be expended on NFS roads (maintenance levels 1-5) that have not been included in a TAP or RAP.

Leadership

The Washington Office lead for Subpart A is Anne Zimmermann, Director of Watershed, Fish, Wildlife, Air and Rare Plants. Working with her on the Washington Office Steering Team are Jim Bedwell, Director of Recreation, Heritage, and Volunteer Resources, and Emilee Blount, Director of Engineering. I expect the Regions to continue with the similar leadership structures which have been established.

Your leadership and commitment to this component of the travel management rule is important. Together, we will move towards an ecologic, economic, and socially sustainable and responsible national road system of the future.

/s/ James M. Pena (for):
LESLIE A. C. WELDON
Deputy Chief, National Forest System


TAP Pre-NEPA
Step 1: Set up analysis
Step 2: Describe situation
Step 3: Identify issues
Step 4: Assess benefits, problems, and risks
Step 5: Describe management opportunities
Step 6: Prepare Travel Analysis Report
This includes:
•A map to inform proposed action for MRS and unneeded roads
•A list of:
Step 6.1 Key Issues
Step 6.2 Risks and Benefits
Step 6.3 Opportunities
TAP steps to be completed by end of FY 2015
WCF Pre-NEPA
Step A: Classify Watershed Condition
Step B: Prioritize Watersheds for Restoration
Step C: Develop Watershed Restoration Action Plans
Left-side NFMA
Travel Analysis
Landscape Assessments
Watershed Analysis
Land Management Plan
NEPA Analysis
Travel Management Decisions
Monitoring
Right-side NEPA
MRS NEPA
Step 1: Based on Travel Analysis Report, develop proposed actions for MRS at subwatershed scale or larger.
This includes a list of:
Step 6.4 Potential actions or projects
Step 6.5 Proposed changes to system
Step 2: Initiate scoping
Step 3: Conduct NEPA analysis on proposed action and alternatives, incorporating travel analysis information. Consider adjacent subwatersheds for connected actions and cumulative effects.
Step 4: Relying on regulatory criteria and NEPA analysis, identify MRS and unneeded roads for sub-watersheds. Identification of MRS done for admin unit when Step 4 completed for all sub-watersheds in unit.
Subpart A is Satisfied
Step 5: Identify projects to implement MRS. Conduct project-specific NEPA, as necessary.
WCF NEPA
Step D: Implement Integrated Projects
Step E: Track Restoration Accomplishments
Step F: Monitor and Verify

Forest Service **Pacific Northwest Region** **1220 SW Third Avenue (97204)**
P.O. Box 3623
Portland, OR 97208-3623

File Code: 1950; 2300; 7700 **Date:** September 6, 2016
Route To:

Subject: Monitoring Travel Management NEPA Decisions for the Minimum Road System

To: Forest Supervisors and the Columbia River Gorge National Scenic Area Manager

In my October 27, 2015 letter regarding our next steps with travel analysis, I stated that I expect to see significant progress each year on every unit toward a sustainable transportation system and directed the Regional Travel Management Board to monitor and report each year on the progress made.

I applaud the recent and current efforts underway to address development of the minimum road system (MRS) in on-going projects. The Regional Travel Management Board will solicit proposals and decisions made on the MRS from each Forest on an annual basis to post on the Region's internet site. This will provide transparency that enables our interested publics to see the progress we are making towards implementing a MRS. Julie Knutson, Regional Environmental Coordinator, will coordinate with each Forest's Environmental Coordinator to gather this information, and will facilitate posting on the Regional website.

Washington Office (WO) guidance is forthcoming for Forests to post travel analysis reports (TARs), maps and other information on their website. In addition, the Infrastructure database (Infra) will be used to code TAR recommendations and MRS decisions.

Ensure that travel management proposals analyzed under the National Environmental Policy Act (NEPA) are addressed in the purpose and need statement. When integrated into restoration projects, the need for travel management actions may vary – for example, to address site-specific water quality issues, or wildlife habitat needs – with an underlying objective (purpose) to develop an environmentally sustainable MRS. In addition to NEPA compliance, including these actions in the purpose and need highlights and demonstrates our commitment to travel management implementation.

Forests, Areas and Grasslands are strongly encouraged to assess all roads within a project area, when feasible since it may be many years before an opportunity arises again in a given watershed to address the MRS.

Proposals to develop the MRS may be incorporated into landscape level restoration projects or stand alone as a single purpose proposal. In all cases, the scale of analysis should be at the HUC-6 watershed area or larger. The TAR that each administrative unit completed in accordance with the Travel Management Rule (36 CFR part 212, Subpart A) will be used to inform the environmental analysis under the NEPA. Conversely, the NEPA analysis will identify relevant updates to be made to the TAR and tracked in Infra, consistent with the forthcoming guidance from the WO.

Travel management decisions related to the MRS that require NEPA include removing a route from the Forest transportation system, decommissioning a route or an unauthorized route, closing roads to vehicular travel, putting roads in storage (converting an open road to a Maintenance

Level 1 status) or changing the allowed classes of motor vehicles or time of year for motor vehicle use. Refer to FSH 7715 for more information on travel management decisions.

If you have engineering questions, please contact Joe Neer, Acting Regional Transportation Program Manager, 503-808-2512. For NEPA questions, please contact Julie Knutson at 503-808-2276.

/s/ Dianne C. Guidry (for)

JAMES M. PEÑA
Regional Forester

cc: Jose Linares, Christy Darden, Paul Podesta, Jeff Mast, ML Smith, Julia Riber, Julie Knutson. FS-pdl R6 Environmental Coordinators 133095