March 17, 2017

Craig Newman
Recreation Engineering Lands & Minerals Staff Officer
Colville National Forest
765 South Main Street
Colville, WA 99114

Sent via e-mail to cnewman03@fs.fed.us

Re: Colville Forest Plan Revision – Winter Travel Management

Dear Craig,

Thank you for reaching out to discuss the Colville National Forest's forest plan revision and winter travel management planning. WildEarth Guardians partners with Winter Wildlands Alliance and The Wilderness Society to ensure forests comply with the 2015 subpart C rule directing over-snow vehicle (OSV) management. We have and continue to be engaged in winter travel management planning on our national forests.

During our call, you stated that the Colville intends to complete winter travel planning as part of the forest plan revision process. You also noted that any future OSV use map (OSVUM) would follow the use outlined in the forest plan revision. We are concerned that this approach, based on the current analysis in the DEIS, is inconsistent with Forest Service rules and policy. Directives from the Forest Service's Washington office provide direction about the additional planning and analysis that needs to occur, if the Colville decides to tackle winter travel planning as part of its forest plan revision.[1] This approach is also inconsistent with statements in the DEIS.[2] Based on the DEIS, it was our understanding that OSV use designations through winter travel planning would take place in a later, second round of public process, and our comments were tailored as such.

We understand that a limited budget for recreation planning understandably plays into your decision on how to address winter travel management on the Colville. But in light of your explanation, we are now submitting additional analysis in Attachments A and B to clarify our concerns in detail.

A key component of the subpart C rule is the need to locate roads, trails and areas with the objective of minimizing impacts to natural resources and other uses. As outlined in WildEarth Guardians' comments on the draft environmental impact statement (DEIS) analyzing the Colville's forest plan revision, our goal is to ensure the Colville properly applies the minimization criteria when designating areas, routes and trails for OSV use to protect the ecology and wildlife on the forest. We

[1] *See, e.g.*, Forest Service Manual (FSM) 7703.11(1) (explaining that when designating roads, trails or areas for motorized use under subparts B or C, the Forest Service "shall . . . [u]se travel analysis . . . to consider and document application of the criteria in 36 CFR 212.55 in making the designation decision," and any decisions must be informed by "site-specific environmental analysis and public involvement.").
[2] *See, e.g.*, DEIS at 10 ("Project activities such as . . . motor vehicle use designations occur through subsequent project-specific decision-making, consistent with forest plan direction"), 26 ("The proposed action and alternatives identify areas suitable for over-snow vehicle motor vehicle use, but forestwide site-specific designations per Subpart C of the Travel Management Rule will be made during subsequent site-specific NEPA analysis.").

are very concerned about the Colville's plans to apply the minimization criteria to management areas. This is addressed in detail in Attachment A.

You mentioned uncertainty as to what an OSVUM should look like: whether it should designate areas or specific roads and groomed trails. The Forest Service's Washington Office will be providing an OSVUM template to work from. We encourage you to hold off on publishing any map until you have had a chance to review that template and direction.

We recognize publication of the OSVUM may be an iterative process. But because future iterations of the OSVUM are unlikely to reassess application of the minimization criteria, it is critically important that we ensure the criteria are properly applied in this first iteration.

The fact that the Colville is approaching winter travel planning through a forest plan revision further elevates our concerns about the proper approach. Although at this point the Colville may not receive much OSV use, the OSV designations made in the forest plan revision will govern the forest for at least the next 15 years. Ensuring natural resources, wildlife, and quiet use are free from the noise and disruption of OSVs on the Colville in the winter season is essential.

WildEarth Guardians and Winter Wildlands Alliance recognize the Colville forest plan revision process provides a clear opportunity to build a resilient future for the forest, protective of wildness, wildlife, and that balances motorized use with quiet uses. We want to make sure the forest seizes this opportunity. I'd be happy to discuss more—please feel free to contact me.

Sincerely,

Marla Fox
Rewilding Attorney
651.434.7737
mfox@wildearthguardians.org

Signing on behalf of

Hilary Eisen
Recreation Planning and Policy Manager
Winter Wildlands Alliance
208.629.1986
heisen@winterwildlands.org

Kitty Craig
Washington State Deputy Director
The Wilderness Society
206.624.4878
kitty_craig@tws.org

Enclosures: Attachment A (additional analysis), Attachment B (Switalski OSV BMPs)

Attachment A

1. **WildEarth Guardians' comments set forth the Colville's duty to apply the minimization criteria and address winter travel planning.**

Our comments on the draft environmental impact statement (DEIS) analyzing the Colville's National Forest Plan revision outline the Forest Service's substantive legal duty to locate areas and trails designated for ORV use—including over-snow vehicle (OSV) use—with the objective of minimizing 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. *See* July 5, 2016 WildEarth Guardians Comment re Colville National Forest Plan Revision #45826, pages 11-14. *See also* Exec. Order 11644, 37 Fed. Reg. 2877 (Feb. 8, 1972), as amended by Exec. Order 11989, 42 Fed. Reg. 26959 (May 24, 1977); 36 C.F.R. part 212, subpart C, 80 Fed. Reg. 4500 (Jan. 28, 2015). Attachment B to our comments explains how to properly apply the minimization criteria. *See* July 5, 2016 WildEarth Guardians Comment, Attachment B (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)).

2. **Based on recent discussion, we are concerned that the Colville's draft forest plan revision and approach to OSV designations will not comply with Forest Service rules and policy.**

<u>Public Disclosure for Meaningful Public Comment</u>

It is critical that the Colville create a public process in which all ideas can be fairly heard and vetted, and that elicits meaningful public comment. But here the DEIS failed to accurately inform the public about the scope of the forest plan revision in relation to winter travel planning. Statements throughout the DEIS indicate there will be a later winter travel planning process to designate OSV use. *See, e.g.*, Proposed Revised Land Management Plan for Colville National Forest, Draft Programmatic Environmental Impact Statement (hereafter, DEIS), page 26 ("The proposed action and alternatives identify areas suitable for over-snow vehicle motor vehicle use, but forestwide site-specific designations per Subpart C of the Travel Management Rule will be made during subsequent site-specific NEPA analysis."). Yet as set forth in our cover letter, it appears the Colville does not intend a second round of site-specific winter travel planning and instead will rely on management areas and suitability determinations in the forest plan revision as the basis for the motor vehicle use map (MVUM).

To ensure a successful forest plan revision and winter travel planning effort, we recommend the Colville expressly and clearly communicate to stakeholders the forest's plans for winter travel planning and the legal requirements—Executive Orders, Travel Management Rule, Directives, etc.—that govern the agency's decision. The DEIS currently omits any mention of the 2015 subpart C rule. *See* DEIS at 823-829 (listing past policy decisions). It is important for the public to understand the requirements of the 2015 subpart C rule and what changes it will require to the management status quo.

Winter Travel Planning & Forest Plan Revisions

Decisions about management areas (MAs) and suitability determinations in the Colville's forest plan revision are not a substitute for the area designations that result from winter travel planning. Forest Service Handbook (FSH) 7709.55, 11.2(1) (Land Management Plans) ("Approval of a plan, plan amendment, or plan revision should not include a final decision designating roads, trails, or areas for motor vehicle use or OSV use or otherwise restricting those routes. Rather, the land management plan provides information and guidance for travel management decisions."). Improper reliance on forest plan winter motorized use allocations rather than applying the minimization criteria to determine OSV use area designations was at the heart of the Ninth Circuit decision rejecting the approach. *See WildEarth Guardians v. U.S. Forest Service*, 790 F.3d 920 (9th Cir. 2015). Forest plans are programmatic in nature and do not meet National Environmental Policy Act (NEPA) obligations to take a hard look at the site-specific impacts of motorized area and trail designations.

We understand the Colville faces limited resources and does not anticipate sufficient funding to complete a separate winter travel planning process. To the extent the Colville wishes to use this forest plan revision process to complete winter travel designations and comply with subpart C, the Forest Service must identify discrete areas and trails open to OSV use, and include environmental analysis to support those winter designations in the DEIS. *See, e.g.*, FSH 7709.55, 11.2(3) ("If travel management decisions are approved simultaneously with a plan, plan amendment, or plan revision, the travel management decisions must be accompanied by appropriate environmental analysis."). We would expect to see additional analysis and more refined OSV area designations—in contrast to designating use by MA—under this approach.

Also as part of this approach, the Forest Service must conduct travel analysis to inform winter travel planning. Current Forest Service directives governing travel management planning require the agency to conduct travel analysis to inform its decision. *See generally* FSH 7709.55, chs. 10 & 20; Forest Service Manual (FSM) 7712 & 7715. *See also* FSM 7703.11(1) (explaining that when designating roads, trails or areas for motorized use under subparts B or C, the Forest Service "shall . . . [u]se travel analysis . . . to consider and document application of the criteria in 36 CFR 212.55 in making the designation decision," and any decisions must be informed by "site-specific environmental analysis and public involvement.").

Closed Unless Designated Open

The Forest Service's subpart C rule requires national forests with adequate snowfall to designate and display on an OSV use map (OSVUM) specific areas and trails where OSV use is permitted based on resource protection needs and other recreational uses. *See* 36 C.F.R. part 212, subpart C. Implemented correctly, the rule presents an important opportunity to restore balance to the winter backcountry.

Subpart C requires a paradigm shift from a default "open unless closed" to a default "closed unless designated open" approach. To implement that approach, each forest must specifically delineate areas and trails where OSV use is permitted. *See* 36 C.F.R. §§ 212.80(a),

212.81(a), 261.14. OSV use outside of the designated system is prohibited. *Id.* In other words, the final rule requires forest to make OSV designations under a consistent "closed unless designated open" approach and not to designate areas as open essentially by default.[1]

As proposed, the Colville's existing winter travel management approach is inconsistent with subpart C's requirement for "closed unless designated open" winter motorized management. *See, e.g.*, DEIS at 564 ("At this time, no motorized cross-country travel is allowed on the Colville National Forest except for over-snow vehicle travel, which is *open to all areas not closed* for resource protection or for the protection of wilderness settings.") (emphasis added); 565 ("Winter trails are also limited to those routes and areas that are *not closed* for the protection of aquatic, plant, and wildlife habitats, or for the protection of wilderness settings.").

Likewise, the Forest Service's proposal to designate OSV use by MA is misguided. Consistent with the closed unless designated open approach, subpart C requires that any areas designated for cross-country OSV use be "discrete," "specifically delineated," and "smaller . . . than a ranger district." 36 C.F.R. § 212.1 (defining "area"). But here it appears the Forest Service proposes to designate large swaths of land by MA, each of which covers hundreds or even thousands of acres at time. *See, e.g.*, DEIS at 579, Table 192 (total acres open to OSV use by alternative). Under this sweeping approach, the proposed alternative would designate 79% of the forest for motor vehicle use. DEIS at 62. Designating such large swaths of land as open to OSV contradicts and renders meaningless the subpart C rule's closed unless designated open approach. Instead, the Forest Service should specifically delineate discrete areas where cross-country travel is permitted. Moreover, proper application of the minimization criteria almost certainly would not result in designation of open areas even close to the size of MAs, as sensitive natural resources, imperiled wildlife, and other recreational uses adversely affected by OSV use would most likely be present throughout the area.

Need For Change

Based on the phone conversation with Forest Service staff, it is our understanding that the Colville does not anticipate major changes to the current OSV management. Because current management is inconsistent with the subpart C rule requiring a closed unless designated open management approach, the Forest Service may not continue the status quo under existing management. Specific to winter travel planning, our comments explain why the existing winter management and the framework set forth in the draft forest plan revision fail to satisfy the Forest Service's obligations under subpart C of the Travel Management Rule. *See* July 5, 2016 WildEarth Guardians Comment at 12-14.

Limited snowfall does not indicate that winter travel planning is not needed. Simply because certain areas of the forest that do not receive sufficient snowfall for OSV use, it does not follow that the Colville may leave those areas open to OSV use. This type of reliance on

[1] Recognizing the draft rule would have permitted inconsistent management approaches, with corresponding confusion among users and enforcement difficulties, the Forest Service in the final subpart C rule determined that "it would be clearer for the public and would enhance consistency in travel management planning and decision-making if the Responsible Official were required to designate a system of routes and areas where OSV use is prohibited unless allowed" (i.e., marked open on a map). 80 Fed. Reg. at 4507.

reduced snow depth as a default to control OSV use is inconsistent with Forest Service rules and policy. An OSVUM designates which areas and trails are open to OSV use; all other areas are closed to OSV use. A forest must provide designations wherever snowfall is adequate. FSH 7709.55, 15.1(2) (stating that an "OSVUM must cover all parts of the unit or District where snowfall is adequate for OSV use to occur."). Therefore, the Forest Service may not designate as open areas where snowfall is inadequate for OSV use. See more in the minimum snow depth section, below.

Application of Minimization Criteria

Federal courts including the Ninth Circuit Court of Appeals have repeatedly affirmed the substantive nature of the Forest Service's obligation to meaningfully apply the minimization criteria.[2] To satisfy this duty, the Forest Service must meaningfully apply each minimization criterion to each area and trail being considered for designation. Compliance with the minimization criteria must be clear in the record. Mitigation efforts do not fulfill the agency's duty to *locate* areas and trails with the objective of minimizing impacts. Finally, the Forest Service should use the best available scientific information to inform its designations.

Applying the minimization criteria to MAs in the forest plan revision is problematic. The Forest Service must apply the minimization criteria with some level of specificity. *See, e.g.*, *WildEarth Guardians*, 790 F.3d at 930 (noting there is "nothing . . . that allows the Forest Service to designate multiple areas for snowmobile use on the basis of a single forest-wide analysis and general decisionmaking principles."). In *WildEarth Guardians*, the Ninth Circuit explained the Forest Service must "apply the minimization criteria to *each area* it designate[s] for snowmobile use" and "provide a . . . more granular minimization analysis to fulfill the objectives of the Executive Order 11644." 790 F.3d at 903-931 (emphasis added). Application of the minimization criteria must address both site-specific and larger-scale impacts.

The Colville's draft forest plan revision identifies MAs suitable for OSV use. *See, e.g.*, DEIS at 575 ("Wilderness, backcountry (semi-primitive non-motorized), research natural areas, big-game winter range, recommended wilderness, National Scenic Trail, and special interest area (except for the Kettle Crest SIA) management areas were used to identify those acres under each alternative that were closed or could be closed to over-snow vehicle use."); 579, Table 192 (showing the total acres open to OSV use by alternative). This forest-wide approach is inconsistent with subpart C and the Ninth Circuit's direction.

[2] *WildEarth Guardians*, 790 F.3d 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); *Friends of the Clearwater v. U.S. Forest Serv.*, No. 3:13-CV-00515-EJL, 2015 U.S. Dist. LEXIS 30671, at *37-52 (D. Idaho 2015) ("to satisfy the Travel Management Rule, 'the Forest Service must actually explain how it aimed to minimize environmental damage in designating routes . . . ."); *The Wilderness Soc'y v. U.S. Forest Serv.*, No. CV08-363-E-EJL, 2013 U.S. Dist. LEXIS 153036, at *22-32 (D. Idaho Oct. 22, 2013); *Cent. Sierra Envtl. Res. Ctr. v. U.S. Forest Serv.*, 916 F. Supp. 2d 1078, 1096 (E.D. Cal. 2013) (explaining the Forest Service is under an "affirmative obligation . . . to actually show that it aimed to minimize environmental damage when designating trails and areas."); *Idaho Conservation League v. Guzman*, 766 F. Supp. 2d 1056, 1074 (D. Idaho 2011) ("The language 'with the objective of minimizing' means that the whole goal or purpose of the exercise is to select routes in order to minimize impacts in light of the agency's other duties.").

The forest plan revision analysis mentions snowmobile trails can be found on every District of the forest. DEIS at 565. To the extent that the Colville designates trails within those management areas, the Forest Service must demonstrate how it locates those trails with the objective of minimizing harm to natural resources, disruption of wildlife, and conflicts with other uses. *See* DEIS at 565 (noting a groomed winter OSV trail system).

Minimize Damage to Natural Resources

Subpart C requires the Colville to locate OSV areas and trails with the objective of minimizing damage to soil, watershed, vegetation, and other public lands resources. The analysis in the DEIS demonstrates that the Forest Service has not done this. *See, e.g.*, DEIS at 575 ("The acres shown as suitable for future consideration of motorized use areas and motorized trail development do not reflect site-specific resource concerns such as slope, soils, heritage resources, etc. that would be addressed in project-level analyses.").

The Colville proposes to leave open Recommended Wilderness MAs, "if motorized use occurred prior to identification as recommended wilderness." DEIS at 563, Table 190. This approach fails to consider designations on a more granular basis, and it fails to show how the OSV use designations were located to minimize impacts to natural resources.

Minimize Harassment of Wildlife & Disruption of Habitat

The Colville must locate areas and trails open to OSV use with the objective of minimizing harassment of wildlife and disruption of habitat. Current assessments fail to show the Colville did this when designating certain MAs as open to OSV use. For example, the analysis in the DEIS recognizes that winter recreation can affect how Canada lynx use habitats, but states that "[e]xisting management plans do not address effects of over-the-snow recreation on lynx habitat." DEIS at 391.

Areas open to OSV use must not be located within big game winter range. The DEIS states that snowmobile riders are attracted to the same subalpine and alpine ridges that provide late winter habitat for woodland caribou. DEIS at 377-378. But because the DEIS only compared the acres of MAs open to OSV use and made assumptions about those acres, it is unclear whether any MAs open to OSV use allow snowmobiles in areas with big game winter range. *See* DEIS at 575 ("For winter range, the entire management area was considered to be closed to over-snow vehicle use regardless of the percentage of the area that was closed to use by gates or Forest closure orders.").

Minimize Conflicts Among Uses

The DEIS recognizes areas of conflicting use. *See* DEIS at 566 ("In a few key areas, such as the power line corridor over Sherman Pass, increased use by backcountry skiers and snowmobilers has resulted in some conflict between the two groups of users."). It also recognizes potential new winter uses. *See* DEIS at 6 ("New activities and modes of travel continue to appear, e.g., mountain bicycles with over-snow tires and snowmobiles that resemble motorcycles."). The Forest Service must demonstrate in the record how it located OSV use areas and trails with the objective of minimizing conflicts among these uses and quiet, non-motorized use.

Minimum Snow Depth & Seasonal Dates

Subpart C requires designation of areas and trails open to OSV use "where snowfall is adequate for that use to occur." 36 C.F.R. § 212.81(a). Particularly with climate change leading to reduced and less reliable snowpack, low-elevation and other areas that lack regular and consistent snowfall should not be designated as open to OSV use.

To account for variable snowpack and ensure OSV use occurs only when and where snowfall is adequate, minimum snow depth restrictions are a necessary tool to further minimize impacts associated with OSV area and trail designations. The best available science shows that minimum snow depths should be at least 18 inches for cross-country travel and 12 inches for travel on groomed trails. *See* Switalski, A. *Snowmobile Best Management Practices for Forest Service Travel Planning: A Comprehensive Literature Review and Recommendations for Management – Water Quality, Soils and Vegetation*, Journal of Cons. Planning 12 (2016), pages 8-12 (Inyo, Sequoia, and Sierra National Forests proposing a minimum snow depth of 18 inches in revised forest plans to protect forest resources) (attached). The Forest Service should also outline plans to enforce minimum snow depth restrictions, including protocols for monitoring snow depths, communicating conditions to the public, and implementing emergency closures when snowpack falls below the relevant thresholds.

In addition, the Colville should clearly identify season of use restrictions based on wildlife needs, water quality considerations, average snow depth figures, and other relevant information. The restrictions should serve as bookends, with minimum snow depth requirements further protecting natural resources.

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Snowmobile Best Management Practices for Forest Service Travel Planning: A Comprehensive Literature Review and Recommendations for Management – *Water Quality, Soils, and Vegetation*

Adam Switalski

Adam Switalski
Ecologist / Principal, InRoads Consulting, LLC
1301 Scott St., Suite C
Missoula, MT 59802
Phone: 406-396-1941
Email: inroadsnw@gmail.com
www.inroadsnw.com

ABSTRACT: Since the seminal research of Wallace Wanek and his colleagues in the 1970s, it has been well established that snowmobiles can negatively impact water quality, soils, and vegetation. However, while early researchers focused on localized impacts of snowmobiles on groomed trails, today's machines also travel off-trail and into many sensitive habitats such as alpine cirques, meadows, and wetlands. Water quality can also be affected when spring runoff releases pollutants stored in the snowpack – especially at staging areas. Furthermore, as snowmobiles become increasingly powerful, their increased torque and reach creates a potential for greater impact on those resources. Based on this research and existing management strategies, we present best management practices (BMPs) which will help protect water quality, soils, and vegetation.

Keywords: Travel planning, snowmobiles, best management practices, BMPs, water quality, soils, vegetation, USDA Forest Service

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Water Quality Research

Protecting and enhancing water supply is a key mandate of the USDA Forest Service (Forest Service), and a number of aquatic species and municipal watersheds depend on National Forests – especially in the West. For example, most National Forest acres west of the Cascade Mountains in Oregon and Washington are municipal watersheds and provide water to local communities (USDA FS 2000). During the winter, snowmobiles release toxins such as ammonium, nitrate, sulfate, benzene, and toluene which accumulate in the snowpack (Ingersol 1999) and increase acidity (Musselman and Kormacher 2007). In the spring runoff, accumulated pollutants are released as a pulse into the soil, groundwater, and surrounding waterbodies.

A recent study found snowmobiles are polluting a tributary of Lake Tahoe, CA. Examining 168 different semi-volatile organic compounds (SVOC), McDaniel (2013) found eight to 20 times greater loadings on snowmobile trails than background levels. He further reported that highly toxic and persistent polycyclic aromatic hydrocarbons (PAHs) had increased two to six times the background level in a nearby stream (McDaniel 2013). Impacts on water quality can be especially pronounced at trailheads and staging areas where snowmobiles congregate (USDA FS 2012). Lakes can also be vulnerable because snow melts directly into the waterbody without any vegetative buffer, and there is a risk of snowmobiles falling through thin ice and spilling toxins directly into the water (USDA FS 2012).

Soils Research

Snowmobiles can directly impact soils in a number of ways including soil compaction, erosion, and contamination. When traveling in areas of low or no snow – such as such as wind-swept ridges, snow-free access points, or during periods of thin snowpack – snowmobiles can be particularly damaging. This may also be an increasingly common situation as climate change leaves low-elevation access points snow-free for longer periods of time. Snowmobiles can also indirectly impact soils through snow compaction (Wanek 1971). Weighing several hundred pounds, snowmobiles easily compact the snow, which can increase snowpack density, reduce soil temperatures, increase soil freezing, and result in a later melt-out (Gage and Cooper 2009).

In areas of low or no snowpack, direct soil compaction can occur from snowmobiles leading to erosion (Gage and Cooper 2009). On steep slopes – especially south facing, or wind-swept slopes – vegetation and snow can be mechanically removed from snowmobile tracks resulting in exposed bare ground (Stagl 1999). Soil compaction impacts nearly all properties and functions of soil including increased bulk density and reduced pore space leading to reduced permeability of water and air (Batey 2009). This results in surface erosion, especially on steep slopes (Batey 2009). Soil erosion when located near streams can also lead to localized stream sedimentation and increased turbidity. As climate change increases the number of snow-free days, erosion from snowmobiles will be an increasing management concern.

Soils can also be contaminated when pollutants enter the soil from a melting snowpack. With inefficient engines, snowmobiles release much of their oil gas mixture into the snow unburned. Several pollutants have been recorded in the snowpack along snowmobile trails including ammonium, nitrate, sulfate, benzene, and toluene (Ingersol 1999). In the spring, these pollutants are released into the soil, creating local contamination and associated impacts.

Vegetation Research

Snowmobiles impact vegetation either through directly crushing and breaking vegetation, or through a number of indirect mechanisms. When traveling off-trail, snowmobiles often run over trees and shrubs causing damage or death – often with minimal snowmobile traffic. Although these impacts may not be environmentally significant when they occur in robust forest environments, they can be very significant when they occur in sensitive forest habit, such as high mountain slopes or meadows.

A recent study on the Gallatin National Forest (MT) found 366 acres of trees damaged by snowmobiles on timber sale units – slowing forest regeneration (WWA 2009, Table 1). Trees such as white-bark pine (*Pinus albicaulis*), found only at high elevations and declining across its range, may be vulnerable to snowmobile damage. Trampling has also been found to result in a reduction in plant productivity, changes in the plant community, and a reduction in plant diversity (Masyk 1973, Wanek 1973, Wanek and Schumacher 1975).

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Compaction of the snow reduces the insulating air spaces and conducts cold air to the ground (Wanek 1973). These lower temperatures can reduce plant density and composition (Neumann and Merriam 1972), reduce productivity and growth (Wanek and Potter 1974), delay seed germination and flowering (Rongstad 1980), as well as affect decomposition rates, hummus formation and microbial activity (Neumann & Merriam 1972, Rongstad 1980). These impacts ultimately can change community structure and reduce the availability and duration of spring wildlife foods (Stagl 1999).

to protect the underlying vegetative cover and soil or trail surface; use and enforce closure orders to mitigate effects when adverse effects to soil, water quality, or riparian resources are occurring; use suitable measures to trap and treat pollutants from over-snow vehicle emissions in snowmelt runoff or locate the staging area at a sufficient distance from nearby waterbodies to provide adequate pollutant filtering" (USDA FS 2012, p. 96-97).

Some Forest Service policy has also recommended restricting snowmobile use to protect water quality.

Table 1. Summary of snowmobile damaged trees on the Gallatin National Forest (MT) reported during regeneration transect surveys of previously logged timber stands (reprinted from WWA 2009).

Area name	Year logged	Year inventoried	Acres	Average # damaged trees per acre	Total number of trees damaged
Little Teepee Creek Drainage	1969	1995	122	140	17,080
Horse Butte Road*	1992	1995	15	514*	7710*
Madison Arm	1991	1995	12	5	60
Unknown	1960s	1983	68	23	1564
Unknown*	1960s	1983	100	652*	65,200*
Cream Creek*	1986	1995	60	725*	43,500*
Total damaged trees:					**135,114**

*surveys note the presence of a snowmobile trail in this stand

Water Quality, Soils, and Vegetation Management

The most common strategy for protecting water quality, soils, and vegetation from snowmobile impacts is to ensure that there is adequate snow cover and create a buffer around waterways. For example, the Forest Service has developed best management practices (BMPs) to protect water resources on Forest Service lands from snowmobile pollution (USDA FS 2012). This document recommends, "Allow over-snow vehicle use cross-country or on trails when snow depths are sufficient

The Uinta-Wasatch-Cache National Forest (UT) does not allow recreational snowmobiling in Salt Lake City's municipal watershed (USDA FS 2003). The Inyo, Sequoia, and Sierra National Forests are proposing a minimum of 18" of snowpack before allowing snowmobiling in their revised Forest Plan to protect forest resources (USDA FS 2014). Restricting snowmobile use in sensitive habitats such as riparian areas and wetlands can be helpful in mitigating these impacts as well.

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Best Management Practices for Water Quality, Soils, and Vegetation

Designating motorized use

1. Set dates for snowmobile season opening and closure, and adjust based upon adequate snow depth.

2. Require a minimum snow depth of at least 0.3m (12 in), or sufficient depth to protect water quality, soils, and vegetation before a contingency plan and implement emergency closures if snowpack goes below this threshold.

3. Require a minimum snow depth of at least 0.45 m (18 in), or sufficient depth to protect water quality, soils, and vegetation before allowing snowmobiling off-trail. Have a contingency plan and implement emergency closures if snowpack goes below this threshold.

4. Avoid locating snowmobile routes or areas in municipal watersheds.

5. Restrict snowmobile use on wetlands, riparian areas, and sensitive meadows and buffer snowmobile trailheads and routes 45 m (150 ft) from these areas.

Minimizing impacts of motorized use

1. Develop public information, educational programs, and signage about the impacts of snowmobiles on water quality, soils, and vegetation and how to minimize those impacts.

2. Ensure adequate maintenance of bridges and culverts on routes to help prevent erosion during the spring run-off.

3. If roads are only used for snowmobile use, scarify the roadbed to restore hydrology.

4. Encourage or require the use of best available technology (BAT) where necessary to minimize the impacts water quality, soils, and vegetation.

5. Close routes and areas when excessive damage to soils and vegetation has occurred, and/or erosion has been documented.

6. Monitor closed routes and areas to ensure the measures taken are effectively mitigating impacts to water quality, soils, and vegetation.

7. Establish an adaptive management framework using monitoring to determine efficacy of current management.

8. Revisit plan decisions as necessary to ensure impacts to water quality, soils, and vegetation are being minimized and motorized impacts are below accepted thresholds.

CONCLUSION

It has been well documented that snowmobiles can impact water quality, soils, and vegetation. Alpine environments are particularly sensitive to disturbance, and snowmobiles can pollute waterways, cause localized soil erosion, and crush and break vegetation. Many of these impacts are compounded by climate change which is leaving many “historic” access points snow-free for much of the winter. Ensuring that there is adequate snow cover and buffered waterways are key mitigation strategies. Restricting use in sensitive habitats such as riparian areas and wetlands is also an important mitigation step. Applying BMPs in the development of a system of snowmobile routes and areas will protect water quality, soils, and vegetation on Forest Service lands.

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