June 24, 2016

Rob Robertson
Washakie District Office
333 East Main Street
Lander, WY 82520

Re: Shoshone National Forest Travel Management #48573

Cc: Joe Alexander, Olga Troxel, Rick Metzger, Sue Stresser, Steve Schacht

Dear Mr. Robertson,

Thank you for the opportunity to comment on the Proposed Action for the Shoshone National Forest's travel management plan. Winter Wildlands Alliance (WWA) is a Boise, Idaho-based nonprofit national advocacy organization representing the interests of human-powered winter recreationists across the U.S. Our mission is to promote and preserve winter wildlands and a quality human-powered snowsports experience on public lands. WWA represents over 50,000 members and 40 grassroots partner organizations in 11 states, including the Togwotee Backcountry Alliance and Wyoming Wilderness Association in Wyoming. Many of WWA's members use the Shoshone National Forest for Nordic and backcountry skiing, snowshoeing and winter hiking. WWA is specifically interested in the winter portion of the travel plan, particularly those areas that will be designated as open on the over-snow vehicle (OSV) use map (OSVUM).

After reading through the Proposed Action for this travel plan we were disappointed not to see any specific mention of the executive orders that underlay all travel management planning: Executive Orders 11644 and 11989. These orders were issued in response to the growing use of off-road vehicles (ORVs), including over-snow vehicles, and corresponding environmental damage and conflicts with non-motorized users. The executive orders require federal land management agencies to plan for ORV use to protect other resources and recreational uses. Specifically, the executive orders require that, when designating areas or trails available for ORV use (including OSV use), the agencies must locate them to:

(1) minimize damage to soil, watersheds, vegetation, and other resources of the public lands;
(2) minimize harassment of wildlife or significant disruption of wildlife habitats; and
(3) minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands.[1]

The 2005 Travel Management Rule (TMR) codified the executive order "minimization criteria" and it is extremely important that the Shoshone adhere to these criteria when making ORV and OSV designation decisions.

A string of federal court cases invalidating prior Forest Service travel management decisions show that the Forest Service struggles with properly applying the minimization criteria.[2] Most

[1] Exec. Order No. 11644, § 3(a), 37 Fed. Reg. 2877 (Feb. 8, 1972), *as amended by* Exec. Order No. 11,989, 42 Fed. Reg. 26,959 (May 24, 1977).

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recently, in *WildEarth Guardians v. U.S. Forest Service*, the Ninth Circuit Court of Appeals invalidated the Beaverhead-Deerlodge's OSV area designations because the record failed to show that the Forest Service applied and implemented the minimization criteria during the decision-making process.[3] The Ninth Circuit's decision upheld several lower court decisions and affirmed that the Forest Service has a *substantive* duty to meaningfully apply the minimization criteria.[4]

When designating routes and areas for OSV use it is critical that the agency apply the minimization criteria at a granular level. As the Ninth Circuit noted, 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 decision making principles."[5] In fact, the Executive Orders direct the Forest Service to establish "rules requiring application of minimization criteria 'for designation of the *specific areas* and trails on public lands on which the use of off-road vehicles may be permitted.'"[6] The Forest Service's own rules define "areas" designated for ORV use as "discrete, specifically delineated space[s] that [are] smaller, and, . . . in most cases much smaller, than a Ranger District."[7] In *WildEarth Guardians*, the Ninth Circuit explained that the Travel Management Rule "requires the Forest Service to apply the minimization criteria to *each area* it designated for snowmobile use" to "provide a more granular minimization analysis to fulfill the objectives of Executive Order 11644."[8]

Compliance with the Executive Orders and Travel Management Rule must be clear in the administrative record.[9] *WildEarth Guardians* confirmed that the Forest Service must apply a transparent and common sense methodology for meaningful application of each minimization

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[2] *WildEarth Guardians v. U.S. Forest Serv.*, 790 F.3d 920, 929-32 (9th Cir. 2015); *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 2015); *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, 1094-98 (E.D. Cal. 2013); *Idaho Conservation League v. Guzman*, 766 F. Supp. 2d 1056, 1071-74 (D. Idaho 2011).

[3] *WildEarth Guardians v. U.S. Forest Service*, 790 F.3d 920 (9th Cir. 2015)

[4] *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 Clearwater* ("to satisfy the Travel Management Rule, 'the Forest Service must actually explain how it aimed to minimize environmental damage in designating routes. . . ."); *Guzman*, 766 F.Supp.2d at 1074 ("The language 'with the object 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.").

[5] *See, e.g.*, *WildEarth Guardians*, 790 F.3d at 930.

[6] Exec. Or. No. 11644, § 3 (emphasis added).

[7] 36 C.F.R. § 212.1.

[8] *WildEarth Guardians*, 790 F.3d at 930 (emphasis in original).

[9] *Id*. at 931 ("What is required is that the Forest Service document how it evaluated and applied [relevant] data on an area-by-area [or route-by-route] basis with the objective of minimizing impacts."); *Guzman*, 766 F.Supp.2d at 1074 ("the Forest Service must explain how the minimization criteria were applied in the route designation decisions."); *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).

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criterion to each area and trail. To address the minimization criteria the Forest Service's methodology should, at minimum:

1. Incorporate site-specific data.
2. Provide opportunities for public participation early in the planning process.
3. Consider the best available scientific information.
4. Account for projected climate change impacts, including reduced and less reliable snowpack, and increased vulnerability of wildlife and resources to OSV impacts.
5. Consider site-specific and larger-scale impacts.
6. Apply best management practices.[10]
7. Account for available resources for monitoring and enforcement.
8. Consider whether to designate areas or trails by "class of vehicle" and "time of year," as provided by the OSV rule.

Subpart C of the 2005 TMR was revised in 2015 and requires each National Forest unit with adequate snowfall to designate and display on an OSV use map a system of areas and routes where OSVs are permitted to travel; OSV use outside the designated system is prohibited.[11] Rather than allowing OSV use largely by default wherever that use is not specifically prohibited, the rule changes the paradigm to a "closed unless designated open" management regime. This paradigm shift entails significant changes in how snowmobiles are managed on the Shoshone National Forest. The Shoshone must apply and implement the minimization criteria when *designating* each area and trail where OSV use is permitted,[12] not as a means of justifying existing management. Any areas where cross-country OSV use is permitted must be "discrete, specifically delineated space[s] that [are] smaller . . . than a Ranger District" and *located* to minimize resource damage and conflicts with other recreational uses.[13] The minimization criteria must come first, followed by drawing lines on the map.

While this approach will result in fewer acres available for OSV use, it will not significantly reduce the number of *usable* acres open to OSVs. For instance, under the proposed action the Beartooth Front outside of Clark, WY is open to OSV use despite the fact that this area receives very little snow and sees limited, if any, OSV activity. There is no real need to designate this area as open to OSV use – it provides little to no OSV recreation opportunity and given the limited amount of snow the area receives cross-country travel is liable to cause significant damage to vegetation and other resources. Keeping low-elevation areas, thickly treed areas, windswept ridgetops, and other such areas open to OSVs gives a false perception of opportunity and presents a management issue when these areas do receive snow. It also falls short of considering how advances in OSV technology have improved, and will continue to improve, access to places where machines once could not reach. A more conservative approach, and more in line with protecting the Shoshone's niche as a wild backcountry forest, would be to first

[10] Winter Wildlands Alliance has published a set of Best Management Practices for Winter Travel Planning, attached to these comments as Exhibit A and available online at http://winterwildlands.org/wp-content/uploads/2015/06/BMP-Final.pdf
[11] 36 C.F.R. §§ 212.81, 261.14.
[12] 36 C.F.R. §§ 212.81(d), 212.55(b).
[13] 36 C.F.R. §§ 212.1, 212.81(d), 212.55(b).

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limit OSV use areas to places where OSV recreation currently occurs and then further refine the boundaries on the OSVUM based on the minimization criteria.

We recognize that the 2015 Forest Plan goes a long way in protecting wild lands and wildlife habitat on the Shoshone National Forest from the impacts of motorized recreation. However, forest plan allocations are not a substitute for the area designations made as part of winter travel planning. Indeed, relying on forest plan allocations rather than applying the minimization criteria to determine OSV use area designations was at the heart of *WildEarth Guardians vs. USFS.* In this case the Court invalidated the Beaverhead-Deerlodge National Forest's decision to have forest plan allocations serve a dual role as winter travel designations without a clear administrative record showing how the minimization criteria were applied and implemented[14] The Final Environmental Impact Statement (FEIS) that accompanies the 2015 Forest Plan makes note of Executive Order 11644 in relation to roads, however, there is no mention in the accompanying FEIS that this order also applies to OSV areas or trails.[15] Likewise, there does not appear to be any indication in the FEIS that the Forest Plan land allocations for winter motorized use were based on the minimization criteria.

The Forest Plan has built a good foundation for over-snow vehicle travel planning but we expect to see additional analysis and more refined OSV area designations during the travel planning process. While the Proposed Action's closures on Togwotee Pass and forest-wide OSV season dates are excellent first steps these actions alone will not be enough to meet the legal requirements of travel planning. To satisfy the legal requirements of the 2005 TMR and 2015 OSV Rule the Shoshone must look closely at the lands allocated for winter motorized use and designate discrete, delineated OSV use areas where OSV impacts on the environment, natural resources, and other uses are minimized. Open areas should have easily enforceable boundaries using topographic or geographic features such as a ridgetop, highway, or watershed boundaries. All other areas that are not determined to be appropriate for open designation must be closed (or limited to designated routes which have been located in compliance with the minimization criteria).

**Non-motorized winter recreation on the Shoshone National Forest**

Non-motorized winter recreation is a highly-valued use across the Shoshone National Forest but within the areas the Revised Forest Plan has allocated for OSV use two stand out as winter recreation "hot spots".

Togwotee Pass has been a destination for human-powered skiers and snowboarders, and snowshoers, for over eighty years. With a high elevation point of nearly 10,000 feet, Togwotee Pass provides human-powered winter recreationists with accessible and quality mountain terrain. Open glades, alpine meadows, bowls, cirques and endless couloirs define the Togwotee

[14] *WildEarth Guardians*, 790 F.3d at 931("[w]hat is required is that the Forest Service document how it evaluated and applied [relevant] data on an area-by-area [or route-by-route] basis with the objective of minimizing impacts) *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).
[15] FEIS Ch. 3, page 474

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region. Togwotee Pass has been the location of several rope tows and more recently a snowcat skiing operation. The American Avalanche Institute, Central Wyoming College, and National Outdoor Leadership School use the area for instructing backcountry snowsports enthusiasts in avalanche education, winter camping, and backcountry skiing. For human-powered snowsports enthusiasts traveling from Fremont County, Togwotee Pass – especially the Shoshone side – is the nearest locale that has reliable snow and accessible quality terrain. We strongly support the proposed closures on Togwtoee Pass to protect cross-country skiing opportunities in the Deception and Pinnacles areas. These trails provide excellent non-motorized recreation opportunities for residents of and visitors to Fremont County.

On the northern end of the forest, the Beartooth Pass is renowned spring and summer ski destination. In late May, when Highway 212 opens to wheeled vehicles the Beartooth Pass provides access to thousands of acres of good skiing often as late as July. Skiers also begin accessing lower elevation areas on the pass – particularly Clay and Beartooth buttes – earlier in the spring as the road begins to melt out. While many skiers use the Pass as a launching point to access the Absaroka-Beartooth Wilderness, some of the most popular Beartooth Pass ski destinations are the roadside lake basins on the Shoshone National Forest. Memorial Day weekend is the high point of spring skier activity on the Beartooth Pass. There is a long and rich tradition of skiers flocking to the state line, Gardner Lakes basin, and other areas near the summit of the pass to celebrate the start of summer with a weekend of skiing and snowboarding. This has always been a human-powered celebration yet in recent years there has been an increase in the number of snowmobile-assisted skiers on the pass, leading to conflict and safety issues. Snowmobiles travelling up or down on the same slopes as skiers and snowboarders, particularly in the Gardner Lakes basin, create a serious safety hazard. In addition, skiers have reported increasing incidents of snowmobiles trespassing into Wilderness on the Line Creek plateau (on the Custer-Gallatin National Forest) and have observed an increase in OSV use within the Line Creek Natural Area at a time when the tundra is most susceptible to damage. Finally, OSV use when Beartooth Pass is open for the summer season is counter to the Area 3.3b Management Approach, negatively impacting the experience of spring and summer visitors. We strongly support the April 30 OSV season closure. This date provides a winters-worth of OSV recreation opportunity on the Beartooth Plateau yet ensures that the long tradition of human-powered skiing on the Pass can continue.

**Forest-wide management actions**

We believe it is important to set seasonal "bookends" before and after which OSV use is not allowed and we support the season dates in the Shoshone's proposed action. The season dates will prevent conflict between OSV use and big game hunting season, protect fragile alpine vegetation in the spring, creates constancy for OSV users on Togwotee Pass who travel between the Bridger-Teton and Shoshone National Forests, and eliminates conflict between skiing and OSV use on the Beartooth Plateau.

Setting an OSV use season is a management action recommended in the Forest Service's own Best Management Practices: "Specify season of use to be at times when the snowpack is

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expected to be of suitable depth conditions."[16] Having set dates for the winter season will help the Shoshone to better enforce the travel plan. However, because the proposed action does not explain how "high" versus "low" elevation areas were determined, we would appreciate more clarification on this point. Additionally, the final plan should stipulate that the season dates do not apply to administrative use. The Beartooth Basin spring ski area operates on the Beartooth Pass in the month following Memorial Day weekend and OSV use necessary for ski area operations should be allowed.

In addition to defining an OSV use season, the Shoshone should also set a minimum snow depth restriction across the forest. The Forest Service's Best Management Practices for water quality management call for forests to institute minimum snow depths, stating that forests should: "Specify the minimum snow depth for each type or class of over-snow vehicle to protect underlying resources as part of any restrictions or prohibitions on over-snow use."[17] Defining a minimum snow depth will help the winter travel plan be adaptive in the face of climate change. The snow season is changing and having flexibility built into the plan is key for ensuring that the impact of winter motorized use is minimized regardless of when that use occurs.
Instituting a minimum snow depth requirement is another management tool the Forest Service should employ to minimize OSV impacts, particularly to soils and vegetation. While snow does buffer OSV impacts, there must be adequate snow on the ground for this to happen. Even in the midst of winter, impacts can be of concern on windswept ridges, big game winter range, and other areas of low snowpack. To avoid these impacts the Forest Service can employ a couple of different management strategies. The boundaries of OSV use areas should be drawn to avoid places where there is traditionally low snow – such as wind-swept ridges or low elevation areas – and the forest should implement a snow depth restriction.

Requiring 18 inches of uncompacted snow before allowing OSV use within an area will help to minimize OSV impacts related to soil compaction, damage to wetland and alpine habitats, and protect vegetation and subnivean habitat. 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 or roads.[18] A snow depth restriction should be paired with a plan to monitor and enforce minimum snow depth restrictions, including implementing emergency closures when snowpack falls below the relevant thresholds. Many National Forests include a snow depth minimum as part of their OSV management toolbox and the Shoshone should do the same. [19]

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[16] USFS 2012. *National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide.* Rec. 7 –Over-Snow Vehicle Use. Available at http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf
[17] USFS 2012. *National Best Management Practices for Water Quality Management on National Forest System Lands. Volume 1: National Core BMP Technical Guide.* Rec. 7 –Over-Snow Vehicle Use. Available at http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf
[18] *Snowmobile Best Management Practices for Forest Service Travel Planning: A Comprehensive Literature Review and Recommendations for Management* at 14. Available at http://winterwildlands.org/wp-content/uploads/2015/06/BMP-Final.pdf
[19] See for example, Tongass NF MVUMs: http://www.fs.usda.gov/detail/tongass/maps-pubs/?cid=stelprdb5430063.

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The five other forests in the nation that are currently writing winter travel plans – the Lassen, Tahoe, Eldorado, Stanislaus, and Plumas - have all proposed minimum snow depths. The language in these proposed actions is the same for each forest: "To implement a forest-wide snow depth requirement for OSV use that would provide for public safety and natural and cultural resource protection by allowing OSV use in designated areas when there is a minimum of 12 inches of snow covering the landscape."[20] Of these five forests the Lassen is the only one to have published a draft EIS so far, and each Alternative includes a minimum snow depth restriction.[21]

A minimum snow depth restriction does not mean that there must be an even blanket of at least 18 inches of snow across the Forest. It is a management tool to help the Forest Service minimize OSV impacts and provide consistency. The Shoshone should determine a set number of snow measuring stations based on local knowledge of locations that are indicative of larger areas. The Forest Service can use Snotel data paired with on-the-ground observations to determine where appropriate locations for these measuring stations should be. The measuring stations should be located in places where they can help the district rangers determine whether the snowpack at specific OSV use areas (such as Togwotee Pass or the Beartooth Plateau) has reached the minimum depth. By setting a forest-wide minimum snow depth, the Shoshone then ensures that each district ranger has a consistent standard to help them determine how much snow is sufficient to protect forest resources.

The Chugach National Forest uses a combination of a season dates and minimum snow depths to very successfully manage OSV use even as climate change is significantly changing the snow season on the forest. On the Chugach OSV season starts on December 1. However, if there is not enough snow by this date (fewer than 12 inches of consolidated snow), or if the snowpack decreases substantially at some other point in the season, the local district ranger issues a special order to close specific areas until there is sufficient snow.[22] Sometimes this means an entire district is closed and other times it may be just one trailhead or use area. When there is a special closure order in place the Forest Service posts notices at trailheads, online, and at district offices. Similarly, the Chugach alerts the public when the closure order is lifted. During the closures district law enforcement officers monitor winter trailheads to ensure compliance. Given the relatively few number of winter trailheads on the Shoshone, this model would work for the Shoshone as well.

**Managing the High Lakes Wilderness Study Area**

The Shoshone Revised Forest Plan states that the High Lakes Wilderness Study Area (WSA) will be managed to prevent long-term impairment of wilderness characteristics until released from wilderness study area status and that snowmobiling is authorized to the same manner and degree as was occurring prior to the Wyoming Wilderness Act of 1984.[23] This language comes almost directly from the Wyoming Wilderness Study Act:

[20] These Proposed Actions can be accessed through the Region 5 Travel Planning webpage: http://www.fs.usda.gov/detail/r5/recreation/travelmanagement/?cid=stelprdb5397043
[21] See http://data.ecosystem-management.org/nepaweb/fs-usda-pop.php?project=45832
[22] See http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5441982.pdf
[23] Shoshone 2015 Revised Forest Plan. Pages 17 and 122.

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"Subject to valid existing rights and reasonable access to exercise such rights, until Congress determines otherwise, the . . . High Lakes Wilderness Study Area shall be administered by the Secretary of Agriculture so as to maintain [its] presently existing wilderness character . . . . [W]ithin the . . . High Lakes . . . Wilderness Study Area, snowmobiling shall continue to be allowed in the same manner and degree as was occurring prior to the date of the enactment of this Act."[24]

Thus, while snowmobiling may be permitted in the High Lakes WSA, this travel plan must include management actions to ensure that snowmobiling occurs in the same manner and degree as occurred prior to October 30, 1984. Because the High Lakes area had not received substantial snowfall by late October 1984 (Table 1), this means OSV use within the High Lakes WSA must be managed to ensure that it does not exceed the manner and degree of use that occurred in the winter of 1983.

**Table 1. Beartooth Lake SNOTEL Readings for October 1984**

| Site Id | Date | WTEQ.I-1 (in) | PREC.I-1 (in) | TOBS.I-1 (degC) |
|---|---|---|---|---|
| 326 | 10/1/1984 | 1.7 | 0 | -2.3 |
| 326 | 10/2/1984 | 1.7 | 0 | -4.5 |
| 326 | 10/3/1984 | 1.7 | 0.1 | -2.8 |
| 326 | 10/4/1984 | 1.7 | 0.1 | -3.4 |
| 326 | 10/5/1984 | 1.7 | 0.1 | -2.6 |
| 326 | 10/6/1984 | 1.8 | 0.1 | -1.3 |
| 326 | 10/7/1984 | 1.8 | 0.1 | -0.8 |
| 326 | 10/8/1984 | 1.8 | 0.1 | -1.8 |
| 326 | 10/9/1984 | 1.8 | 0.1 | -2.5 |
| 326 | 10/10/1984 | 1.8 | 0.1 | 0.1 |
| 326 | 10/11/1984 | 1.8 | 0.1 | 0.9 |
| 326 | 10/12/1984 | 1.8 | 0.1 | -2 |
| 326 | 10/13/1984 | 1.8 | 0.1 | -2.1 |
| 326 | 10/14/1984 | 2 | 0.3 | -9.6 |
| 326 | 10/15/1984 | 2.4 | 0.4 | -18.6 |
| 326 | 10/16/1984 | 2.8 | 0.6 | -11.4 |
| 326 | 10/17/1984 | 2.9 | 0.7 | -3.7 |
| 326 | 10/18/1984 | 2.9 | 0.7 | -12.4 |
| 326 | 10/19/1984 | 2.9 | 0.7 | -14 |
| 326 | 10/20/1984 | 2.9 | 0.7 | -20.9 |
| 326 | 10/21/1984 | 3 | 0.8 | -20 |
| 326 | 10/22/1984 | 3.1 | 0.9 | -11.7 |
| 326 | 10/23/1984 | 3.2 | 0.9 | -13.4 |
| 326 | 10/24/1984 | 3.5 | 0.9 | -8.2 |
| 326 | 10/25/1984 | 3.6 | 1 | -7.8 |
| 326 | 10/26/1984 | 3.8 | 1.1 | -4.6 |
| 326 | 10/27/1984 | 4.5 | 1.7 | -7.7 |
| 326 | 10/28/1984 | 4.6 | 1.8 | -12.8 |
| 326 | 10/29/1984 | 4.7 | 2 | -8.4 |
| 326 | 10/30/1984 | 4.7 | 2.1 | -12.7 |
| 326 | 10/31/1984 | 4.7 | 2.3 | -11.4 |

Data obtained from NRCS. Available at http://wcc.sc.egov.usda.gov/nwcc/site?sitenum=326

[24] Wyoming Wilderness Act of 1984.

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There are two legal cases that should help the Forest Service determine how to manage snowmobile use within the High Lakes WSA in compliance with the Wyoming Wilderness Act. The first, *Greater Yellowstone Coalition vs. Timchak*, addressed the Forest Service's decision to permit increased helicopter use within the Palisades WSA.[25] The court struck down this decision because it failed to preserve the "opportunities for solitude" that existed in the WSA at the time of designation (1984).[26] The impact that the noise from motorized use – in this case helicopters - has on a backcountry skiers "opportunities for solitude" was a major determinant in the court's decision. The court held that the Forest Service must maintain the wilderness character that existed in 1984.[27] The same is true here: the Forest Service must manage snowmobiling within the High Lakes WSA to protect the wilderness opportunities present in the early 1980s.

A more recent case out of Montana, *Montana Wilderness Association vs. McAlister*, is perhaps even more relevant as it pertains to travel planning decisions made for a WSA on the Gallatin National Forest.[28] In this case the court ruled that the travel plan did not maintain the WSA's 1977 wilderness character or current user's ability to enjoy the 1977 wilderness character. The Montana Wilderness Study Act passed in 1977. As with the Palisades case, the court noted that noise impacts from snowmobiles would adversely impact backcountry skiers' opportunities for solitude. The court also recognized that technological advances in snowmobile technology have dramatically changed motorized use patterns within the WSA. The court held that the Forest Service must protect the area's wilderness characteristics, including opportunities for solitude, as existed when the WSA was designated. Likewise, the Shoshone must manage snowmobile use within the High Lakes WSA to protect the wilderness characteristics and opportunities for solitude within the High Lakes area as they existed in the winter prior to October 1984 (the winter of 1983).

Comparing snowmobiles from 1983 and 2016 can give some indication of differences in how the machines, and sport, have evolved in the past 32 years. In 1983 no company made a "powder sled" capable of venturing far from the groomed trail. Indeed, it was not until 1984 that Yamaha released their Phazer, which due to it's relatively light weight and manuverability, made it the premier powder sled of it's time. The 1984 Phazer had a 2-stroke, 485-cc engine and a 116 inch track. Meanwhile, the Snowmobile.com 2016 Mountain Sled of the Year - the Polaris AXYS Pro-RMK - has a 795-cc 2-stroke engine and a 155 inch track. The longer track allows for more floation in deep snow and, combined with the more powerful engine, allows riders to highmark steep slopes. With todays machines OSV riders easily travel to the far reaches of the High Lakes WSA and highmark it's steepest slopes.

The World Championship Snowmobile Hill Climb provides a good indicator of how technological advances have translated to advances in snowmobile performance. This event takes place each March in Jackson Hole, WY and draws competitors from across the United States and Canada. Competitors on snowmobiles race to see who can ride a set course to the top of SnowKing ski

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[25] *Greater Yellowstone Coal. v. Timchak*, 2006 WL 3386731 (D. Idaho Nov. 21, 2006) (decision attached).
[26] *Id.* at 8 ("According to Congress, the opportunities for solitude that existed in 1984 must be maintained.").
[27] *Id.* at 6.
[28] *Montana Wilderness Ass'n v. McAllister*, 666 F.3d 549 (9th Cir. 2011)

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resort in the shortest amount of time, or barring a "top out", who can get the highest. Although the first Hill Climb was in 1976, 1986 marked the first year that a competitor made it to the top of the mountain, riding a custom modified sled.[29] It wasn't until 1993 that "stock models" began making it to the top of the mountain. Today participants routinely make it to the top of the climb in under two minutes, with some doing so in under one minute.[30]

The Bitterroot National Forest recently published a travel management plan that explicitly addressed management of motorized use, including OSVs, within WSAs. The Forest Supervisor decided to prohibit OSVs within the two WSAs on the Bitterroot National Forest because she determined that OSV use within these areas at the time of designation (1977) was extremely low and that to manage use consistent with what was occurring in 1977 would be extremely challenging and not practical.[31] While it is likely that OSV use within the High Lakes WSA in 1983 was higher than occurred within the Bitterroots' WSAs in 1977, it is undoubtable that OSV use within the High Lakes WSA in 2016 was much greater – both in terms of visitation and where users are going - than in 1983. To comply with the Forest Plan and the Wyoming Wilderness Study Act, the travel plan must include substantial changes to how OSV use is managed within the High Lakes WSA to protect the wilderness character present in October 1984, or more specifically, the winter of 1983. Closing the WSA to OSV use entirely is one management action the Forest Service could employ. Others include permitting to limit the amount of use, a more restrictive season (perhaps only allowing use on certain days), limits to what type of use is allowed (i.e. no high-marking), and/or limits on where use is allowed (designated routes only).

The travel plan EIS must include a discussion of the High Lakes WSA that documents the manner and degree of use prior to October 30, 1984 and describes management actions that the Forest Service will be taking to ensure compliance with the Forest Plan and Wyoming Wilderness Study Act.

**OSV impacts the EIS must address to meet the minimization criteria**

***Minimize damage to soil, watersheds, vegetation, and other resources of the public lands***

Air Quality

Motorized and non-motorized winter backcountry recreationists are often confined to the same plowed parking areas to prepare for their trips. However in these "staging areas" snowmobile emissions can be concentrated and lead to an additional source of conflict and potential health concerns. While technological advances have produced cleaner four-stroke engines (and even zero emission electric snowmobile prototypes), the vast majority of snowmobiles still use two-stroke engine technology. In two-stroke engines lubricating oil is mixed with the fuel, and 20% to 30% of this mixture is emitted unburned into the air and snowpack.[32] In addition, the

[29] http://www.off-road.com/snowmobile/feature/jackson-hole-world-championship-snowmobile-hill-climb-11081.html?printable

[30] http://www.snowdevils.org/HCResults.htm

[31] Bitterroot National Forest Travel Management Planning Project Record of Decision. May 2016. pp. 24 and 25. Available at http://www.fs.usda.gov/project/?project=21183

[32] Kado, N.Y., P.A. Kuzmicky, and R.A. Okamoto. 2001. Environmental and Occupational Exposure to Toxic Air Pollutants from Winter Snowmobile Use in Yellowstone National Park. Prepared for the Yellowstone

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combustion process itself is relatively inefficient and results in high emissions of air pollutants.[33] As a result, two-stroke OSVs emit very large amounts of exhaust which includes carbon monoxide (CO), unburned hydrocarbons (HC) and other toxins.[34] Carbon monoxide impacts the human body's ability to absorb oxygen,[35] and thus OSV exhaust is particularly harmful to those who are engaging in aerobic exercise (skiing and snowshoeing).

In a study on the Medicine-Bow National Forest researchers documented a decline in air quality with increased snowmobile activity.[36] They measured higher ambient concentrations of $CO_2$, $NO_x$, NO, and $NO_2$ at a snowmobile staging site and found significantly higher concentrations of these air pollutants on days with significantly more snowmobile activity. The researchers concluded that snowmobile exhaust was degrading local air quality.

Concerns over human health related to snowmobile emissions have led to extensive recent research on snowmobile pollution in Yellowstone National Park,[37]and conclusions from these studies have led to a ban of older technology 2-stroke engines from the Park.[38] Emissions from OSVs emit many carcinogens and can pose dangers to human health.[39] Several "known" or

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Park Foundation and National Park Service. 152p.

[33] USDI National Park Service (NPS). 2000. Air Quality Concerns Related to Snowmobile Usage in National Parks. Washington, D.C.: Feb. 2000. 22p.

[34] Zhou, Y., D. Shively, H. Mao, R.S. Russo, B. Pape, R.N. Mower, R. Talbot, and B.C. Sive. 2010. Air toxic emissions from snowmobiles in Yellowstone National Park. Environmental Science and Technology 44(1): 222-228.

[35] Janssem, S., and T. Schettler. 2003. Health Implications of Snowmobile use in Yellowstone National Park. 27p.

[36] Musselman, R. and J. Korfmacher. 2007. Air qualiy at a snowmobile staging area and snow chemistry on and off trail in a Rocky Mountain subalpine forest, Snowy Range, Wyoming. Environmental monitpring and assessment. 133: 321-334.

[37] See USDI National Park Service (NPS). 2000. Air Quality Concerns Related to Snowmobile Usage in National Parks. Washington, D.C.: Feb. 2000. 22p. http://www.nature.nps.gov/air/Pubs/pdf/yell/Snowmobile_Report.pdf; Bishop, G.A., J.A. Morris, and D.H. Stedman. 2001. Snowmobile contributions to mobile source emissions in Yellowstone National Park. Environmental Science and Technology 35: 2874-2881; Kado, N.Y., P.A. Kuzmicky, and R.A. Okamoto. 2001. Environmental and Occupational Exposure to Toxic Air Pollutants from Winter Snowmobile Use in Yellowstone National Park. Prepared for the Yellowstone Park Foundation and National Park Service. 152p; Janssem, S., and T. Schettler. 2003. Health Implications of Snowmobile use in Yellowstone National Park. 27pp; Bishop, G.A., D.A. Burgard, T.R. Dalton, D.H. Stedman, and J.D. Ray. 2006. Winter motor-vehicle emissions in Yellowstone National Park. Environmental Science and Technology 40(8): 2505-2510. http://www.nature.nps.gov/air/Pubs/pdf/yell/200604ESTBishop_etalSnowmobileEmissions.pdf; Bishop, G.A., R. Stadtmuller, D.H. Stedman, and J.D. Ray. 2009. Portable emission measurements of Yellowstone Park snowcoaches and snowmobiles. Journal of the Air and Waste Management Association 59: 936–942. http://www.nature.nps.gov/air/Pubs/pdf/yell/Bishop_YELL_JAWMA59_Aug_936_2009.pdf; Ray, J. D. 2010. Winter Air Quality in Yellowstone National Park: 2009-2010, Natural Resource Technical Report. National Park Service, Fort Collins, Colorado. http://www.nature.nps.gov/air/Pubs/pdf/yell/20092011_YELL_WinterAQ.pdf; and Zhou, Y., D. Shively, H. Mao, R.S. Russo, B. Pape, R.N. Mower, R. Talbot, and B.C. Sive. 2010. Air toxic emissions from snowmobiles in Yellowstone National Park. Environmental Science and Technology 44(1): 222-228.

[38] USDI National Park Service (NPS). 2013. Yellowstone National Park Winter Use Plan / Supplemental Environmental Impact Statement February 2013. Yellowstone National Park, WY. 384p.

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"probable" carcinogens are emitted including nitrogen oxides, carbon monoxide, ozone, aldehydes, butadiene, benzenes, and polycyclic aromatic hydrocarbons (PAH). Particulate matter, also found in OSV exhaust, is detrimental in fine and coarse forms as it accumulates in the respiratory system and can lead to decreased lung function, respiratory disease and even death.[40] While these pollutants are more concentrated at OSV staging areas and parking lots, OSV exhaust on trails can dramatically reduce the quality of the experiences of non-motorized users along the trail as well.

Due to concerns with air pollution, particularly at OSV staging areas or where OSV use is concentrated, we recommend separating motorized and non-motorized winter recreationists to the extent possible. Separate parking areas for motorized and non-motorized users will help skiers and snowshoers limit their exposure to snowmobile exhaust. Separating parking areas will also help to relieve congestion as snowmobile trailers take up considerably more space than passenger cars and trucks, often leaving little or no room for non-motorized users to park at trailheads. In particular we recommend creating a new non-motorized trailhead at Wind River Lake to separate skiers and snowshoers from the OSV staging area.

Currently skiers and snowshoers have to share a parking lot with a busy OSV staging area and then cross the highway to access the popular Brooks Lake winter trail. By plowing a non-motorized parking area on the north side of the highway at Wind River Lake the Forest Service will minimize the impact that OSV exhaust has on non-motorized visitors and improve public safety by eliminating a potentially dangerous highway crossing.

Designating trails and parking areas for non-motorized use gives skiers and snowshoers the option to avoid OSV exhaust and other issues that cause conflict between non-motorized and motorized winter trail users. This is one reason that we support the Shoshone's proposal to close the areas around the Deception and Pinnacles ski trails on Togwotee Pass. Likewise, we oppose the proposal to designate the Sublette Pass trail as an official OSV route. This trail was historically used by and managed for skiers. Although the Forest Service has removed the cross-country skier signs from the trail it is still a traditional non-motorized route and it does not make sense to us that the Forest Service would decide to direct motorized users to this trail.

Water quality impacts

Protecting and enhancing water supply is a key mandate of the Forest Service. During the winter, OSVs release toxins such as ammonium, nitrate, sulfate, benzene, and toluene which accumulate in the snowpack. In the spring runoff, accumulated pollutants are released as a pulse into the soil, groundwater, and surrounding waterbodies.

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http://parkplanning.nps.gov/document.cfm?parkID=111&projectID=40806&documentID=51874

[39] Eriksson, K., D. Tjarner, I. Marqvardsen, and B. Jarvholm. 2003. Exposure to Benzene, Toluene, Xylenes and Total Hydrocarbons among snowmobile drivers in Sweden. Chemosphere 50(10): 1343-7 and Reimann, S., R. Kallenborn, and N. Schmidbauer. 2009. Severe aromatic hydrocarbon pollution in the arctic town of Longyearbyen (Svalbard) caused by snowmobile emissions. Environmental Science and Technology 43: 4791–4795.

[40] Janssem, S., and T. Schettler. 2003. Health Implications of Snowmobile use in Yellowstone National Park. 27p.

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On the Medicine-Bow National Forest researchers found several changes to snow chemistry on snowmobile trails as compared to untracked powder.[41] These changes included elevated numbers of cations and some anions and a significant drop in pH. Other studies have shown that snowpack concentrations of ammonium and sulfate positively correlate with snowmobile activity.[42] Concentrations of toluene and xylene in the snow are also positively correlated with snowmobile traffic.[43] Likewise, snowpack concentrations of benzene are higher in areas with heavy snowmobile use.[44] When the snow melts, these pollutants, which are stored in the snowpack throughout the winter, are released in a concentrated pulse and can seep into groundwater or enter surface water.

A recent study found snowmobiles are polluting a tributary of Lake Tahoe, CA. Examining 168 different semi-volatile organic compounds (SVOC), researchers found eight to 20 times greater loadings on snowmobile trails than background levels.[45] They further reported that highly toxic and persistent polycyclic aromatic hydrocarbons (PAHs) had increased two to six times the background level in a nearby stream.[46] Impacts to water quality can be especially pronounced at trailheads and staging areas where snowmobiles congregate.[47]

Soils

OSVs 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 - OSVs can be particularly damaging. They can also indirectly impact soils through snow compaction. Weighing several hundred pounds, OSVs easily compact the snow which can increase snowpack density, reduce soil temperatures, increase soil freezing, and result in a later melt-out.[48]

In areas of low or no snowpack, direct soil compaction can occur from OSVs leading to erosion.[49] 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.[50] Soil

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[41] Musselman, R. and J. Korfmacher. 2007. Air qualiy at a snowmobile staging area and snow chemistry on and off trail in a Rocky Mountain subalpine forest, Snowy Range, Wyoming. Environmental monitpring and assessment. 133: 321-334.

[42] Ingersoll, G. 1998. Effects of snowmobile use on snowpack chemistry in Yellowstone National Park.

[43] *Id.*

[44] *Id.*

[45] McDaniel, M.R. 2013. Semivolatile Organic Compounds in Snowmobile Emissions and in the Snowpack and Surface Water in Blackwood Canyon, Lake Tahoe, CA. Dissertation, University of Nevada, Reno.

[46] *Id.*

[47] USDA Forest Service (FS). 2012. National Best Management Practices for Water Quality Management on National Forest System Lands - Volume 1: National Core BMP Technical Guide FS-990a. 165p. http://www.fs.fed.us/biology/resources/pubs/watershed/FS_National_Core_BMPs_April2012.pdf

[48] Gage, E., and D.J. Cooper. 2009. Winter Recreation Impacts to Wetlands: A Technical Review. Prepared for Arapaho-Roosevelt National Forests, White River National Forest, and Black Hills National Forest. Colorado State University, Fort Collins, CO. 29p.

[49] *Id.*

[50] Stangl, J.T. 1999. Effects of winter recreation on vegetation. Pages 119-121 in T. Olliff, K. Legg, and B. Kaeding, editors. Effects of Winter Recreation on Wildlife of the Greater Yellowstone Area: a Literature Review and Assessment. Report to the Greater Yellowstone Coordinating Committee. Yellowstone

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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.[51] This results in surface erosion especially on steep slopes.[52] Soil erosion when located near streams can also lead to localized stream sedimentation and increased turbidity. As climate change reduces 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.[53] In the spring these pollutants are released into the soil creating local contamination and associated impacts.

A recent example of how OSVs are causing damage to soils on the Shoshone National Forest was observed this past Memorial Day weekend (May 28-30 2016). Winter Wildlands Alliance staff observed many OSVs traveling through areas with patchy and low snow cover, creating ruts in the alpine tundra and damaging both soils and vegetation.

OSV impacts on alpine tundra within the Line Creek Research Natural Area, May 28 2016

Setting a snow season, as proposed in the Proposed Action, and instituting minimum snow depth restrictions, are management tools the Shoshone can use to minimize impacts to soils.

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National Park, WY. 315p.

[51] Batey, T. 2009. Soil compaction and soil management – a review. Soil Use and Management 25: 335–345.

[52] *Id.*

[53] Ingersoll, G.P. 1999. Water-Resources Investigations Report Effects of Snowmobile Use on Snowpack Chemistry in Yellowstone National Park, 1998. U.S. Geological Survey, Denver, CO. 24p.

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Vegetation

Pollution from OSV exhaust contains a number of elements that can impact vegetation. While the amount of pollutants emitted by two-stroke engines are greater than those emitted by four-stroke engines, the elements in the emissions, except for the unburned fuel emitted by two-stroke engines, are similar and include: 1) carbon dioxide which may act as a fertilizer and cause changes in plant species composition;[54] 2) sulfur dioxide which is taken up by vegetation and can cause changes in photosynthesis;[55] 3) oxides of nitrogen which may be harmful to vegetation or may act as a fertilizer, causing changes in plant species composition;[56] 4) organic gases such as ethylene, to which plants may be extremely sensitive;[57] and 5) heavy metals which may cause phytotoxic damage.

OSVs can cause significant damage to land cover indirectly through snow compaction. Impacts on soil and vegetation include retarded growth, erosion, and physical damage.[58] These impacts are exacerbated on steep slopes or in areas with inadequate snow cover.[59] This erosion can lead to increased soil runoff resulting in sedimentation and turbidity in the immediate area and throughout the watershed.[60] Snow compaction can delay spring flowering, lower soil bacteria, and elimination some plants entirely.[61]

Snow compaction from snowmobiles can lower soil temperatures and reduce the survival of plants and soil microbes.[62] A natural, un-compacted snowpack greater than 45 cm deep will prevent frost from penetrating the soil.[63] However, the thermal conductivity of snow, when compacted by snowmobiles, is greatly increased, resulting in both greater temperature

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[54] Bazzaz, F.A., and Garbutt, K., 1988. The response of annuals in competitive neighbourhoods: effects of elevated carbon dioxide. Ecology 69:937-946.Borkowski, J. J., P. J. White, R. a Garrott, T. Davis, A. R. Hardy, and D. J. Reinhart. 2006. Behavioral responses of bison and elk in Yellowstone to snowmobiles and snow coaches. Ecological Applications 16:1911–1925.

[55] Iqbal, M.Z., 1988. Accumulation of sulfur in foliage of roadside plantation and soil in Karachi city (Pakistan). Tropical Ecology 298:1-5.

[56] Falkengren-Grerup, U. 1986. Soil acidification and vegetation changes in deciduous forest in southern Sweden. Oecologia. 70:339-347.

[57] Gunderson, C.A., and Taylor, G.E., 1988. Kinetics of inhibition on foliar gas exchange by exogenous ethylene: an ultrasensitive response. New Phytologist 110:517-524.

[58] Baker, E. and Bithmann, E. 2005. Snowmobiling in the Adirondack Park: Environmental and Social Impacts.

[59] *Id.* and Stangl, J.T., 1999. Effects of Winter Recreation on Vegetation. National Park Service: Effects of Winter Recreation on Wildlife:119-121.USDI. 2000. Air Quality Concerns Related to Snowmobile Usage in National Parks.

[60] Stangl, J.T., 1999. Effects of Winter Recreation on Vegetation. National Park Service: Effects of Winter Recreation on Wildlife:119-121.USDI. 2000. Air Quality Concerns Related to Snowmobile Usage in National Parks.

[61] Rongstad, O.J., 1980. Research needs on environmental impacts of snowmobiles. *In* R.N.L. Andrews and P. Nowak, editors. Off-road vehicle use: A management challenge. U.S. Department of Agriculture, Office of Environmental Quality, Washington, D.C.

[62]Wanek, W. J., 1973. The Ecological Impact of Snowmobiling in Northern Minnesota. The Center for Environmental Studies. Bemidji State College, Bemidji, MN. Pp.57-76.

[63] Baker, E. and Bithmann, E. 2005. Snowmobiling in the Adirondack Park: Environmental and Social Impacts

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fluctuations and overall lower soil temperatures.[64] This in turn inhibits soil bacteria that play a critical role in the plant food cycle.[65]

Vegetation in riparian areas is highly susceptible to damage from snowmobiles.[66] In a study of snowmobile impacts on old field and marsh vegetation in Nova Scotia, Canada, researchers concluded that compaction may affect the soil surface microstructure, early spring germination and growth, seed dispersal from capsules still attached to dead stalks, and may modify seed predation patterns by subnivean rodents.[67]

Abrasion and breakage of seedlings, shrubs, and other exposed vegetation frequently result from snowmobile travel across a landscape.[68] 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 areas, such as high mountain slopes or meadows. A study on the Gallatin National Forest found 366 acres of trees damaged by snowmobiles on timber sale units - slowing forest regeneration.[69] We are particularly concerned about impacts to whitebark pine. Whitebark pine are slow growing conifers that are found in high elevation mountain environments – including Togwotee Pass and the Beartooth Pass. Whitebark pine have declined drastically across the Shoshone due to mountain pine beetle and blister rust and it is critical that the Forest Service not let recreational OSV use negatively impact the trees that have survived. The EIS should show what measures the Shoshone is taking to protect whitebark pine in areas open to OSV use.

***Minimize harassment of wildlife or significant disruption of wildlife habitats***

Over-snow vehicle use can cause mortality, habitat loss, and harassment of wildlife.[70] While most animals are well adapted to survival in winter conditions, the season creates added stress for wildlife due to a harsher climate and limited foraging opportunities.[71] Deep snow can increase the metabolic cost of winter movements in ungulates up to five times normal levels at

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[64] *Id.*

[65] Stangl, J.T., 1999. Effects of Winter Recreation on Vegetation. National Park Service: Effects of Winter Recreation on Wildlife:119-121.USDI. 2000. Air Quality Concerns Related to Snowmobile Usage in National Parks.

[66] *Id.*

[67] Keddy, P. a., a. J. Spavold, and C. J. Keddy. 1979. Snowmobile impact on old field and marsh vegetation in Nova Scotia, Canada: An experimental study. Environmental Management 3:409–415.

[68] Stangl, J.T., 1999. Effects of Winter Recreation on Vegetation. National Park Service: Effects of Winter Recreation on Wildlife:119-121.USDI. 2000. Air Quality Concerns Related to Snowmobile Usage in National Parks.

[69] Winter Wildlands Alliance (WWA). 2009. Seeing the Forest and the Trees: Assessing Snowmobile Tree Damage in National Forests. A report by Winter Wildlands Alliance, Boise, ID. http://209.200.74.232/resources/reports/WWA_Treetop_Damage_Report_final.pdf

[70] See Boyle, S. A., and F. B. Samson. 1985. Effects of Nonconsumptive Recreation on Wildlife : A Review. Wildlife Society Bulletin 13:110–116 and Oliff, T.K., Legg, K., and Kaeding, B. 1999. Effects of winter recreation on wildlife of the Greater Yellowstone Area: a literature review and assessment.

[71] Reinhart, D. 1999. Effects of Winter Recreation on Habituated Wildlife.

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a time when they are particularly stressed by forage scarcity and high metabolic demands.[72] Indirectly, the noise generated by OSVs can adversely impact animals impairing feeding, breeding, courting, social behaviors, territory establishment and maintenance, increasing stress, and/or by making animals or their young more susceptible to predation.[73] Disturbance and stress to wildlife from OSV activities during this highly vulnerable time can cause significant impacts. Studies of observable wildlife responses to snowmobiles have documented elevated heart rates, elevated glucocoritcoid stress levels, increased flight distance, habitat fragmentation as well as community and population disturbance.[74]

In addition to the direct physiological stress that results from OSVs, evidence suggests that popular winter trails can fragment habitat and wildlife populations. Winter trails through core areas create more "edge effect" (the negative influence of the periphery of a habitat on the interior conditions of a habitat) and thereby marginalize the vitality of some species.[75]

In many instances, OSVs induce animal flight, causing increased energy expenditures. In Yellowstone National Park, where OSV-wildlife interactions have been most extensively studied, evasive maneuvers in response to snowmobiles were documented in a number of species. These maneuvers result in increased energy expenditures for the affected animals. For example, researchers reported flight distances of 33.8 meters for elk and 28.6 meters for mule deer in response to snowmobiles in Yellowstone.[76] The energy cost estimates calculated for these impacts were 4.9 to 36.0 kcal in elk and 2.0 to 14.7 kcal in mule deer per disturbance.[77] These energy expenditures are roughly equivalent to the necessary additional consumption of 4.3 - 31.7 grams of dry forage matter by elk and 1.8 - 12.9 grams by mule deer each time a disturbance occurs.

<u>Ungulates</u>

It has been widely documented that snowmobile activity disturbs wintering ungulates through physiological stress[78] resulting in increased movements[79] and higher energy expenditures.[80]

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[72] Parker, K.L., Robbins, C.T. and Hanley, T. A. 1984. Energy expenditures for locomotion by mule deer and elk. Journal of Wildlife Management 48:474–488.

[73] See Luckenbach, R.A., and Bury, R.B., 1983. Effects of off-road vehicles on the biota of Algodones Dunes, Imperial County, California. J. Appl. Ecology 20:265-286; Wilshire, H.G., Bodman, G.B., Broberg, D., Kockelman, W.J., Major, J., Malde, H.E., Snyder, C.T., and Stebbins, R.C., 1977. Impacts and management of off-road vehicles. The Geological Society of America. Report of the Committee on Environment and Public Policy; and Bury, R.L. 1978. Impacts of Snowmobiles on Wildlife. Transcript. 43rd North American Wildlife and Natural Resource Conference. WMI.

[74] Baker, E. and Bithmann, E. 2005. Snowmobiling in the Adirondack Park: Environmental and Social Impacts

[75] *Id.*

[76] Aune, K.E., 1981. Impacts of Winter Recreationists on Wildlife in a Portion of Yellowstone National Park, Wyoming. Master's thesis. Montana State University.

[77] Parker, K.L., Robbins, C.T. and Hanley, T. A. 1984. Energy expenditures for locomotion by mule deer and elk. Journal of Wildlife Management 48:474–488.

[78] Canfield, J.E., Lyon, J., Hillis, J.M. and Thompson, M.J., 1999. Effects of recreation on Rocky Mountain wildlife: A review for Montana. Montana Chapter of the Wildlife Society, pp 307.

[79] See Dorrance, M. J., P. J. Savage, and D. E. Huff. 1975. Effects of Snowmobiles on White-Tailed Deer. Journal of Wildlife Management 39:563–569; Eckstein, R.G., O'Brien, T.F., Rongstad, O.R. and Bollinger.

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The flight response of ungulates to snowmobiles has been documented in a number of species.[81] In one study bison and elk responded to OSVs in Yellowstone National Park by increasing vigilance and running away from approaching machines.[82] Snowmobile activity has been shown to displace mule deer as well.[83] A study conducted in Minnesota found that deer responded to even low intensities of snowmobile activity and as the amount of time that snowmobiles were in an area increased deer were more likely to change their behavior or flee. This disturbance resulted in displacement of deer from areas near snowmobile trails and increased home range sizes. However, there is evidence that wildlife may become habituated to snowmobiles *if* the activity is controlled, predictable, and does not cause physical harm.[84]

In addition to showing physical signs of disturbance, physiological indicators of OSV-induced stress have been documented in wildlife. Researchers have found that stress hormones in elk living in Yellowstone National Park fluctuated weekly, rising and falling in direct correlation with snowmobile activity.[85] While OSV-caused stress has not yet been documented to be a chronic issue in wildlife, chronically elevated stress hormone levels can have a deleterious effect on wildlife and result in health and fitness costs.[86]

Limiting disturbance on ungulates, especially in winter range, is a key management strategy. For example, in their review of the impact of recreation on Rocky Mountain ungulates Canfield et al. suggest keeping motorized routes and trails away from wintering areas, and to create established designated travel routes to make human use as predictable as possible.[87] Other

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J.G., 1979. Snowmobile effects on movements of white-tailed deer: A case study. Environmental Conservation. 6:45-51; Aune, K.E., 1981. Impacts of Winter Recreationists on Wildlife in a Portion of Yellowstone National Park, Wyoming. Master's thesis. Montana State University; and Colescott, J.H., and M.P. Gillingham. 1998. Reaction of Moose (*Alces alces*) to Snowmobile Traffic in the Greys River Valley, Wyoming. Alces 34(2):329-338.

[80] Canfield, J.E., Lyon, J., Hillis, J.M. and Thompson, M.J., 1999. Effects of recreation on Rocky Mountain wildlife: A review for Montana. Montana Chapter of the Wildlife Society, pp 307.

[81] See Aune, K.E., 1981. Impacts of Winter Recreationists on Wildlife in a Portion of Yellowstone National Park, Wyoming. Master's thesis. Montana State University; Hardy, A.R., 2001. Bison and Elk Responses to Winter Recreation in Yellowstone National Park. M.S. Thesis, Montana State University; Severinghaus, C.W. and Tullar, B.F. 1978. Wintering Deer versus Snowmobiles. New York State Department of Environmental Conservation; and Freddy, D.J. 1977. Snowmobile harassment of mule deer on cold winter ranges. Job Progress Report, Deer-Elk Investigations. Colorado Division of Wildlife. Project No. W-38-R-32.

[82] Borkowski, J.J., P.J. White, R.A. Garrott, T. Davis, A.R. Hardy, and D.J. Reinhart. 2006. Behavioral responses of bison and elk in Yellowstone to snowmobiles and snow coaches. Ecological Applications 16: 1911–1925.

[83] Dorrance, M. J., P. J. Savage, and D. E. Huff. 1975. Effects of Snowmobiles on White-Tailed Deer. Journal of Wildlife Management 39:563–569

[84] *Id. (Borkowski et al and Dorrance et al)*

[85] Creel, S., J.E. Fox, A.R. Hardy, J. Sands, B. Garrot, and R.O. Peterson. 2002. Snowmobile activity and glucocorticoid stress responses in wolves and elk. Conservation Biology 16(3): 809-14. http://www.montana.edu/wwwbi/staff/creel/snomoGC.pdf

[86] *Id.*

[87] Canfield, J.E., Lyon, J., Hillis, J.M. and Thompson, M.J., 1999. Effects of recreation on Rocky Mountain wildlife: A review for Montana. Montana Chapter of the Wildlife Society, pp 307.

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researchers recently reviewed the impacts of winter recreation on northern ungulates and highlighted the importance of limiting the duration and spatial footprint of disturbance.[88]

It is critically important to restrict OSV activity in big game winter range areas in order to protect ungulate populations and we appreciate that the Forest Plan prohibits winter motorized use across most of the winter range on the Shoshone. Although the Forest Plan makes an exemption for winter motorized use within certain winter range areas, OSV use within these winter range exemption areas should be limited to designated routes only. According to the 2015 forest plan, the reason these areas were determined to be suitable for motorized use at all was because use is limited and primarily occurs on specific routes.[89] Limiting use to designated routes within these areas allows for access to cabins and use of designated trails while protecting wildlife by managing OSV use in a predictable and limited manner. In addition, we suggest prohibiting OSV use entirely within the exemption area that follows Indian Ridge in the Wind River Ranger District. Although OSV use in this area is currently very rare and thus may not currently impact wildlife wintering in this area, new types of OSVs such as tracked ATVs could lead to increased use, causing deleterious effects to wintering wildlife.

Grizzly Bears

Grizzly bears are most vulnerable to disturbance during hibernation and when they first emerge from their dens. There is some evidence that both motorized and non-motorized winter recreationists can disturb denning bears. However, scientists have been unable to fully quantify the extent of this problem.[90] When bears are disturbed during hibernation they expend more energy than in their normal resting state. This is a concern as bears must live off of their energy reserves until they emerge from their dens in the spring. In addition, disturbances may cause bears to abandon their dens. In cases of females with cubs, den abandonment can lead to cub mortality if the cubs are left in the abandoned den or the new den is insufficient to protect the cubs from the elements. Finally, repeated or frequent disturbances can lead to total displacement from denning areas.[91] It is suspected that snowmobile activity would have a detrimental effect on bears if there is heavy use in denning areas.

Although grizzly bears can be susceptible to disturbance and the risk of den abandonment, careful management of winter recreation can help avoid this conflict. Linnell et al. recommended that "winter activities should be minimized in suitable or traditional denning

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[88] Harris G., R.M. Nielson, and T. Rinaldi. 2014. Effects of winter recreation on northern ungulates with focus on moose (*Alces alces*) and snowmobiles. European Journal of Wildlife Resources 60: 45–58. Hastings, A.L., G.G. Fleming, and C.S.Y. Lee. 2006. Modeling Sound Due to Over-Snow Vehicles in Yellowstone and Grand Teton National Parks. Report DOT-VNTSC-NPS-06- 06, Volpe Transportation Center, Cambridge, MA

[89] Shoshone National Forest, Record of Decision for the Land Management Plan Revision, 2015. Page 28: "Examples of areas exempted include designated groomed and un-groomed snowmobile trails and access to cabin owners holding special use permits"

[90] See Podruzny, S., S. Cherry, C. Schwartz, and L. Landenburger. 2002. Grizzly bear denning and potential conflict areas in the Greater Yellowstone Ecosystem. Ursus 13:19–28 and Goldstein, M. I., A. J. Poe, L. H. Suring, R. M. Nielson, and T. L. McDonald. 2010. Brown Bear Den Habitat and Winter Recreation in South-Central Alaska. Journal of Wildlife Management 74:35–42.

[91] Goldstein, M. I., A. J. Poe, L. H. Suring, R. M. Nielson, and T. L. McDonald. 2010. Brown Bear Den Habitat and Winter Recreation in South-Central Alaska. Journal of Wildlife Management 74:35–42.

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areas; if winter activity is unavoidable, it should begin around the time bears naturally enter dens, so that they can choose to avoid disturbed areas; and winter activity should be confined to regular routes as much as possible".[92] Podrunzney et al. modeled the overlap of potential grizzly bear denning habitat and potential snowmobile use areas on the Gallatin National Forest, MT.[93] This model was used in Forest Service travel planning and allowed managers to plan snowmobile routes and areas to avoid conflict with grizzly bears. Similar modeling efforts have been conducted in Alaska incorporating both motorized and non-motorized recreation with bear denning habitat.[94] We recommend that the Shoshone undertake similar modeling efforts to determine appropriate locations for OSV use areas and routes.

As a federally protected Threatened Species, the U.S. Fish and Wildlife Service considers OSV disturbance as a potential "take" of grizzly bears thus requiring management actions. In a recent Biological Opinion for snowmobiling on the Flathead National Forest (MT), the U.S. Fish and Wildlife Service required the Forest to "quantify and monitor snowmobile use… and ensure adequate protection to known and discovered grizzly bear den sites and post-emergent females with cubs".[95] In 2014, the Flathead National Forest closed the Skyland / Challenge snowmobile play area due to the emergence of a grizzly bear in the area.

Limiting open motorized route density is a key management action to increase grizzly bear habitat security. For example, Region 1 of the Forest Service recommends limiting open motorized route density to less than 1 mile per square mile in much of the Cabinet-Yaak Recovery Area.[96] State-level management plans also address management of snowmobiles in grizzly bear habitat. For example, The Montana Forested State Trust Lands Habitat Conservation Plan calls for minimizing road miles and restricting public access (including snowmobiles) on roads in important grizzly bear habitat areas and seasons.[97]

Lynx

OSV trails that are created by winter recreation and forest management activities may enable coyotes to access lynx habitat not normally accessible to them.[98] Coyotes aggressively compete

[92] Linnell, J.D.C., J.E. Swenson, R. Andersen, B. Brain. 2000. How vulnerable are denning bears to disturbance? Wildlife Society Bulletin 28(2): 400-413. See pp. 409-410.
[93] Podruzny, S., S. Cherry, C. Schwartz, and L. Landenburger. 2002. Grizzly bear denning and potential conflict areas in the Greater Yellowstone Ecosystem. Ursus 13: 19–28.
[94] Goldstein, M.I., A.J. Poe, L.H. Suring, R. M. Nielson, and T.L. McDonald. 2010. Brown bear den habitat and winter recreation in south-central Alaska. Journal of Wildlife Management 74: 35–42.
[95] USDI Fish and Wildlife Service (FWS). 2008. Biological Opinion on the Effects of Winter Motorized Recreation Forest Plan Amendment for the Flathead National Forest" ("A24") on Grizzly Bears. U.S. Fish and Wildlife Service, Montana Ecological Services Field Office. Helena, MT. 71p. See page 57.
[96] USDA Forest Service (FS). 2011. Forest Plan Amendments for Motorized Access Management within the Selkirk and Cabinet-Yaak Grizzly Bear Recovery Zones (Kootenai, Lolo, and Idaho Panhandle National Forests) USDA Forest Service Northern Region. Missoula, MT 68p.
[97] Montana Department of Natural Resources (MT DNRC). 2011. Forested State Trust Lands Habitat Conservation Plan (HCP). Final Environmental Impact Statement (EIS), September 17, 2010. 801p.
[98] See for example, Buskirk, S.W., L.F. Ruggiero, C.J. Krebs. 2000. Habitat fragmentation and interspecific competition: implications for lynx conservation. Pages 83-100 in Ruggiero, L.F., K.B Aubry, S.W. Buskirk, et al. Ecology and conservation of lynx in the contiguous United States. University Press of Colorado,

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with, or prey upon, a number of different vertebrate species, including Canada lynx, that are adapted and limited to deep snow.[99] Koehler and Aubry determined that inter-specific competition during late winter, a time when lynx are already nutritionally stressed, may be especially detrimental to lynx.[100]

Following their research on coyotes use of snowmobile trails, Dowd et al. suggests "limiting the expanse of groomed trail system may minimize coyote encroachment into these deep snow environments".[101] The Canada Lynx Assessment and Conservation Strategy set planning standards on Forest Service lands that include, "on federal lands in lynx habitat, allow no net increase in groomed or designated over-the-snow routes and snowmobile play areas by Lynx Analysis Unit… and map and monitor the location and intensity of snow compacting activities that coincide with lynx habitat, to facilitate future evaluation of effects on lynx as information becomes available"[102]

Wolverine

There is scientific uncertainty about the exact effects of OSVs on wolverines. However, compelling anecdotal evidence suggests snowmobile use displaces wolverines and may reduce reproductive success, especially when it occurs within potential wolverine denning habitat. Wolverine parturition primarily occurs mid-winter during the month of February.[103] Six of the seven natal dens located in the Greater Yellowstone Ecosystem by the Wildlife Conservation Society were in areas without motorized use, i.e., in designated wilderness, areas inaccessible by vehicle, or within a National Park. Female wolverines appear to be quite sensitive to human disturbance in the vicinity of natal and maternal dens, and may abandon dens and move their kits a considerable distance if they detect human presence in the area.[104] In general it appears that wolverines are sensitive to human disturbance and are less likely to occur in areas with anthropogenic activity.[105]

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Boulder, Colorado and Bunnell, K.D., J.T. Flinders, and M.L. Wolfe. 2006. Potential impacts of coyotes and snowmobiles on lynx conservation in the Intermountain West. Wildlife Society Bulletin 34:828-838.

[99] *Id.* (Buskirk et al)

[100] Koehler, G.M. and K.B. Aubry. 1994. Lynx. In: Ruggiero, L. F., K.B. Aubrey, S.W. Buskirk, L.J. Lyon and W.J. Zielinski, eds. The scientific basis for conserving forest carnivores: American marten, fisher, lynx and wolverine in the western United States. pp. 74-98. U.S. Forest Service General Technical Report RM-254.

[101] Dowd, J.L.B., E.M. Gese, and L.M. Aubry. 2014. Winter space use of coyotes in high-elevation environments: behavioral adaptations to deep-snow landscapes. Journal of Ethology 32: 29-41.
See page 39.

[102] USDA Forest Service (FS). 2000. Canada Lynx Assessment and Conservation Strategy. Forest Service, Missoula, MT. 120p. See page 82.

[103] Wildlife Conservation Society, 2007. Greater Yellowstone Wolverine Program: Cumulative Report. Wildlife Conservation Society, Ennis Montana.

[104] See Copeland, J.P., 1996. Biology of the wolverine in central Idaho. Thesis. University of Idaho, Moscow, Idaho, USA and Magoun, A. J. and Copeland, J. P., 1998. Characteristics of wolverine reproductive den sites. J. Wildl. Manage. 62:1313-1320.

[105] Fisher, J. T., S. Bradbury, B. Anholt, L. Nolan, L. Roy, J. P. Volpe, and M. Wheatley. 2013. Wolverines ( Gulo gulo luscus ) on the Rocky Mountain slopes : natural heterogeneity and landscape alteration as predictors of distribution. Canadian Journal of Zoology 91:706–716.

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Key management schemes for protecting wolverine include limiting disturbance and retaining and restoring habitat connectivity. The Shoshone can reduce the potential conflict with snowmobiles and wolverine by identifying areas of overlap and managing accordingly. To identify wolverine habitat the Shoshone should use the model described in Inman et al. 2013.[106]

In the face of climate change, wolverines may lose much of their denning habitat as persistent snowfields disappear,[107] and connectivity among remaining habitat patches will become increasingly important.[108] To the extent the winter travel plan can plan for and protect wolverine habitat connectivity it should do so.

Birds

Many threatened or sensitive bird species, such as the bald eagle and northern goshawk great gray owl, peregrine falcon, and golden eagle, occupy areas that also provide high-quality winter recreation opportunities. In addition some species, such as the American Pipit, have unique nesting behavior which makes them particularly vulnerable to OSV impacts.

Many birds rely on auditory communication, which can be disrupted by anthropogenic sources of noise. In a recent study researchers found that the noise from motor vehicles has an adverse effect on migrating birds – in this experiment birds were either displaced entirely from otherwise suitable habitat, or, if they remained in the area impacted by vehicle noise, their body condition decreased dramatically.[109]

We recommend locating snowmobile staging areas and groomed trails away from known sensitive species nesting areas, winter roosting areas and placing timing restrictions on trails that pass through important migratory stopover points. The travel plan should also include monitoring and closure actions to protect nesting sites and winter roosting areas.

The proposed season closure date of April 30 will help to protect American pipit nesting habitat. This species breeds on the Beartooth Plateau and nests in the first patches of melted-out tundra. Currently, with no restrictions concerning OSV use on the plateau in the spring, pipit nests are vulnerable to being run over. While the pipit is not a threatened or sensitive species, it is still interesting and worth protecting.

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[106] Inman, R. M., B. L. Brock, K. H. Inman, S. S. Sartorius, B. C. Aber, B. Giddings, S. L. Cain, M. L. Orme, J. A. Fredrick, B. J. Oakleaf, K. L. Alt, E. Odell, and G. Chapron. 2013. Developing priorities for metapopulation conservation at the landscape scale: Wolverines in the western United States. Biological Conservation 166:276-286.

[107] Fisher, J.T., S. Bradbury, B. Anholt, L. Nolan, L. Roy, J.P. Volpe, and M. Wheatley. 2013. Wolverines *(Gulo gulo luscus*) on the Rocky Mountain slopes : natural heterogeneity and landscape alteration as predictors of distribution. Canadian Journal of Zoology 91: 706–716.

[108] Schwartz, M.K., J.P. Copeland, N.J. Anderson, J.R. Squires, R.M. Inman, K.S. McKelvey, K.L. Pilgrim, L.P. Waits, and S.A. Cushman. 2009. Wolverine gene flow across a narrow climatic niche. Ecology 90(11): 3222–3232.

[109] Ware et al. 2015. A Phantom Road Experiment Reveals Traffic Noise is an Invisible Source of Habitat Degradation. PNAS 39: 12105-12109.

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Subnivean Mammals

Compacted snow fundamentally alters habitat quality in the subnivean zone.[110] Small mammals that remain active year round, including American marten, pika, and snowshoe hare, depend on the insulated space between the snowpack and ground for winter survival.

Winter temperatures, even with snow cover, are stressful to small mammals and many small mammal species depend on the insulated space between the frozen ground and the snow for survival.[111] When snow compaction from snowmobiles occurs, the subnivean space temperatures decrease, which can lead to increased metabolic rates in these small mammal species. If the subnivean air space is cooled by as little as 3 degrees Celsius, the metabolic demands of small mammals living in the space would increase by about 25 calories per hour.[112]

Compaction from snowmobile use has been shown to reduce rodent and shrew use of subnivean habitats to near zero, a decline in use attributed this decline to direct mortality, not outmigration.[113] In a study in Minnesota researchers found that intensive snowmobiling on an old field eliminated the small mammal population in the layer between the ground and snow.[114] Likewise, there have been documented declines in small mammals following destruction of the subnivean zone following snowmobile activity. [115]Population declines of small mammals undoubtedly impacts the species that prey upon them, creating ecosystem level disturbance. We suggest limiting the size of OSV open areas in order to protect subnivean habitat and the species that depend (directly or indirectly) upon it.

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[110] See Keddy, P. a., a. J. Spavold, and C. J. Keddy. 1979. Snowmobile impact on old field and marsh vegetation in Nova Scotia, Canada: An experimental study. Environmental Management 3:409–415 and Sanecki, G. M., K. Green, H. Wood, and D. Lindenmayer. 2006. The implications of snow-based recreation for small mammals in the subnivean space in south-east Australia. Biological Conservation 129:511–518.

[111] See Schwartz, S.S., Pakrovski, A.V., Istchenko, V.G., Olsnjev, V.G., Ovtschinnikova, N.A., and Pjastolova, O.A., 1964. Biological peculiarities of seasonal generations of rodents with special reference to the problem of senescence in mammals. Acta Theriologica 8:11-43; Fuller, W.A., 1969. Changes in numbers of three species of small rodents near Great Slave Lake, N.W.T., Canada, 1964-1967, and their significant for general population theory. Ann. Zool. Fennici. 6:113-144; Fuller, W.A., Stebbings, L.L., and Dyke, G.R., 1969. Overwintering of small mammals near Great Slave Lake, northern Canada. Arctic 22:34-55; and Brown, E.B., 1970. Some aspects of the ecology of the small, winter-active mammals of a field and adjacent woods in Itasca Park, Minnesota. Dissertation. University of Minnesota, Minneapolis, Minnesota, USA.

[112] Neumann, P. W., and Merriam, H.G., 1972. Ecological effects of snowmobiles. The Canadian Field-Naturalist, 86:207-212.

[113] Jarvinen, J.A., and W. D. Schmid. 1971. Snowmobile Use and Winter Mortality of Small Mammals. Pp. 131-141 in M. Chubb (ed.), Proc. of the Snowmobile and Off-Road Vehicle Research Symposium. Michigan State Univ. Tech. Rep. 8, 196 pp.

[114] Rongstad, O.J., 1980. Research needs on environmental impacts of snowmobiles. *In* R.N.L. Andrews and P. Nowak, editors. Off-road vehicle use: A management challenge. U.S. Department of Agriculture, Office of Environmental Quality, Washington, D.C.

[115] Sanecki, G. M., K. Green, H. Wood, and D. Lindenmayer. 2006. The implications of snow-based recreation for small mammals in the subnivean space in south-east Australia. Biological Conservation 129:511–518.

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***Minimize conflicts between off-road vehicle use and other existing or proposed recreational uses of the same or neighboring public lands***

Because OSVs can cover more ground more quickly than people on foot, OSV recreation disproportionately consumes a limited but valuable resource, powder snow. In addition, slopes displaying dozens of "high mark" tracks can take away the natural beauty of the landscape for some even if there are no OSVs physically present when these tracks are observed. The deep tracks of snowmobile can also create a hazard when skiing down a slope, or quickly "track out" a slope, rendering it un-skiable. Safety is also a concern as there is the possibility of collision with a snowmobile, or a risk of a snowmobile triggering an avalanche from above. Alternatively, an OSV can diminish the sense of risk or wildness that many skiers seek because they effectively reduce the distance from safety.[116]

Noise is one of the most common causes of conflict related to OSV use.[117] Natural soundscapes are intrinsic elements of the environment and are necessary for natural ecological functioning.[118] Noise from snowmobiles severely affects the winter soundscape and impacts wildlife and other visitors. A noise study from Yellowstone National Park involving four-stroke machines, which are much quieter than two-stroke snowmobiles, found that under a "best case scenario" (upwind, no temperature inversion, soft snow) snowmobiles were audible at distances of up to a half mile.[119] When there was a temperature inversion or firm snow, or for those downwind of a snowmobile, the machines could be heard more than two miles away[120] and even four-stroke snowmobiles can be audible from as many as 8 miles away.[121]

In "multiple-use" backcountry areas, OSV noise can be difficult to escape. While dependent on speed, type of machine, and direction of wind, OSV noise can travel up to 10 miles[122] – a distance farther than most non-motorized recreationists travel in a day. Additionally, considering that most forest roads are not plowed in the winter, the ability of skiers to avoid motorized noises is very restricted. Often trails and areas that are considered "frontcountry" and easily drivable in the summer are much more difficult to access in the winter. Accordingly, the user expectation in these areas is more aligned with a backcountry experience including a

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[116] Adams, J.C., and S.F. McCool. 2010. Finite recreation opportunities: the Forest Service, the Bureau of Land Management, and off-road vehicle management. Natural Resources Journal 49: 45-116.

[117] Vittersø, J., R. Chipeniuk, M. Skår, and O. I. Vistad. 2004. Recreational Conflict Is Affective: The Case of Cross-Country Skiers and Snowmobiles. Leisure Sciences 26:227–243.

[118] Burson, Shan. 2008. Understanding Oversnow Vehicle Noise Impacts. U.S. National Park Service Publications and Papers. Paper 17. http://digitalcommons.unl.natlpark/17

[119] National Parks Conservation Association (NPCA), 2000, Yellowstone Sound Survey. Available: http://www.npca.org/media_center/reports/yellowstone.html

[120] *Id*

[121] Burson, Shan. 2008. Understanding Oversnow Vehicle Noise Impacts. U.S. National Park Service Publications and Papers. Paper 17. http://digitalcommons.unl.natlpark/17

[122] Hastings, A.L., G.G. Fleming, and C.S.Y. Lee. 2006. Modeling Sound Due to Over-Snow Vehicles in Yellowstone and Grand Teton National Parks. Report DOT-VNTSC-NPS-06- 06, Volpe Transportation Center, Cambridge, MA and Burson, S. 2008. Natural Soundscape Monitoring in Yellowstone National Park December 2007– March 2008. National Park Service, Yellowstone Center for Resources, Mammoth, WY. 106p.http://www.nps.gov/yell/parkmgmt/upload/soundscape_monitoring-2007-2008.pdf

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quiet soundscape. This disconnect between available recreation settings and desired user experience is something the Forest Service primarily addresses in planning through the Recreation Opportunity Spectrum (ROS). However, ROS is a classification tool that describes physical, social and managerial attributes – access, remoteness, size, user density, level of development – in summer, but *not* winter. Addressing these front country multiple-use areas, which span a variety of ROS settings, is a particularly important issue to address in travel planning. Multiple use does not mean all uses in all areas and although the ROS spectrum identifies a base to work from, travel planning is the stage where the Forest Service must rely on site-specific details to further delineate uses to establish a balance for users, both motorized and non-motorized.

The 2015 Revised Forest Plan states that "Front country areas provide a wide range of recreation opportunities for motorized *and non-motorized* recreation in a natural setting"[123] yet 88% of the lands that are available for administrative management decisions on South Zone are available for winter motorized use under the final forest plan. On the North Zone, where only 30% of the administratively available lands are available for winter motorized use, the lands available for OSV use include almost all of the relatively accessible high elevation terrain – areas that are valued for snow-based recreation by all users. To reach the desired conditions stated in the Forest Plan the Shoshone will need to do more to bring balance to the winter recreation landscape. Closing the Deception and Pinnacles ski trails is a good first step for Togwotee. The travel plan should also include language that directs the Forest Service to support and encourage education efforts aimed at resolving conflict between motorized and non-motorized uses on Togwotee Pass and other popular multi-use areas. Togwotee Backcountry Alliance has approached the Forest Service in the past with ideas of trailhead kiosks, signage, and other educational materials and we would like to see the Forest Service embrace and promote these types of ideas.

Please see our attached maps (Exhibit B) to better understand how non-motorized users utilize popular winter recreation areas on the Shoshone. These maps focus specifically on the Beartooth Pass and Togwotee Pass as these are the two areas on the Shoshone that are available for motorized over-snow use and are also popular destinations for human-powered winter recreation. The Pahaska Teepee area on the North Fork of the Shoshone and Beaver Creek on South Pass are also popular non-motorized winter recreation areas, particularly for Nordic skiers, but these area are not available for winter motorized use and thus we are not focusing on them in these comments. Although vast areas of the Shoshone are designated as Wilderness and can provide quiet winter recreation opportunities, the most popular and frequently used backcountry skiing destinations tend to overlap with areas that are available for motorized use. This is because these are the places on the forest that receive, and retain, sufficient snow throughout the winter *and* are reasonably accessible to people traveling on foot for a day trip. In considering how to minimize conflict between uses, and to better comply with the Shoshone's Forest Plan desired conditions, the travel plan should ensure that these winter recreation "hot spots" are managed to ensure high quality non-motorized winter recreation opportunities as well as motorized winter recreation opportunities.

[123] 2015 Revised Forest Plan, page 85

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There are a number of ways that the Shoshone can minimize impacts between motorized and non-motorized recreational uses on Togwotee and the Beartooth Pass and there is no "one size fits all" solution.

The season dates in the Proposed Action, especially the April 30 end date, will virtually eliminate conflict between recreational uses on the Beartooth Pass and are an excellent management tool for this area. An April 30 end to the OSV season temporally separates motorized and non-motorized recreation on the Beartooth Pass while allowing each use to occur during the season that is best suited for the activity – snowmobiling in the winter and skiing in the spring and early summer.

On Togwotee however, conflict cannot be resolved through season dates because both skiers and snowmobilers recreate on Togwotee at the same time of year. Instead, a mixture of closures and education is needed to minimize conflict between uses. The proposed closures around the Deception and Pinnacles ski trails will minimize OSV impacts to Nordic skiers using these trails. However, there are also many backcountry skiers who visit Togwotee in search of powder turns. In previous comments we have asked for the Forest Service to designate part of Two Ocean Mountain for non-motorized use. However, given the stiff opposition to such a proposal, we are not asking for this closure at this time. We do ask, however, that the Forest Service work with the motorized and non-motorized winter recreation communities to educate each user group about how to share this area. Education efforts focused on courtesy, safety, and respect – not unlike the signs posted in the summer explaining which users groups yield to each other – can go a long way to reduce user conflict on Two Ocean. In addition, the Forest Service should consider implementing a speed limit on popular shared-use trails such as the trail to Brooks Lake Lodge. A reasonable speed limit will increase pedestrian safety and reduce the noise associated with OSV use on this trail, thus reducing a major source of conflict.

Many people visit the Shoshone in the winter with the expectation that they will experience silence or natural soundscapes and it is important that this opportunity be afforded to those who cannot travel deep into Wilderness areas. In order ensure that there are places on the landscape where both people and wildlife can experience natural soundscapes it is important for the Forest Service to consider how sound travels when designating motorized and non-motorized areas. Many of the terrain features that lend themselves to natural boundaries, such as ridgelines and rivers, can also help to buffer noise. By using these types of terrain features to demarcate motorized and non-motorized areas the Forest Service will be able to better enforce travel regulations and non-motorized areas will be quieter.

Understanding and addressing conflicts that arise between different uses – whether its conflicts between different recreational uses, between recreation and wildlife, or conflicts that arise between different ways of managing the land – are essential to crafting a robust and sustainable travel plan. Likewise, it is important work with stakeholders to educate users about the new travel plan and solicit buy-in from the public. To this end we are glad that the Shoshone has convened a Compliance Working Group to help with user education, implementation, and future partnerships. However, the Working Group has focused almost exclusively on summer motorized use so far. We feel it would be beneficial for the Working Group to also consider how it may help the Forest Service address user education, partnerships, and education related to

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winter travel management as well. We look forward to exploring opportunities for Winter Wildlands Alliance, our Wyoming-based Grassroots Groups, and our members can help the Forest Service write and implement a travel plan that does justice to the unique winter resources and recreation opportunities on the Shoshone National Forest.

Thank you for considering these comments. If you have any questions or require follow-up information please do not hesitate to contact me.

Sincerely,

Hilary Eisen
Recreation Planning and Policy Manager

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