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Comments: This email is to comment on the importance of leaving some Rio Grand National Forest forest service roads and areas free of snowmobile and tracked vehicle traffic, for cross-country/backcountry and skate skiing for late fall, winter and spring recreation.

First, a major reason for my retiring in Pagosa Springs some years ago is the availability of late fall, winter and spring cross country/backcountry and skate skiing, with early season (November) and late season (later March, April, May) focused on the Wolf Creek Pass area (including parts of the Rio Grande National Forest) due to lack of skiable snow at lower elevations. With the critical 1.5 C increase in global temperature over pre-industrial times global heating tipping point (1) now breached (2) years ahead of predictions, and no effective action to limit fossil fuel use in the US or worldwide (3), in upcoming years cross country/backcountry and skate skiing in the Rio Grande National Forest will become even more focused on high elevation areas such as the larger Wolf Creek Pass area. I view the cardiovascular, strength and endurance aspects of cross country and skate skiing as important for health at any age, and especially for seniors. A number of these areas are also useful for winter landscape photography of the relatively pristine forest (when there are no oversnow vehicle tracks).

Second, snowmobile and tracked vehicle use can create major ruts in an otherwise skiable snow surface. The Pagosa Nordic club grooms Fall Creek and Westfork for skate and classic skiing when there is adequate snow, and the Wolf Creek ski area grooms part of Alberta Park for skate and cross country skiing during winter. These ruts can make skate skiing almost impossible due to the narrow skis and width of track needed for this form of skiing (ca. 6-8 ft. for each directional skiing lane), and a highly uneven/rutted surface can make descents challenging for beginning skiers. These ruts have occurred a number of times at both Westfork and Fall Creek in the 2023-2024 season.

Third, snowmobile and tracked vehicle use disrupts the quiet and serenity of cross-country skiing that makes this outdoor sport attractive. Snowmobile noise (sound pressure) has been measured at 75-85 dBA at 50 feet (4), with higher readings when blasting uphill at full throttle, with snowmobile modifications using aftermarket parts, with tuning the engine for increased speed, with use of 2 stroke engines, and with reckless snowmobile use (5). Since noise diminishes with the inverse square of distance from the noise source (6), noise will be higher than these levels when closer than 50 ft. to the noise source. When passing a cross-country skier 5 feet away, 75 dBA of snowmobile sound pressure at 50 ft becomes a roar of 95 dBA at 5 ft.; 85 dBA at 50 feet becomes 105 dBA at 5 ft. (6); this can be obnoxious. Snowmobile sounds can travel significant distances depending on variables such as wind direction and speed, topography and ground cover, etc., and can be heard up to several miles away (4).

Fourth, snowmobile noise not only disrupts quiet cross-country skiing, it can cause hearing loss. At 3 feet (e.g. approximate snowmobile rider ear distance from engine) 75 dBA at 50 feet becomes 99.4 dBA, and 85 dBA becomes 109 dBA (6). National Institute for Occupational Safety (NIOSH) standards for maximal exposure time to environmental noise are calculated as maximum time (min)= $480/(2 \exp(L-85)/3)$ where L is noise exposure in dBA (8). For a 3 foot distance and L=99.4 dBA, maximum time exposure = 17.2 min. For L=109 dBA, maximum time exposure = 1.88 min. At this sound pressure a ride of 2 min. or longer puts riders without ear protection at risk of noise-induced hearing loss, as long or repeated exposure to noise above 85 dBA can cause hearing loss (7). Damaging the hearing of snowmobile riders and potentially nearby skiers are important negative environmental impacts. Note that a 2004 non-industry, non-snowmobile aficionado study by Yellowstone National Park rangers indicated supposedly quieter (than 2-stroke) 4-stroke snowmobile engines could produce 111 dBA of noise (not 75-85 dBA), requiring ear protection for riders (9). The above 75-85 dBA sound pressure measurements may in fact be understated.

Fifth, snowmobile noise may adversely affect wildlife in a variety of ways by disrupting natural soundscapes. Increased noise on roadways is associated with a decrease in nearby animal diversity and density, difficulty for predators to hear prey, disruption of interspecies communication, changes in breeding success, and increased stress responses (10). Snowmobile noise can alter bird vocalization patterns during winter (11).

Sixth, snowmobile and tracked vehicle use can damage the forest. On a number of cross country ski trips up the Fall Creek forest service road (Wolf Creek Pass area) in 2023-2024 I have observed that snowmobiles have used this road as access to drive offroad all over the surrounding backcountry, including down very steep slopes, sometimes driving over conifer saplings and breaking off branches. Numerous other instances of how snowmobiles can damage soil and vegetation have been cited, e.g. from snow compaction and altered soil bacteria, increased erosion, altered early spring germination, growth, and seed dispersal, and direct vegetation damage and death (12). Minimizing these impacts means greatly limiting snowmobile and tracked vehicle access, rather than declaring 77% of the Rio Grande National Forest open for over snow vehicle use.

Seventh, alternative (e.g. to Alberta Park, Lobo Summit, Big Meadows) areas for Wolf Creek Pass area snowmobile use are already available and are used by both commercial and recreational snowmobile users. These include the large area served by forest service road 725, and at the Wolf Creek Pass summit itself. There should be no need for snowmobile and tracked vehicle use in otherwise quiet areas used mainly by nordic skiers, or in other undamaged areas. Lobo summit is of particular interest for skiers as the terrain allows not only backcountry skiing well into May, but backcountry telemark skiing as well as incredible views. In view of the above points, declaring 77% of the Rio Grande National Forest open for over snow vehicle use seems designed to maximize damage to the Rio Grande National Forest.

Eighth, the cross country areas groomed by the Pagosa Nordic Club, San Juan Nordic Club (Rio Grande National Forest), and by the Wolf Creek ski area (Rio Grande National Forest) are important community recreation and health resources (see above) utilized by many people, including (in my direct experience) members of the Pagosa and San Juan Nordic Clubs, many members of the Pagosa Outdoor Club, other local skiers, and out of state skiers. Funding of the Pagosa Nordic Club ski trail and forest service road grooming by the Pagosa Area Tourism Board indicates its importance to the local area's economy; the importance of the Wolf Creek Ski Area (including nordic and skate skiing areas) to the economies of surrounding towns including South Fork, del Norte, Monte Vista, Alamosa and Pagosa Springs, e.g. via ski equipment rentals and sales, motels stays, restaurant meals, outdoor clothing purchases etc. should be obvious.

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