

# Snowmobiling



**Facts and Myths  
about Snowmobiling  
and Winter Trails**





Photo by Kim Raap

# Acknowledgements



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Photo by Kim Raap



U.S. Department of Transportation  
Federal Highway Administration



SUSTAINABLE FORESTRY INITIATIVE

## Executive Summary of Contents

# Snowmobiling



ISMA photo

### A Provider of Multiple Use Trails and Opportunities 4

There are over 137,000 miles of snowmobile trails across the United States. The majority are open to other recreation uses like cross-country skiing, dog sledding, snowshoeing, winter hiking and/or fat tire bicycling. These trails are funded solely by snowmobilers and often shared with other winter recreationists.

### A Catalyst for Winter Economies 6

Snowmobiling generates over \$26 billion in annual spending across the United States. Much of this occurs in rural areas, and helps keep businesses open year-round, provides jobs, and generates tax revenues for state and local governments.

### Cooperative Partnerships 8

Snowmobilers continually reach out to work with land managers. Their funding and volunteer labor provide trail grooming and clearing, signing, trailhead and trailside facilities, law enforcement, trail monitoring, safety and ethics education, avalanche forecasting, and search and rescue equipment – all which also ultimately benefit other winter recreationists.

### Soil and Vegetation Compaction 10

Numerous scientific studies have concluded there are no detrimental effects to soil or vegetation from snowmobiling. Given adequate snow cover and responsible operation, all evidence of snowmobile operation generally disappears when seasons change and snow melts.

### Emissions and Air Quality 12

Snowmobile engines are dramatically cleaner than are portrayed and have changed immensely. National Ambient Air Quality Standards have never been exceeded anywhere due to snowmobile use.

### Snow and Water Quality 14

Wide-ranging scientific studies have looked at water chemistry from snowmelt runoff in busy snowmobiling areas and concluded that all potential contaminant levels were substantively below EPA criteria and well below levels that would adversely impact aquatic habitats.

### Sound Levels 16

Snowmobile sound levels have been reduced 94% as compared to early models. Snowmobile manufacturers employ state of the art noise reduction technologies and continue to refine their exhaust system designs.

### Wildlife Impacts 18

Numerous studies have concluded that snowmobile activity has no significant effect on wildlife populations. After years of intensive snowmobile/wildlife monitoring in Yellowstone National Park, researchers concluded that ‘the debate regarding the effects of motorized recreation on wildlife is largely a social issue as opposed to a wildlife management issue.’

### Recreation Conflicts 26

Emphasis needs to be placed on requiring varying user groups to ‘play together in the snow versus succumbing to pressures to segregate uses. Education should focus on how to better ‘share the powder’ rather than enacting area closures.

### Planning for Multiple Use Winter Recreation 28

Poor parking is the root stressor for winter recreation conflicts and must be addressed first to successfully manage winter recreation. Snowmobilers require larger trail networks and more off-trail areas than nonmotorized users since they routinely travel significantly farther distances on their day trips.

### ‘Twelve Principles’ for Minimizing Conflicts on Multiple Use Trails 38

Light-handed approaches are essential to provide freedom of choice and a desired range of natural environments.



# Snowmobiling

## A Provider of Multiple Use Trails and Opportunities



ISMA photo

Snowmobiling is a favorite winter pastime for over two million people in the United States. Snowmobiling also helps provide a large number of recreation opportunities for other trail users since the majority of the 137,000 miles of snowmobile trails in the U.S. are open for multiple uses and help provide important winter access, services, and trailheads.

Snowmobiling provides opportunities for families and friends to enjoy wintertime companionship while experiencing splendid scenery like no other season offers; opportunities for challenge, physical exertion and stress relief while recreating in the great outdoors; and opportunities to connect with nature in the solitude of secluded winter backcountry. These opportunities combine to help teach respect and conservation of the environment, while also instilling a strong appreciation for private and public lands.

Snowmobile trails are funded solely by snowmobile users through:

- \* Snowmobile registrations,
- \* Snowmobile trail or user permits,
- \* Snowmobile gasoline tax rebates, and
- \* An immense number of hours snowmobilers volunteer each year to clear, maintain, sign and groom trails.

The efforts by snowmobilers often provide a myriad of opportunities for other winter recreationists, including cross-country skiers, backcountry skiers, snowshoers, dog sledders, winter hikers, fat tire bicyclists, and in some areas, ATV riders. All of this typically comes at no cost to the other winter trail users. Additionally, many snowmobile trails are also used by hikers, bicyclists, equestrian riders, OHV riders, and a host of other recreationists during the summer season. Contributions from snowmobilers help public land managers accomplish their goals for providing winter recreation opportunities – at little or no cost to the agencies.

## Did you know...

The majority of the 137,000 miles of snowmobile trails are open for multiple uses.



Photos by: (Clockwise from top left) Wyoming Stage Stop by Chris Havener, ISMA, Kim Raap, ISMA

## Hybrid motorized / nonmotorized recreation is growing in popularity.

Many backcountry skiers and snowboarders are using snowmobiles to get further into the backcountry or closer to nonmotorized opportunities at Wilderness boundaries. These ‘hybrid users’ value how snowmobiles allow them to get 10 or 20 miles away from their vehicles – which is substantially farther than they could ski while on day trips. These cross-over motorized / nonmotorized recreationists represent the ultimate example of public lands recreation ‘multiple use.’

Snowmobiling occurs on private and public lands across the northern tier of the country. It involves a wide variety of riding styles that include on-trail riding, cross-country riding off trails in powder and gentle open areas, boon-docking in forested areas, and hill climbing in mountainous regions. This wide range of riding styles requires an equally wide variety of recreation settings ranging from gentle on- and off-trail opportunities for families to challenging off-trail opportunities for experienced and expert riders.

A growing trend is that more elderly and people with disabilities are using snowmobiles to access areas where they may have skied or snowshoed when they were more mobile. Snowmobiles provide opportunities for disabled individuals and the elderly to experience the great outdoors in a way that would not otherwise be possible during winter.

Snowmobile technology has dramatically improved to the point where today’s snowmobiles bear little resemblance to snowmobiles produced ten or twenty years ago. They are tightly regulated by the U.S. Environmental Protection Agency (EPA) and are consequently significantly cleaner and quieter than early models. As a result, multiple use trail sharing is more workable than ever before.



Photo by Shad Hamilton



# Snowmobiling

## A Catalyst for Winter Economies

Snowmobiling generates over \$26 billion in annual spending across the United States and is responsible for over 100,000 fulltime jobs. Its overall economic impact is particularly important in rural communities where snowmobiling-related tourism provides income and jobs in what otherwise would be an off-season. This helps businesses keep their doors open and people employed year-round and also generates important tax revenues for state and local governments.

According to the International Snowmobile Manufacturers Association (ISMA Snowmobiling Fact Book 2018), there are 1.2 million registered snowmobiles in the U.S. The average snowmobiler rides their snowmobile 1,250 miles per year and is 45 years old, with about 75% being male. The average annual household income for snowmobilers is \$70,000.

About 56% of snowmobilers usually trailer their snowmobiles to go riding. The other 44% either snowmobile directly from their primary residence or have a vacation home where they keep and use their snowmobiles.

Snowmobilers are also caring neighbors. They raise over \$3 million for charity each year – which is above and beyond their substantial local fundraising and thousands of hours of

volunteer work they do to provide public snowmobile trails.

Snowmobiling requires a significant investment of tens of thousands of dollars for a snowmobile, clothing, trailer, and tow vehicle. It also requires substantial daily trip costs for fuel, oil, repair parts, user fees, food, and oftentimes lodging.

In comparison, it is much less expensive to participate in nonmotorized recreation. Cross-country skiers and snowshoers can get started in their sport for as little as \$100 or \$200 – and even the most technologically advanced non-motorized equipment costs thousands of dollars less than \$6,000 to \$15,000 for snowmobiles. And typical daily trip costs for nonmotorized recreationists are next to nil compared to snowmobilers' trip costs.

Many States have commissioned studies to determine the economic impacts of snowmobiling. A list of available economic studies can be found at [www.snowmobileinfo.org/research-studies-snowmobiling-impact-economics.html](http://www.snowmobileinfo.org/research-studies-snowmobiling-impact-economics.html). Economic benefits vary based upon the ratio of local/resident snowmobile riders (lower spending) versus the level of non-resident and non-area riders (higher trip expenditures). State survey results include:

**IDAHO:** Snowmobile owners spent \$197.5 million on snowmobiles, equipment, fuel, lodging, food and other items. This supported 4,062 jobs, generated \$108 million in labor income, and increased value added by \$161 million and output of locally produced goods and services by \$157 million. (Boise State University 2017).

**IOWA:** Snowmobiling generated \$65.4 million in annual economic activity, resulting in 899 jobs (Iowa State University 2005).

**MICHIGAN:** The average snowmobiler spent \$4,218 annually on snowmobiling activity, equipment, and vacationing within the state of Michigan. This generated over \$1 billion in economic impact and created 6,455 full time jobs (Michigan State University 1998).



ISMA photo

MINNESOTA: Over \$51 million in taxes were paid at the local and State level directly related to snowmobiling activity (University of Minnesota 2005).

MONTANA: Snowmobiling generated \$110.6 million annually. Nonresidents spent about \$147 per day on food, lodging and snowmobile rental costs generating nearly \$14.3 million per year. Resident's annual spending totaled about \$96.3 million with over half attributed to gasoline for snowmobiles and transportation to riding areas. Snowmobilers buy about 4.3 million gallons of gasoline per season, generating over \$1.2 million for the state highway trust fund (University of Montana 2013).

OREGON: Total spending by snowmobilers was estimated to exceed \$18 million, support 155 jobs, and generate approximately \$5 million in labor income and \$7.7 million in value added (Oregon State University 2015).

PENNSYLVANIA: The annual economic impact of snowmobiling was estimated to be approximately \$161 million per year (Lebanon Valley College 2000).

SOUTH DAKOTA: The snowmobiling industry generated \$131.6 million in annual economic impact while supporting over 1,400 jobs; \$58 million was related to snowmobile retailers and distributors and over \$15 million was generated by trip-related spending for lodging, meals and gaming. (University of South Dakota 2011)

UTAH: Snowmobiling generated \$138 million in local industry sales, \$88 million in value added to the state's economy, 1,378 jobs that generated \$60 million in labor income, and over \$13 million annually in state and local tax revenues. (Utah State University 2017).

WASHINGTON: The annual economic impact of snowmobiling was \$92.7 million (Washington State University 2001).

WYOMING: The annual economic impact of snowmobiling was \$175.8 million, which supported 1,300 jobs and generated \$7.4 million annually in state and local government revenue. Gasoline was the largest trip cost for snowmobilers, followed by lodging. (University of Wyoming 2013)

## Fact

**Snowmobiling generates over \$26 billion in annual spending across the United States, which is important to winter rural economies.**



ISMA photo



# Snowmobiling

## Cooperative Partnerships

Snowmobilers have built cooperative partnerships that provide many multiple use winter trails. They are also heavily involved with local community service projects. Through their funding and volunteer labor efforts, snowmobilers provide multiple use winter recreation opportunities through management assistance that includes:

- \* Trail grooming
- \* Trail signing
- \* Trail clearing and maintenance
- \* Trail monitoring
- \* Law enforcement
- \* Avalanche forecasting, education, and weather monitoring equipment
- \* Safety and ethics education
- \* Search and rescue equipment
- \* Trailhead and trailside facilities
- \* Land use planning input

Snowmobilers always work closely with land managers. The national snowmobile community extended a service-wide Memorandum of Understanding (MOU) with the USDA Forest Service in 2016 to help promote continued cooperative partnerships. This MOU was signed by the American Council of Snowmobile Associations (ACSA) which represents the organized snowmobiling public and the International Snowmobile Manufacturers Association (ISMA) which represents snowmobile industry. ACSA members are recognized leaders in promoting volunteerism, while both organizations develop snowmobiling ethics and safety education materials and also promote proper management of federal and non-federal lands.



Photo by Kim Raap



Photo by Bridger-Teton National Forest Avalanche Center

### Examples of equipment provided for partners by snowmobilers:

(Top to bottom)

- Trail grooming equipment
- Weather monitoring equipment for avalanche forecasting
- Snow ambulance for search and rescue
- Safety Shelter



Photos by Kim Raap





This MOU stresses a need to actively promote public-private partnerships that encourage responsible use of public lands by visitors participating in snowmobile travel and recreational activities. It established a general framework of cooperation upon which mutually beneficial programs, work projects, and snowmobile activities may be planned and accomplished on National Forest System lands. It also recognized that such programs, projects, and activities complement the Forest Service mission and are in the best interests of the public.

### Key provisions of the MOU outline that snowmobile cooperators shall:

- \* Provide technical assistance to land managers and communities involved in work projects, educational activities, and snowmobile opportunities.
- \* Encourage its members to work with local Forest Service officials to discuss and identify opportunities for cooperative work on mutually beneficial projects or activities.
- \* Promote Tread Lightly! ethics by providing training and instruction to its members.

### Key provisions of the MOU outline that the Forest Service shall:

- \* Provide the Cooperators information regarding the development and presentation of training materials related to snowmobiling safety and ethics, management direction guidance and the availability of snowmobiling opportunities on National Forest System lands.
- \* Encourage local Forest Service officials to participate with snowmobile clubs and associations in the development of mutually beneficial work projects, educational activities, and snowmobile opportunities.
- \* Make National Forest System lands available for the furtherance of this MOU, subject to applicable Federal laws, regulations, Forest plans, and other management direction.



Wyoming State Trails Program Photo



Oregon State Snowmobile Association Photo

### Examples of volunteer work provided by snowmobilers for partners:

(Top to bottom)

- Wilderness boundary signing
- Fall trail maintenance
- Firewood cutting for shelters
- Safety shelter construction



Oregon State Snowmobile Association Photo



Sweetwater Sno-Pokes Photo

# Snowmobiling



## Myth

**Snowmobiles compact soil and damage vegetation.**

## Fact

**Snowmobiles exert dramatically less pressure on the earth's surface than other recreational activities (i.e., just one-tenth the pressure of a hiker and one-sixteenth the pressure of a horse-back rider, as shown in the table on page 11). Moreover, a snowmobile's one-half pound of pressure is further reduced by a layer of snow between the snowmobile and the ground.**

## Soil and Vegetation Compaction

The only comprehensive studies regarding potential compaction impacts from snowmobiles were conducted in the 1970s when snowmobiles were first growing in popularity. These studies determined that potential impacts were minimal – and are conclusions that remain valid today. Visit [www.snowmobileinfo.org/research-studies-snowmobiling-impact-vegetation.html](http://www.snowmobileinfo.org/research-studies-snowmobiling-impact-vegetation.html) to view all research related to this topic. Research findings include:

- \* A study of the effects of snowmobile traffic on bluegrass (Foresman 1976) concluded that 'early growth was slower but summer yields were the same; no soil compaction was detected in the treated plots.'
- \* A research symposium report published by Michigan State University (1974) stated that 'where snow cover exceeded 3 inches in depth there were no detrimental effects on grass or vegetation stands, their vigor, or yield; high-grade grasses recover naturally from heavy snowmobile traffic; and snowmobile traffic caused no stand reductions, but did cause a slower recovery in early spring.'

## Did you know...

**A man hiking exerts 10 times more pressure per square inch than what a snowmobile does.**



- \* A study in Maine (Wentworth 1972) concluded that ‘compaction of the snow cover had little effect on average soil temperature under the different treatment areas.’
- \* A study of snowmobile traffic on several forage species and winter wheat (Ryerson 1977) over a 3-year period showed no detrimental effects on four forage species and that winter wheat yields were not reduced. It concluded that trail use rather than open, uncontrolled use would be most appropriate in crop vegetation environs.
- \* A study in Nova Scotia (Keddy 1979) concluded that ‘marsh vegetation showed no significant effects of snowmobile treatment’ since its roots are under solid ice cover during winter.

Given adequate snowfall and responsible operation, all evidence of snowmobile operation generally disappears when the seasons change and snow melts.

The photos to the right show the same locations in both winter and summer; the top photo set is of a heavily used trail while the bottom set shows a heavily used off-trail location adjacent to a busy parking area.

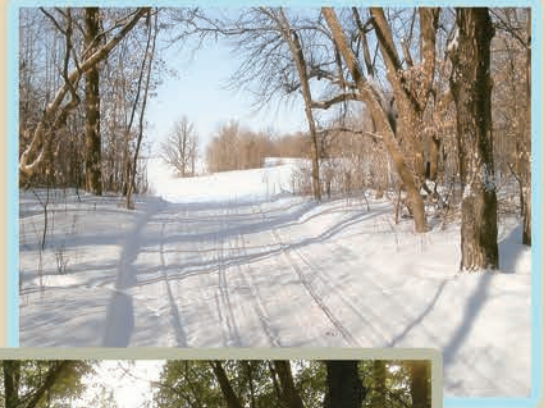
Furthermore, a vast number of snowmobile trails are located on snow-covered roadways or hardened trails – so there is zero impact on soil or vegetation.

### Pressure Exerted by Various Travel Modes

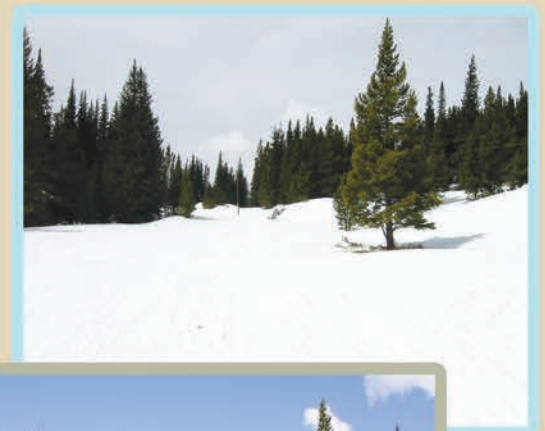
Object	Pounds of pressure exerted per sq. in.
4-Wheel Drive Vehicle	30
Horse	8
Man (hiking)	5
Fat Tire Bicycle	3 to 6
Wheeled UTV	4
Wheeled ATV	2
Tracked UTV	0.6 to 0.9
Tracked ATV	0.55
<b>Snowmobile</b>	<b>0.5</b>

## Fact

**Numerous studies have concluded that ‘there were no detrimental effects’ to soil or vegetation from snowmobiling.**



Photos by Kevin Dreyer



Photos by Kim Raap



# Snowmobiling

## Emission and Air Quality

### Myth

**Snowmobile emissions cause air pollution and harm the environment.**

### Facts

**Snowmobile engines are dramatically cleaner than portrayed and they do not cause air pollution.**

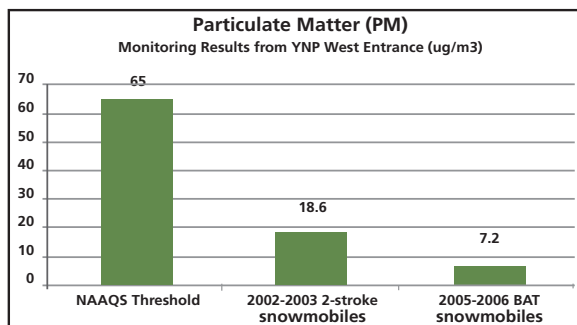
Large numbers of snowmobiles entering Yellowstone National Park (YNP) through its West Entrance from the mid-1990's through 2003 likely represent some of the most concentrated snowmobile use ever experienced in one location at one time. This time period was prior to when the U.S. Environmental Protection Agency (EPA) first regulated snowmobile engine emissions and prior to implementation of Yellowstone's new Winter Use Management Plan in late 2004. Consequently, the YNP West Entrance during that time period clearly represented a worst-case scenario in respect to snowmobile emissions. Subsequently, the issue of snowmobile emissions and air quality was studied more intensely in YNP than anywhere else in the world. Despite all the concerns and negative rhetoric regarding snowmobile use in Yellowstone, very intensive studies confirmed that – despite high levels of unregulated snowmobile use at the time – National Ambient Air Quality Standards (NAAQS) were never close to being exceeded in YNP due to snowmobile use. NAAQS thresholds have also never been exceeded elsewhere due to snowmobile use.

The NAAQS 1-hour threshold for Carbon Monoxide (CO) is 35 parts per million (ppm). The winter season of 2002-2003 represents the 'highest snowmobile visitation levels' for the most recent years when 'any snowmobile model' (primarily 2-strokes) could be used in YNP; monitoring showed the 1-hour average for CO at the YNP West Entrance was 8.6 ppm (about one-fourth the NAAQS threshold). In

2005-2006 the requirement for only Best Available Technology (BAT) model snowmobiles (only certain 4-stroke models) was fully implemented in Yellowstone; monitoring showed the 1-hour average for CO dropped to 2.1 ppm (6% of the NAAQS threshold). CO emissions from both engine types were – and remain – significantly below the NAAQS threshold.

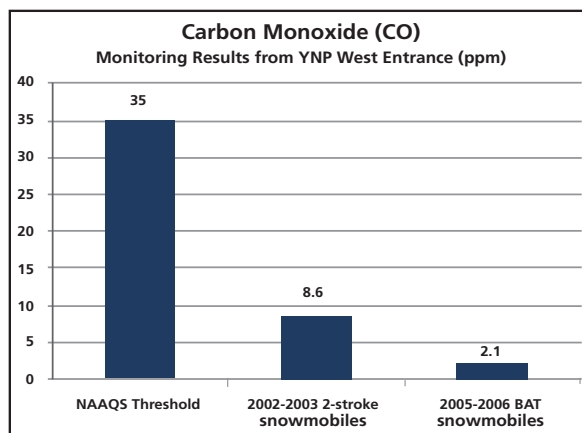
Air quality monitoring during the same time period at YNP also measured Particulate Matter (PM 2.5). The NAAQS 24-hour threshold for PM 2.5 is 65 micro-grams per cubic meter (ug/m<sup>3</sup>). The average 24-hour concentration observed during the 2002-2003 YNP winter season (primarily 2-stroke models) was 18.6, while the average during the 2005-2006 season (all 4-stroke models) was 7.2 ug/m<sup>3</sup>. PM emissions from both engine types were – and remain – well below the NAAQS threshold (28% and 11% of the threshold, respectively).

### Yellowstone National Park Air Quality Monitoring – PM



Source: NPS Winter Use Plans DEIS

### Yellowstone National Park Air Quality Monitoring – CO



Source: NPS Winter Use Plans DEIS



The EPA – with the full support of snowmobile manufacturers – began regulating snowmobile engine emissions in 2002. These regulations target Carbon Monoxide (CO) and Hydro-Carbon (HC) emissions from snowmobiles on an engine family (fleet average) basis and were phased in between 2006 and 2012 model years.

Consequently, emissions from 2012 and newer snowmobiles are at least 50% lower than pre-2006 snowmobiles. New four-stroke engines and direct or semi-direct injection two-stroke engine technology has driven a major transformation in snowmobile engines that significantly lowered emissions. Additionally, the increased use of low-emission synthetic engine oils by snowmobilers has helped reduce snowmobile emissions even further.

### EPA Snowmobile Emission Standards

Model Year	Emission Standards		% of Fleet Phase-In
	HC g/kW-hr	CO g/kW-hr	
2002 baseline 2-stroke snowmobile	150	400	NA
2006	100	275	50%
2007 – 2009	100	275	100%
2010	75	275	
2012	75	200	

### Key findings from other studies include:

- \* A two-year air quality monitoring study was conducted by the USDA Forest Service Rocky Mountain Research Station (Musselman 2007) at the Green Rock snowmobile staging area in the Snowy Range of Wyoming. It found that snowmobile emissions did not have a significant impact on air quality at this extremely busy snowmobiling area located in a high-elevation ecosystem. The study measured levels of nitrogen oxides (NO<sub>x</sub>, NO), carbon monoxide (CO), ozone (O<sub>3</sub>) and particulate matter (PM<sub>10</sub> mass); air quality data during the summer was also compared to winter data. It determined that pollutant concentrations were generally low both winter and summer, and were considerably lower than maximum levels allowed by NAAQS.
- \* A Comparability Assessment of Snowmobile and Snowcoach Transportation Event Impacts in Yellowstone National Park (NPS Winter Use Plan/SEIS, 2013) determined:
  - One mode of transportation is not conclusively cleaner, quieter, or less harmful to wildlife than the other.
  - One mode of transportation does not provide for higher quality visitor experiences than the other.
  - One mode of transportation is not conclusively more harmful to health and safety of visitors and employees than the other.

Visit: [www.snowmobileinfo.org/research-studies-snowmobiling-impact-air-quality.html](http://www.snowmobileinfo.org/research-studies-snowmobiling-impact-air-quality.html) to view all research related to this topic.



KRC/Clean Snowmobile Challenge Photo

## SAE Clean Snowmobile Challenge

A wide range of local and national snowmobiling groups plus the four snowmobile manufacturers have been strong supporters of the Society of Automotive Engineers (SAE) Clean Snowmobile Challenge since it was founded in 2000. This Collegiate Design Series event requires students to reengineer an existing snowmobile to reduce emissions and noise. A total of 21 universities from across the United States and Canada participated in the 2018 event, indicative of its annual strong support from Snowbelt universities.

The 200-plus students, advisors and sponsors who take part in this annual event are making a difference for the future of snowmobiling. Several dozen technical papers have been produced as a result of this event as it continues to be a prime driver in lowering snowmobile emissions and sound levels. Many student competitors have been hired as engineers by snowmobile manufacturers upon graduation.

# Snowmobiling

## Snow and Water Quality

Photo by Kim Raap

### Myth

**Snowmobiles deposit large amounts of gasoline, oil, and other contaminants on snow, which leads to ground and surface water quality degradation and subsequently impacts aquatic life.**

### Facts

**Scientific monitoring has proven that snowmobiles do not emit gasoline and other contaminants directly into the snowpack or have a negative effect on water quality.**

Visit [www.snowmobileinfo.org/research-studies-snowmobiling-impact-water.html](http://www.snowmobileinfo.org/research-studies-snowmobiling-impact-water.html) to view all research related to this topic.

#### A summary of key findings includes:

- ✧ The effect of snowmobile emissions on the chemistry of snowmelt water was extensively studied by Yellowstone National Park's Center for Resources (Arnold/Koel 2006) over consecutive winters. This long-term study represents the most extensive and accurate body of science available on this topic.

The monitoring project was conducted in 2003 and 2004, when pre-EPA regulated two-stroke snowmobile visitation was around 75,000 units per year. Snowmelt runoff samples were collected from four sites along the heavily traveled road corridor connecting West Yellowstone, Montana, and the Old Faithful area. Three sites were located immediately adjacent to the roadway in the vicinity of the West Entrance, Madison Junction, and Old Faithful. The fourth site was used as a control and was located near Madison Junction approximately 100 meters from the roadway, away from the effects of snowmobiles. Each site was visited on 9–10 different days during the spring sampling period, with visits dependent on having a daily temperature >5 degrees Celsius for good potential to obtain snowmelt runoff. Water quality measurements related to water temperature, dissolved oxygen, pH, specific conductance, and turbidity were collected at each site and analyzed for nine volatile organic compounds (VOCs).

All water quality measurements were within acceptable limits and the concentrations of all VOCs detected were considerably below the U.S. Environmental Protection Agency's water quality criteria and guidelines for VOCs, while also being well below levels that would adversely impact aquatic systems.



- ※ A USDA Forest Service Rocky Mountain Research Station study (Musselman 2007) in the Snowy Range of Wyoming measured water chemistry and snow density from snow samples collected on and adjacent to a heavily used snowmobile trail. Snow on the trail was denser than it was off-trail, which would stand to reason since it had been compacted by trail grooming.

Snow chemistry was significantly different between on- and off-trail locations. On-trail snow was more acidic with higher concentrations of sodium, ammonium, calcium, magnesium, fluoride, and sulfate than what was found in snow off the trail, especially early in the season. However, since the trail followed a roadway, researchers felt the higher early-season concentrations may have likely been affected more by roadway chemistry conditions than by snowmobile traffic. Nonetheless, all levels were within acceptable limits and well below levels that would adversely impact aquatic systems. The study also found that snowmobile activity had no effect on nitrate levels in snow; they were the same both on- and off-trail.

- ※ A study of snowpack chemistry on heavily traveled snowmobile trails in Vermont (VHB Pioneer 2010) indicated no detectable levels of VOC or total petroleum hydrocarbons in surface waters located immediately downstream of snowmobile trails. Soil chemistry monitoring also indicated no detectable levels of VOC or total petroleum hydrocarbons.

## Fact

**VOC concentrations of snowmelt runoff were well below EPA criteria and well below levels that would adversely impact aquatic systems.**

**– Arnold 2006**



ISMA Photo

# Snowmobiling

## Sound Levels

### Myth

**Snowmobiles are loud and impact natural soundscapes.**

### Facts

**Since 1975, snowmobiles have been certified to emit no more than 78 decibels from a distance of 50 feet while traveling at full throttle. Comparatively, pre-1969 snowmobiles had sound levels as high as 102 decibels.**

Since sound levels are logarithmic, this means sound levels for snowmobiles have been reduced 94% from early models. Consequently, it would take 256 78-decibel snowmobiles operating together at wide open throttle to equal the noise level of just one pre-1969 snowmobile. Examples of comparative sound levels are shown in the table below.

#### Examples of Comparative Sound Levels

Sound Source	Sound Level dB(A)
75-piece orchestra	130
Car horn, snow blower	110
Pre-1969 snowmobile	102
Blow dryer, diesel truck	100
Electric shaver, lawn mower	85
Garbage disposal, vacuum cleaner	80
<b>Post-1975 snowmobile (full throttle at 50 feet; maximum allowed by law)</b>	<b>78</b>
Alarm clock, city traffic, normal conversation at 3 feet	70
Dishwasher	60
Leaves rustling, refrigerator	40

Snowmobile sound levels have continued to decline. According to a Michigan Technological University (MTU) study (Blough 2009), 'exhaust noise has long been considered to be the primary noise source on a snowmobile. Historically most snowmobiles have been powered by 2-stroke engines which require a tuned exhaust to produce maximum power. This tuned exhaust is composed of a tuned expansion chamber and a "can" or muffler. In the past, the muffler was not always designed to provide significant noise attenuation. However, in the last 5 to 10 years modern snowmobiles have significantly modified this approach to their exhaust system designs. Many snowmobiles are now powered by 4-stroke engines which do not require a tuned expansion chamber to produce maximum power, leaving the muffler as the only exhaust system component besides the requisite downpipes and piping. While newer 2-stroke snowmobiles still require a tuned expansion chamber, they are now fitted with a very significant muffler, like 4-stroke snowmobiles, which provides a very significant reduction in exhaust noise. These advances in the reduction of the exhaust noise can clearly be heard on the modern snowmobiles. In many cases, under many operating conditions the dominant noise source now appears to be the track system.'

The MTU study also found that 'snowmobile manufacturers are employing nearly all of the state-of-the-art noise reduction technologies that the automotive and heavy equipment manufacturers use. The snowmobile industry has spent a large sum of money over the last 7 to 10 years to modernize and upgrade both the facilities and software capability to deploy these technologies throughout the design and manufacturing of their snowmobiles. They use finite element analysis, rigid body dynamics, boundary element analysis, modal analysis, transfer path analysis, sound intensity and near-field acoustic holography to optimize their designs. In every new product release by the snowmobile manufacturers the snowmobiles have been heavily optimized and tested for noise and in many cases hard decisions have to be made between weight, cost, performance, and noise. Upon listening to a new snowmobile, it is very evident that in the tradeoff sit-



uations, noise has become much more important and driven the final design decisions much more often than in the past designs.’

Immense public discussion regarding snowmobiling in Yellowstone National Park over the past two decades has resulted in numerous sound monitoring projects that compared sound levels between different snowmobile models and snowcoaches. A summary of key findings is noted below. Visit [www.snowmobileinfo.org/research-studies-snowmobiling-impact-sound.html](http://www.snowmobileinfo.org/research-studies-snowmobiling-impact-sound.html) to view all research related to this topic.

- ✳ Natural soundscape monitoring by the National Park Service (Burson 2011) found that ‘although on average snowmobiles were audible for more time than snowcoaches (because there were significantly more snowmobiles than snowcoaches in the park), snowcoaches in general had higher sound levels, especially at higher speeds.’
- ✳ An earlier Park Service report (Burson 2005) concluded that ‘the sound level and percent time oversnow vehicles were audible remained substantially lower than oversnow vehicle sounds from the 2002-2003 winter use season.’ This reflects the regulation change whereby only Best Available Technology (BAT) snowmobiles with a maximum sound level of 70 decibels are allowed into the park.
- ✳ A State of Wyoming study (Daily 2002) concluded that ‘the sound levels of many late model snowmobiles overlap or are quieter than snowcoaches under the same or similar testing conditions. The quietest snowmobile at 20 mph produced less sound than any of the snowcoaches at the same speed. The loudest stock over-snow vehicle at a steady state speed was a Bombardier snowcoach.’ The report recommended that ‘any regulations written should reasonably consider that over-snow vehicle sound levels are not attributable to just engine sounds, but also must factor in the other mechanical sounds (clutch, track and skis) associated with tracked vehicles.’

## Stationary Sound Test

Protocol for SAE test J2567 was issued in January 2004 and has since been adopted as a sound enforcement tool by several states. This new test established a sound level threshold of 88 decibels at 4 meters (13 feet) which, due to the logarithmic nature of sound levels, corresponds to the ‘78 decibels at 50-feet’ sound law. The result is that illegally altered exhaust systems can now be identified with an enforcement tool that is safe to administer in the field and will also hold up in court.

## Fact

**Snowmobile sound levels have been reduced 94% as compared to early models.**

Problems with excessive noise levels do occur when irresponsible riders modify their snowmobiles’ exhaust systems or substitute factory systems with aftermarket racing exhaust systems. In most states this practice is illegal. It also grossly misrepresents responsible riding habits practiced by the vast majority of snowmobilers. The snowmobile industry worked with the Society of Automotive Engineers (SAE) and State DNR agencies to address this issue by developing the new stationary sound test for snowmobiles that is described below.

A snowmobile’s sound level is being measured by a law enforcement officer using the SAE J2567 stationary sound test.

Photo by  
Kim Raap





Photo by  
Kim Raap

Researchers monitoring  
wildlife/human interactions in  
Yellowstone National Park

# Snowmobiling

## Wildlife Impacts

### Yellowstone National Park Studies

## Myth

**Snowmobiles disturb and harm wildlife populations.**

## Facts

**Numerous scientific studies about the impact of snowmobiles on wildlife have been conducted over the years. They range from the early 1970s when snowmobiling was an emerging activity to those completed in more recent years. Regardless if old or new, study conclusions remain valid and are the same: real impacts are minimal and manageable. Snowmobilers and wildlife populations can coexist very well and have actually done so for over 50 years.**

The most recent snowmobile/wildlife related studies were conducted in Yellowstone National Park and represent some of the most intensive winter wildlife monitoring ever conducted. This extensive body of research includes:

The Scientific Assessment of Yellowstone National Park Winter Use (YNP SEIS 2011) concluded that ‘collectively, wildlife studies conducted to date suggest effects of over-snow vehicles (OSV) on individual animals have not had measurable detrimental effects. Any behavioral or physiological reaction to disturbance associated with OSV use qualifies as an effect on an individual animal. Studies of ungulate physiology suggest habituation to predictable disturbances like those associated with OSV use in YNP. Observations of bison, elk, trumpeter swans, and bald eagles, which evince awareness of passing OSVs but typically are not displaced, do not suggest substantial energetic costs. Elk and bison near roadways do not appear to exhibit elevated levels of stress hormones attributable to OSV traffic. Effects of OSV use on the dynamics of intensively studied species clearly are subsidiary to effects of ecological processes.’

A National Park Service study in Yellowstone (White 2006) concluded that ‘human disturbance did not appear to be a primary factor influencing the distribution and movements of the wildlife species studied; there was no evidence that snowmobile use during the past 35 years adversely affected the demography or population dynamics of bald eagles, bison, elk, or trumpeter swans.’

A previous Yellowstone study conducted by the Park Service (White 2005) concluded that ‘responses by



these wildlife species to over-snow vehicles were relatively infrequent, short in duration, and of minor to moderate intensity; ungulates habituated somewhat to motorized recreation; there was no evidence of population-level effects to ungulates from motorized winter use because estimates of abundance either increased or remained relatively stable during three decades of motorized recreation prior to wolf colonization in 1998. Thus, we suggest that the debate regarding the effects of motorized recreation on wildlife is largely a social issue as opposed to a wildlife management issue.'



National Park Service Photo

A workshop sponsored by the National Park Service, which included experts from federal agencies, state agencies, and universities, was held in 2001 to summarize the state-of-science on monitoring the effects of snowmobiles on wildlife in national parks and surrounding lands. The report from this workshop (Graves 2001) states that 'experts in the field of wildlife (and wildlife reactions to disturbance) are uncomfortable passing judgments on whether snowmobiles adversely (or, for that matter, positively) affect wildlife. Even under circumstance with the best available information, the question of when an impact becomes serious enough to warrant taking action is a subjective value judgment, and many respondents recognized this. The majority felt that insufficient data exist to even begin to understand the issue.'

A study of bison and elk responses to winter recreation in Yellowstone (Hardy 2001) found that 'both species behaviorally responded more often to people off-trail than to people on trails, and these activities prompted more behavioral responses than activities on roads. The predictability and frequency of OSV activities facilitated habituation to the majority of the winter recreation activities. Despite varying responses to increased winter visitation since the late 1970s, bison and elk return to winter in the same area each year, coexisting with winter recreation without incurring losses at the population level.'

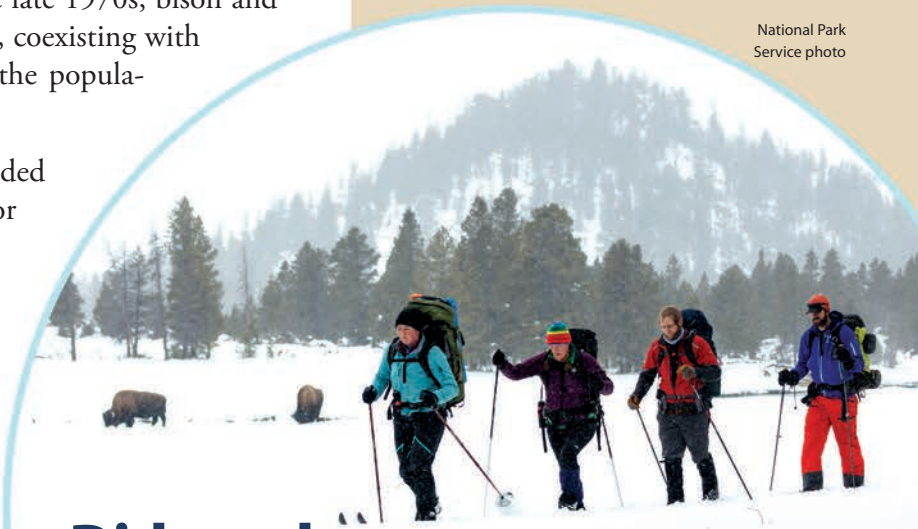
Older Yellowstone studies (Aune 1981) concluded that 'winter recreation activity was not a major factor influencing wildlife distributions, movements, or population sizes.' Prior to that it was observed (Chester 1976) that 'variation in the intensity of human use did not appear to be responsible for shifts in wildlife distribution.'

A study of elk responses to disturbances by cross-country skiers in Yellowstone (Cassirer 1992) found that 'elk in this study had a low tolerance for disturbance by people on foot or skis. Disturbance caused temporary displacement of the elk.'

## Fact

**Researchers have concluded that 'the debate regarding the effects of motorized recreation on wildlife is largely a social issue as opposed to a wildlife management issue.'**  
– White 2005

National Park Service photo



## Did you know...

**Many studies have concluded that wildlife is disturbed more by skiers and people on foot than by snowmobiles.**

# Wildlife Impacts

## Other Wildlife Studies

Over 100 studies have concluded that impacts to wildlife from snowmobiles are either non-existent or minor and manageable. Visit [www.snowmobileinfo.org/snowmobiling-access-resources.aspx#Research-Studies-Related-to-Snowmobiling-Impacts](http://www.snowmobileinfo.org/snowmobiling-access-resources.aspx#Research-Studies-Related-to-Snowmobiling-Impacts) to review the full range of wildlife related studies.

While many wildlife studies are 20 to 40 years old, their conclusions remain valid. Actual impacts either remain the same or are substantially lower given significant reductions in snowmobile sounds and exhaust emissions compared to 1970- and 1980-era snowmobiles when many studies were originally conducted. Since scientists have not felt the need to spend current research funds to simply reconfirm old conclusions, these studies continue to represent the 'best available science.' A summary of key wildlife studies, by species, includes the following:

deer-pictures.com photo



## Deer, Elk and Moose

- \* A Montana study of ungulates (Canfield 1999) concluded that 'snowmobiles appear less distressing than cross-country skiers.' The report also stated that 'big game hunting has more immediate effects on ungulate population densities and structures than any other recreational activity.'
- \* A Colorado study (Freddy 1986) found that 'mule deer were disturbed more by persons on foot than by snowmobiles.'
- \* A Wisconsin study (Eckstein 1979) states 'data showed that snowmobile activity had no significant effect on home-range size, habitat use, or daily activity patterns of white-tailed deer wintering in Wisconsin.' Additionally it concluded that 'deer appeared to react more to a person walking/skiing than on snowmobiles.'
- \* A Maine study (Richens 1978) concluded that 'white-tailed deer response to snowmobiles seemed dependent on the deer's apparent security. Animals in the open or in hardwood stands tended to run when approached by snowmobile. Deer in softwood stands, which provide more cover, showed a greater tendency to stay when approached. A significantly greater number of deer ran from a person walking than from a person on snowmobile.'
- \* Another Maine study (Lavigne 1976) found that 'disturbance of deer by snowmobiles did not cause them to abandon preferred bedding and feeding sites. Snowmobile trails enhanced deer mobility and probably reduced their energy expenditure.'
- \* A Montana study (Aasheim 1980) concluded that 'animals accustomed to humans are less affected by snowmobiles than animals in more remote areas.'



- \* An Alberta study (Ferguson 1985) regarding the influence of Nordic skiing on distribution of elk and moose determined ‘cross-country skiing influenced the general over winter distribution of moose but not of elk. Both species, however, tended to move away from areas near heavily-used trails during the ski season.’
- \* A Wyoming study (Ward 1980) fitted elk with heart rate monitors and determined that ‘elk responded most strongly to sonic booms, gunshots, and people on foot. Elk seldom reacted when approached by an OSV.’
- \* Another Wyoming study (Colescott 1998) found that ‘the frequency of snowmobile traffic did not seemingly affect the average percent of moose active, or the numbers of moose present in the study areas.’
- \* A study of the effects of snowmobile noise on deer and rabbits (Bollinger 1974) indicated that ‘the deer and rabbits were not forced to move out of their normal home ranges, nor did they seek shelter or remain stationary with fright while snowmobiles were being operated.’
- \* A study of the impact of snowmobile tracks on animal mobility in Maine (Hubbe 1973) found that ‘snowmobile tracks were helpful’ since they help animals save energy in powder snow.

## Reindeer

- \* A study in southern Norway (Reimers 2003) determined that, ‘overall provocations by skiers and snowmobiles revealed similar behavioral responses.’

## Caribou

- \* According to Natural Resources Canada (cfs.nrcan.gc.ca, 2013), Woodland Caribou do not migrate long distances between seasons like those that inhabit the tundra, and instead stay in the forest, either alone or in small groups. Their main threat is habitat deterioration, either from fragmentation, degradation or loss. Habitat fragmentation can also contribute to an increase in predation.
- \* Caribou range in Canada is heavily used for snowmobiling so snowmobile trail locations need to be sensitive to potential habitat fragmentation.

## Mountain Goats

- \* A Greater Yellowstone Area assessment (Olliff 1999) concluded that ‘because mountain goat winter range is inaccessible and precipitous, goats and recreationists are not often coming into conflict.’



Photo by Mary Herzog

## Fact

**Numerous scientific studies have concluded that snowmobile activity has no significant effect on wildlife populations; in some situations, snowmobile trails have been found to enhance wildlife mobility and help animals save energy in deep powder snow.**

Moose-pictures.com photo

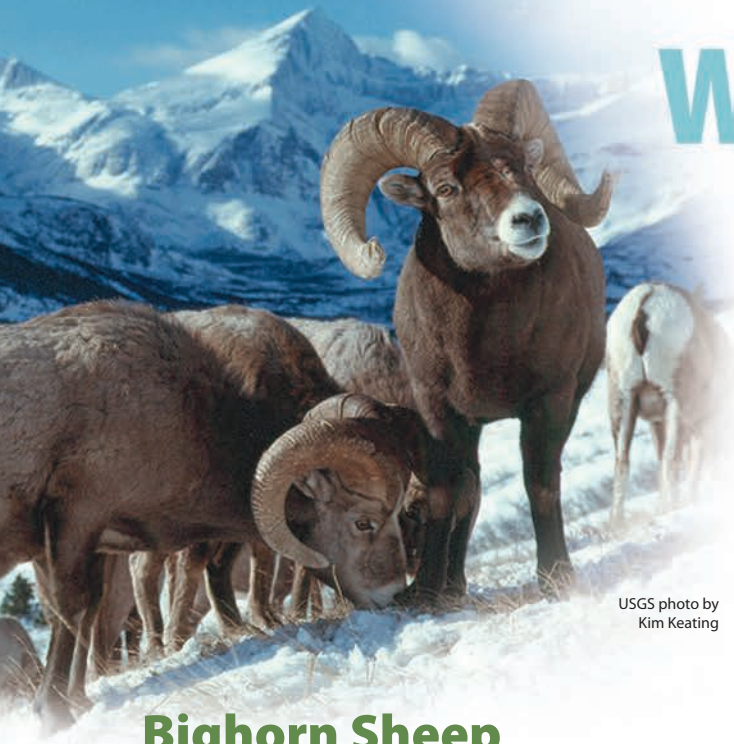


# Wildlife Impacts

## Other Wildlife Studies

### Lynx

- \* The Canada Lynx was listed as “threatened” under the Endangered Species Act in 2000, at which time a Lynx Conservation Assessment and Strategy (LCAS) was established by the U.S. Fish and Wildlife Service (FWS) to guide lynx conservation and management. A 2013 update to the 2000 LCAS was based on a substantial amount of new information learned about lynx, hares, and their habitats and distributions that was collected through over a decade of continued research. Very importantly, the 2013 LCAS deemed it appropriate to abandon the use of many prescriptive measures initially established by the 2000 LCAS.
- \* The FWS determined several original 2000 LCAS ‘risk factors’ were actually not negatively affecting the lynx population as a whole. Most important in respect to snowmobile management, new findings found that compacted snow routes did not increase competition from other species to levels that adversely impact lynx populations



USGS photo by  
Kim Keating

### Bighorn Sheep

- \* A Greater Yellowstone Area assessment (Olliff 1999) concluded that ‘skiing, snowmobiling, mountaineering, and snowshoeing will most likely only affect bighorn sheep wintering at higher elevations. The encounters between these recreationists and the bighorns may be infrequent enough that there would be little or no impact to the animals.’

### Rabbits

- \* A study of the effects of snowmobile noise on deer and rabbits (Bollinger 1974) concluded ‘the research team was unable to detect a severe or negative animal reaction to noise generated by vehicles. Conclusions of the study indicate that the deer and rabbits were not forced to move out of their normal home ranges, nor did they seek shelter or remain stationary with fright while snowmobiles were being operated.’

### Birds

- \* A Washington study (Skagen 1980) found that ‘eagles were found to be more sensitive to disturbance while feeding on gravel bars than while perching, and to approaches by humans on foot and concealed than by people in vehicles.’
- \* An Iowa study (Sodja 1978) found ‘no effects of snowmobiling on pheasant movements or behavior.’



National Park  
Service photo



(Bunnell 2006 and Kolbe 2007). Consequently, the 2000 LCAS standard which prescribed ‘no increase in snow compaction’ was determined to be a flawed recreation management premise.

- \* The 2013 LCAS took a revised management approach which established two tiers of potential anthropogenic influences related to lynx population dynamics. The first tier of influences includes four factors: climate change, vegetation management, wildland fire, and fragmentation of habitat. Each of these situations can directly affect both snowshoe hare (the primary lynx food source) and lynx population dynamics. Consequently, first tier influences will be the prominent drivers for future lynx conservation and management efforts.
- \* The second tier of anthropogenic influences includes six activities that were previously identified as ‘risk factors’ in the 2000 LCAS: incidental trapping, recreation, minerals and energy exploration and development, illegal shooting, and forest/backcountry roads and trails. These six activities have been lowered to being a ‘second tier’ influence since subsequent research or management experience since 2000 has shown they are not likely to have substantial effects on lynx or their habitat. Consequently, while snowmobiling in lynx habitat should be ‘considered’ in future land use planning, it is not precluded from occurring (or growing) given that it’s proven to not have substantial effects on lynx conservation. Likewise, trails have not proven to negatively affect lynx.

In response to a lawsuit filed by the Washington and Wyoming snowmobile associations over a proposal to designate critical lynx habitat in parts of Wyoming, Idaho, Montana, Washington, Maine and Minnesota – the lead lynx biologist for the Fish and Wildlife Service in Helena, Montana said his agency hasn’t identified snowmobiling as a problem in lynx habitat:

*“We haven’t identified trail maintenance as being a problem for critical habitat, and we don’t expect trail maintenance to be a problem for critical habitat. And we don’t see new trails as being a problem for critical habitat. So, we don’t see that there’s a basis for those fears.”*

## Fact

**A lead lynx biologist for the U.S. Fish and Wildlife Service says “the agency doesn’t consider snowmobiling to be a problem in lynx habitat.”**

– S. Sartorius 2009



Wikimedia Commons  
Photo by Michael Zahra

# Wildlife Impacts

## Other Wildlife Studies

### Subnivean (under-the-snow) Animals – Shrews and Voles

A California study for the USDA Forest Service (Wildlife Resource Consultants 2004) represents some of the most current information regarding the effects of winter recreation on subnivean mammals:

- \* Snowmobiles and cross-country skiing may affect the amount of subnivean space, but both snow depth and vegetation are also strong influences.
- \* Winter recreationists would be unlikely to affect the early season formation of subnivean space over woody shrubs or large woody debris. Until there is a deep snow cover, recreationists tend to avoid woody shrubs as they are difficult to move through and logs can be difficult to cross because of breaking into the subnivean space. Later in the season as snow depth increases, recreational use of these sites probably has a minimal effect due to the snow depth.
- \* Wet meadows at low elevations with low snow depth probably have the most subnivean space. While this study's findings were not conclusive regarding the effects of recreational use on subnivean space, there is some suggestion that winter recreation may impact subnivean space at low elevations.
- \* Winter recreation probably has the greatest effect at low snow depths.

### Earlier Studies Concluded:

- \* Skiers may do more damage to the snowpack than snowmobilers because narrow skis cut deeper into the snowpack and because skis have a greater foot load (amount of weight per surface area) in comparison to a snowmobile track. For both ski tracks and snowmobile tracks, multiple passes over the same track will have more impact than a single pass. (Halfpenny 1989)
- \* An early Minnesota study (Jarvinean 1971) suggested there 'may be increased winter mortality of small mammals beneath snowmobile compacted snowfields.' However, the report concluded that 'more information is necessary.' Given the dramatic evolution of snowmobiles over the nearly 50 years since this study was conducted, it is likely this report has no tangible relevance today even though it is still cited by snowmobiling critics.

### Wolverines

The wolverine has become one of the latest species of concern for winter recreation management. It is one of the rarest animals in North America and the least known large carnivore (Banci 1994). Because these rare animals have such large home ranges, research has been challenged by a small sample size of wolverines

## Did you know...

**Skiers may do more damage to the snowpack than snowmobiles because narrow skis cut deeper into the snowpack and have a heavier foot load.**

– Halfpenny 1989



and particularly of animals exposed to higher levels of winter recreation across their home range.

The Wolverine Winter Recreation Research Project investigated interactions between wolverines and winter recreation and represents the most intensive backcountry winter recreation monitoring to-date (Heinemeyer et al. 2017). It monitored the movement and habitat use of wolverines in four different study areas in Idaho, Wyoming and Montana while simultaneously tracking winter recreationists to characterize the spatial extent and relative intensity of recreation activities across the study areas. Findings include:

- \* Wolverines maintained multi-year home ranges within landscapes that support winter recreation, with some animals having activity occur in more than 40% of their home range. This suggests that wolverines tolerate some level of recreation use.
- \* Dispersed recreation activities elicited a stronger response than recreation along roads and groomed routes, with females showing more sensitivity to disturbance than males. Responses to dispersed recreation suggest that avoidance results in potentially important indirect habitat loss when a significant portion of an animal's home range receives heavy recreation use.
- \* Male wolverines do not appear to be sensitive to winter recreation in general. Males were found closer to roads than expected and these roads were identified as an important predictor of male habitat selection.
- \* Female wolverines typically avoid areas with linear recreation travel, dispersed motorized recreation and dispersed non-motorized recreation but appeared to most strongly avoid areas with dispersed non-motorized recreation. This results in indirect habitat loss during the critical denning season.
- \* Overall effects of winter recreation on wolverine habitat are dependent upon the relative intensity of recreation. There was generally more pronounced indirect habitat loss for females compared to males within the same landscapes.

- \* Weak avoidance of areas near linear access used by winter recreationists suggests wolverines may be less sensitive to linear disturbances. Recreation use of roads and groomed routes appears to have low influence on wolverine habitat use.
- \* Both male and female wolverines showed negative functional responses to nonmotorized winter recreation, even at the relatively lower intensities this recreation occurred at.
- \* Wolverine management solutions will require creative approaches and collaboration between land managers, stakeholders and wildlife professionals. Since males are less sensitive to dispersed recreation, they may be a lower management priority.

## Fact

**Recreation use of roads and groomed routes appears to have low influence on wolverine habitat use.**

– Heinemeyer 2017



Wolverine Project photo

# Snowmobiling

## Recreation Conflicts



National Park Service photo

## Myth

**Conflicts require that multiple use management practices be abandoned.**

## Facts

**Recreation conflict is social conflict caused by a collision of different ideals and expectations with the degree of conflict being driven by how much tolerance or intolerance there is in an area for those who choose to recreate differently.**

Unfortunately, user conflict on public lands is often overgeneralized when characterized as simply motorized versus non-motorized recreation when, in reality, it is just as often conflict between different user subsets of motorized or nonmotorized recreationists.

Public lands belong to all, so multiple use should always be an over-arching principle. While every acre is not suitable for every use, extensive Wilderness and constant push for more conservation and segregated nonmotorized areas continues to diminish snowmobiling options on public lands. The 'quiet-use' movement has forced snowmobilers out of open meadows

and creek bottoms, resulting in closures or forcing snowmobilers into less safe riding areas.

It is important to have snowmobiling areas available close to parking areas for families and novice riders. Yet, a growing amount of open terrain close to roads and parking is being lost to new 'nonmotorized only' use zones. This diminishes ability to safely introduce and grow new snowmobile riders.

Public lands management has generally proven to be most successful when the focus is on reasonable sharing through multiple use management principles. Yet unfortunately, public land managers are often pushed to be social police expected to referee between similar as well as diverse interest groups. Divvying up public lands pits user groups against one another and doesn't really address the root issue of growing intolerance for those who recreate differently. Future planning processes must place greater emphasis on requiring all user groups to collaborate and find ways to 'play together in the snow' rather than continuing to create only winners and losers.

Motorized-nonmotorized conflicts are sometimes driven by a claimed 'increased demand' for nonmotorized quiet use areas. However, increased 'demand' doesn't always correlate to not already having an adequate supply of nonmotorized areas. Since nonmotorized users can travel most everywhere motorized recreationists are allowed if they so choose, any consideration to further eliminate multiple use should first ensure existing 'exclusive use' nonmotorized zones are fully utilized. Consequently, a local 'needs assessment' (not a 'wants' assessment) should always be conducted before considering reallocation of lands for winter recreation.



## Myth

**Separating user groups is the best way to manage winter recreation on public lands.**

## Facts

**Segregation of user groups has often proven to be a poor solution for managing recreation on public lands.**

It's a polarizing premise that leads to long-term ill-will and decreased support for agencies, so land managers should be cautious about employing it as an appropriate and sustainable management tenet.

Segregation has proven to be poor public policy for this country in many respects since it represents exclusion and isolation which can result in discrimination. Federal agencies routinely preface land use planning documents with this statement: "The Department prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and, where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or part of an individual's income is derived from any public assistance program."

Recreation conflict – which is really social conflict – is often addressed at length in federal agency land use plans. Many social conflicts, in reality, are connected to differences in political beliefs, age, sex, religion, and/or race – and persons with disabilities and the elderly are more dependent upon motorized vehicles for their recreational outings than younger or more able-bodied persons. Yet, 'segregating recreational users' based upon motorized and nonmotorized uses is all too often, too quickly, chosen as "The Fix" for public lands conflicts. Reality is that segregating recreational users based upon their class of use is potentially a violation of the very anti-discrimination standard that prefaces all land use planning.

Photo by Kim Raap

## Myth

**Untracked terrain for skiers and snowshoers is disappearing under the tracks of snowmobiles.**

## Facts

**Untracked terrain is important to motorized and nonmotorized winter recreationists alike; consequently, education about how to best 'share the powder' is important for everyone.**

It's important to provide untracked terrain for skiers close to their access areas. Yet, complaints that 'snowmobilers are tracking up the backcountry' are often illogical since the vast majority of skiers and snowshoers never get beyond a '3- to 5-mile radius' from where they park. So, it's irrational to impose backcountry snowmobile closures beyond a normal skier's use zone under the pretense of 'saving untracked terrain' for skiers since few will ever travel that far during winter conditions. Consequently, multiple use powder-sharing principles between motorized and nonmotorized recreationists should generally prevail beyond that radius while also providing managed passage on designated routes for snowmobilers through or around nonmotorized zones.

As for 'who should get to track up the terrain first?' Reality is that it's simply a case of 'the early bird gets the worm' (powder) on public lands; everyone other than the 'early birds' will simply continue to get leftovers until nature's cycle repeats itself the next time it snows. That's the nature of winter sports in the backcountry.



Photo by Kim Raap

# Snowmobiling

## Planning for Multiple Use Winter Recreation

### Myth

**Snowmobiling creates conflicts, so is best managed by reducing or eliminating snowmobile access on public lands.**

### Facts

**Land managers are sometimes hesitant to expand or continue allowing snowmobiling access due to concerns about ‘conflicts’ between winter recreationists. These situations can, however, often be addressed with better management rather than by eliminating snowmobiling.**

Trailheads and parking areas are where conflicts between snowmobilers and nonmotorized winter recreationists typically begin since poor parking is often the root stressor for winter recreation. Consequently, it’s important that land managers and recreationists work collaboratively to address conflict at its origin.

While a nonmotorized family of four can easily park their vehicle in about 20 feet or less, a motorized family of four needs about 60 feet of room to park their 4-place trailer and tow vehicle. Plus, they need extra room for loading and unloading their snowmobiles, as well as room to pull in and out with their extended length vehicle. And some snowmobilers have even longer trailers – for six or more snowmobiles – which further increases their need for adequate parking and maneuverability.

Consequently, if parking is not designed and managed well, winter recreationists (motorized and nonmotorized alike) can begin to become stressed the minute they arrive at areas with poor parking. And their stress and ‘conflict’ builds from that point on, for the remainder of their outing, due to their initial hassle getting parked.

Winter ‘conflicts’ are frequently just a need for more parking or better winter parking management. While more parking may require project-specific NEPA analysis, simply separating uses for a short distance out of trailhead areas can easily help resolve conflicts.



## The following guidance can help address winter conflict issues where they most often originate – in parking areas:

When space allows, provide separate motorized and nonmotorized parking areas to eliminate interaction between the groups while loading and unloading. This requires good on-the-ground signing to help guide recreationists to the staging area appropriate for their recreation choice. If possible, egress and ingress routes should also have some degree of separation between user groups to minimize interaction rather than immediately placing them together in the same area or onto the same trail route.

If available space does not allow for separate parking areas, staging areas should be zoned for nonmotorized and motorized parking use. Again, good on-the-ground signing is crucial to help guide recreationists to their designated parking zones.

When designing and/or zoning winter parking areas, recognize that significantly more space is required for maneuvering, parking, and unloading vehicles with trailers than is needed to park cars/SUVs used by most nonmotorized users – so parking zones should be arranged and space allocated accordingly.

When possible, have motorized and nonmotorized egress/ingress routes depart from different sections of parking areas, that correlate to their separate parking zones. If topography or ultimate destinations for both groups require them to depart from the same parking location, designate separate motorized and nonmotorized routes and delineate them with on-the-ground snow poles and signing – and enforce the use of separate routes.

When feasible, it can be advantageous to route nonmotorized users along or slightly into the tree line (if adjacent to open areas), while concurrently routing snowmobile traffic along the opposite side of open areas. If access routes must be located entirely within woods, consider cutting two trail routes with a degree of separation between them.

When designing or zoning parking areas for snowmobilers, it is important to provide snowmobile ‘warm-up’ areas close to parking areas. Older snowmobiles that have been hauled on trailers typically have their carburetors ‘load-up’ (flood), which requires them to be run a bit to clear their engines. While newer sleds with fuel injection have fewer problems with this, cold weather conditions still create a need to warm up all snowmobiles. Consequently, it’s important to have either open areas or extra trail space adjacent to parking areas available for snowmobile warm-up.

## Did you know...

Poor parking is the root stressor for winter recreation.

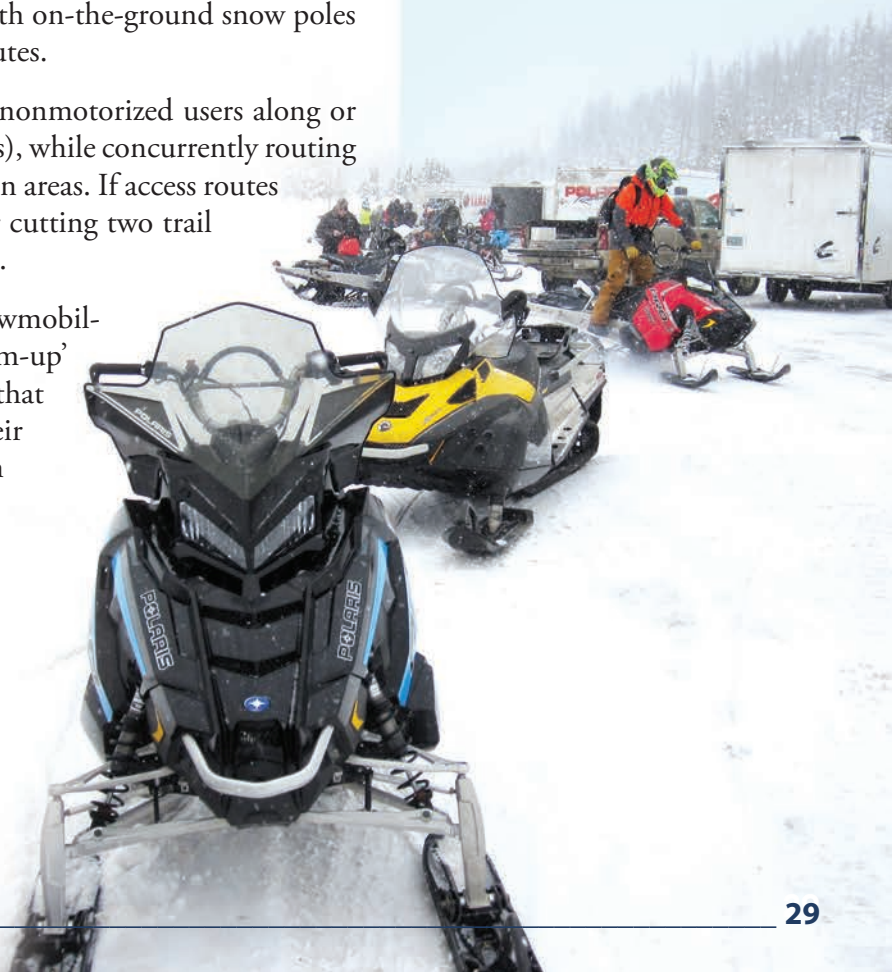


Photo by Kim Raap

## Myth

Summer and winter travel planning is very similar so is best conducted simultaneously.

## Facts

There are significant impact differences between summer (wheeled vehicles) and winter (over-snow vehicles) motorized activities.

# Snowmobiling

## Planning for Multiple Use Winter Recreation

Summer and winter travel planning is usually most successful when conducted separately. Over-snow-vehicles (OSVs) operate on snow which covers and insulates the ground, and then winter tracks disappear once snow melts. Conversely, wheeled vehicles operate directly on the ground which can potentially cause more direct resource impacts. Consequently, the planning process is more complicated and potentially more confusing when conducted concurrently.

Trails as well as open off-trail riding opportunities are important for snowmobiling in many parts of the country. Conversely, summer motorized activities are mostly restricted to designated routes and trails – so summer travel planning rarely considers off-trail riding opportunities for wheeled vehicles.

The USDA Forest Service OSV Travel Management Rule (Subpart C) recognizes this distinct difference by expanding its ‘area’ definition for OSVs to potentially include an entire administrative unit – compared to restricting travel designation areas for wheeled OHVs to “smaller, and in most cases much smaller, than a Ranger District.”

## Winter Travel Planning Considerations

Motorized winter recreation generally encompasses large areas and its participants are quite mobile. In comparison, most nonmotorized over-snow recreation takes place within 3 to 5 miles of trailheads. An exception is that a growing number of people are using snowmobiles to access distant areas for backcountry skiing or snowboarding.

Current travel plans should only be modified when changing resource issues indicate adjustments are clearly needed. Modifications should consider both motorized and nonmotorized activities, and examine whether existing plans are adequately meeting public needs. Existing motorized closures should be re-evaluated to see if they are still warranted or whether changing demands or resource conditions may warrant modifying the mix of allowed uses.

A level playing field for both motorized and nonmotorized activities is important for winter recreation management. If wildlife issues are driving winter area closures, all forms of recreation may need to be excluded. While animals may be disturbed by any recreation activity, they are more easily stressed by nonmotorized recreationists since their quieter approach generally resembles predator behavior and ultimately provokes threat responses from animals.



Photo by Kim Raap



'Conflict' management must work both ways since – if those asserting conflict are regularly rewarded with closures at the expense of other users – their incentive to continually push conflict can become an appealing, unending enterprise. All too often conflicts are inappropriately escalated when the issues are actually very minor or isolated. All uses should stand an equal chance to be excluded when considering allocating exclusive use for one group over another. For example, if skiers insist that snowmobiling is incompatible with their desires, they should in turn be excluded from areas open to snowmobiling due to equal incompatibility; otherwise the unending conflict enterprise continues to repeat itself.

Past winter travel management has largely allowed nonmotorized users to have their exclusive areas - plus free and unfettered access to all snowmobile areas. This is untenable and creates a situation where snowmobilers are forced to ask, 'how much more area should the motorized community be forced to give up?' This has not been a satisfactory approach to winter travel planning; rather, all users should have something to win or lose to help force more effective and equitable compromises.

## Winter Travel Planning Procedures

- ✱ Evaluate the unit's entire land base – including areas currently closed to specific uses – to determine which areas are currently suitable or unsuitable for various winter recreation activities. While Congressionally-designated Wilderness is not available for motorized recreation, it is exclusively available for nonmotorized recreation and should be recognized as such during winter travel planning. Always consider new information, new science, and changes resulting from natural forces such as wildfires, diseases and other events which may have altered the landscape.
- ✱ Work closely with the public to determine: where people currently recreate on the public lands unit, and where else would they go if given the opportunity to do so; what are the primary access locations and trails; where are the current loop opportunities, and where can new ones be developed; where are potential new play areas; what parking and trailheads are currently available, and what new ones are needed; and what attributes of the winter experience are most important to the various user groups.
- ✱ Evaluate the amount of current use taking place by all user groups as well as likely future trends for each.
- ✱ Collaborate with all potentially affected user groups early in the process and use information gained to help develop formal alternatives or proposals for consideration during planning analysis.



ISMA photo

## Did you know...

A growing number of nonmotorized recreationists are using snowmobiles to access distant areas for back-country skiing or snowboarding.

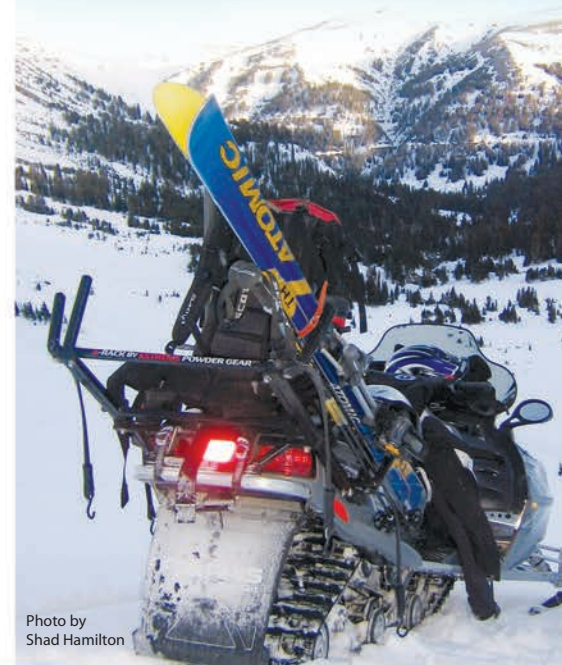


Photo by Shad Hamilton



Photo by Kim Raap

# Snowmobiling

## Planning for Multiple Use Winter Recreation

- \* Fully evaluate potential economic impacts to surrounding counties, communities, and the region.
- \* Use adaptive management to respond to changing conditions, new science, new trends, or fires that modify native vegetation and wildlife habitats.
- \* Consider a full range of management actions to help manage winter visitor use, including: trail grooming, trailhead snow removal, developing or expanding existing parking areas, providing loop opportunities, establishing access routes from communities, construction of safety shelters or warming huts, and/or placement of restrooms.
- \* Determine how winter recreation improvements will be funded and maintained. Snowmobiling generally pays its own way via gas taxes, registrations and/or trail use fees. Evaluate whether/how other winter users can help pay for winter facilities and services or if they will rely on agency funds to pay their share.
- \* All restricted or closed areas should be evaluated periodically to ensure clear justification remains for the restriction. Closure areas should be manageable, enforceable, and easily recognized on the ground.
- \* Designated motorized trails and travel routes through or around restricted areas should be provided whenever possible to ensure access remains open to motorized use areas beyond the restricted area.
- \* The final step in travel planning should be development of detailed yet user-friendly maps that clearly identify boundaries of areas appropriate for over-snow vehicle travel, along with areas designated for only nonmotorized uses.
- \* Once travel planning is completed, agencies should continue working with user groups to ensure travel plan implementation is working as envisioned. User groups can provide valuable assistance with plan implementation, including the maintenance and construction of facilities, trails, parking lots, and signage, along with providing education/enforcement, maps and informational brochures.



# Myth

**There should be substantially more miles of groomed trails for cross-country skiing since it is a more popular winter activity.**

# Facts

**The USDA Forest Service National Visitor Use Monitoring (NVUM) program provides the best available information regarding the relative popularity and participation levels for snowmobiling and cross-country skiing.**

**Long-term data from this program shows overall participation levels are actually quite similar, continually fluctuate due to varying snow conditions across the country, and are slightly lower for both activities than they were ten years ago.**

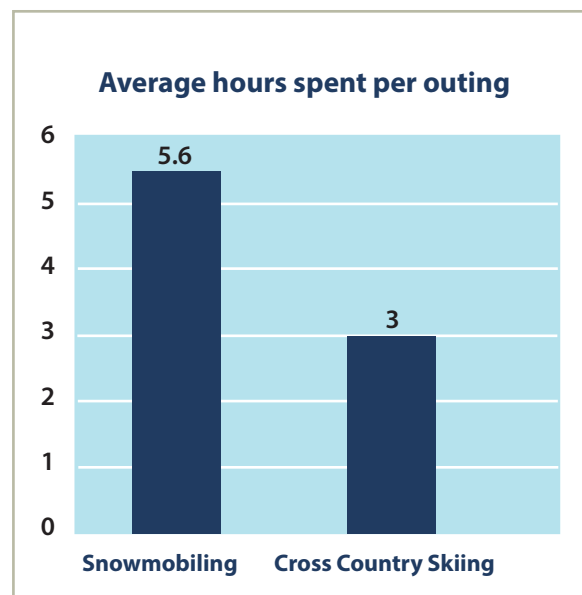
- \* NVUM monitoring shows snowmobilers spend an average of about 5.6 hours per recreation visit engaged in snowmobiling while cross-country skiers ski only about 3 hours per visit. Consequently, even though the popularity of the two activities is similar, their needs for space are quite different. Snowmobilers spend nearly twice as much time on the snow during an outing, and regularly travel much further. Subsequently, snowmobilers require substantially more miles of trail for their outings than what cross-country skiers do.
- \* Numerous state studies show that snowmobilers typically ride 60 to 120 miles per day in the West and up to 100 to 200 miles



Photo by Gavin Johnson

per day in the rest of the country. In comparison, research shows that cross-country skiers typically travel no more than a 3- to 5-mile radius from where they park, resulting in no more than five to ten miles being traveled during an entire outing.

- \* There is also a much greater actual need for snowmobile trail grooming than there is for ski trail grooming. Since snowmobile traffic has a tendency to create heavy moguls on trails, it requires much more frequent trail grooming to keep snowmobile trails smooth and pleasurable to ride. Conversely, cross-country skiing doesn't create heavy moguls so doesn't require as much trail grooming.
- \* Additionally, many cross-country skiers and snowshoers actually do not desire (or require) groomed trails for their outings. And since the purpose of snowshoes is to provide flotation for travel across the top of uncompacted snow, having groomed trails is typically not desired.



# Snowmobiling

## Planning for Multiple Use Winter Recreation



Photo by Kim Raap

### Myth

**The opportunity for nonmotorized recreation is lost on lands designated for multi-use since those lands are often dominated by motorized use.**

### Facts

**Motorized winter recreation can only occur in one place – on lands designated for multiple use. Conversely, nonmotorized recreation can occur essentially everywhere on public lands – in multi-use areas as well as in separate ‘nonmotorized-only’ areas.**

Snowmobilers pay 100% of the cost to groom their trails and then, particularly when located on public lands, others are generally allowed to freely use them for a wide range of ‘multi-uses’ which include cross-country skiing, snowshoeing, dog sledding and winter biking. So, if not for snowmobilers providing free multiple-use opportunities on many of the groomed trails they fund, considerably fewer winter trail opportunities for nonmotorized recreationists would exist.

At the same time, nonmotorized activists continue to whittle away at snowmobiling access by advocating for additional snowmobile closures. As a result snowmobilers are beginning to push for single-use (snowmobiles-only) on their groomed snowmobile trails. Consequently, this issue

could affect the future of multi-use due to lack of support from nonmotorized users.

Reality is that closures to snowmobiling which extend beyond a 3- to 5-mile radius from plowed access areas in non-Wilderness settings eliminates multi-use since remote areas cannot be accessed by most cross-country skiers and snowshoers. Consequently, management focus for non-motorized areas should be within zones that are close to parking areas. Beyond those zones, multiple use for all users – or even winter ‘domination’ by snowmobiles – should be acceptable since very few, if any, other recreationists besides snowmobilers will likely ever be there.

### Myth

**Large areas should be closed to snowmobiles to create more areas for nonmotorized winter recreationists in every national forest.**

### Facts

**There are rarely justifiable reasons to support additional snowmobiling closures on national forest lands since existing land management plans have already zoned all areas as either ‘open’ or ‘closed’ to motorized recreation.**

Rather, emphasis should be on resolving conflict issues with plowed winter parking and more efficient



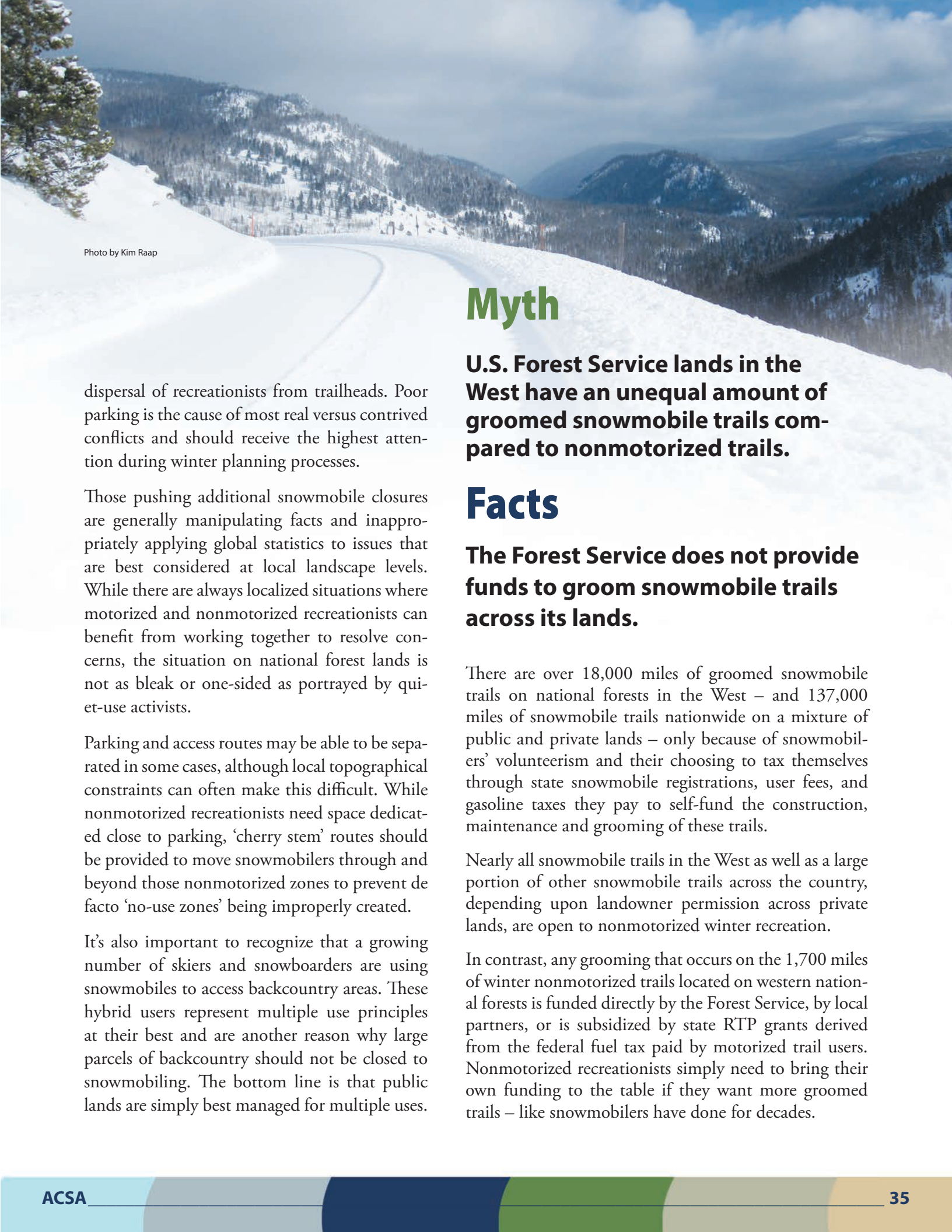


Photo by Kim Raap

dispersal of recreationists from trailheads. Poor parking is the cause of most real versus contrived conflicts and should receive the highest attention during winter planning processes.

Those pushing additional snowmobile closures are generally manipulating facts and inappropriately applying global statistics to issues that are best considered at local landscape levels. While there are always localized situations where motorized and nonmotorized recreationists can benefit from working together to resolve concerns, the situation on national forest lands is not as bleak or one-sided as portrayed by quiet-use activists.

Parking and access routes may be able to be separated in some cases, although local topographical constraints can often make this difficult. While nonmotorized recreationists need space dedicated close to parking, ‘cherry stem’ routes should be provided to move snowmobilers through and beyond those nonmotorized zones to prevent de facto ‘no-use zones’ being improperly created.

It’s also important to recognize that a growing number of skiers and snowboarders are using snowmobiles to access backcountry areas. These hybrid users represent multiple use principles at their best and are another reason why large parcels of backcountry should not be closed to snowmobiling. The bottom line is that public lands are simply best managed for multiple uses.

## Myth

**U.S. Forest Service lands in the West have an unequal amount of groomed snowmobile trails compared to nonmotorized trails.**

## Facts

**The Forest Service does not provide funds to groom snowmobile trails across its lands.**

There are over 18,000 miles of groomed snowmobile trails on national forests in the West – and 137,000 miles of snowmobile trails nationwide on a mixture of public and private lands – only because of snowmobilers’ volunteerism and their choosing to tax themselves through state snowmobile registrations, user fees, and gasoline taxes they pay to self-fund the construction, maintenance and grooming of these trails.

Nearly all snowmobile trails in the West as well as a large portion of other snowmobile trails across the country, depending upon landowner permission across private lands, are open to nonmotorized winter recreation.

In contrast, any grooming that occurs on the 1,700 miles of winter nonmotorized trails located on western national forests is funded directly by the Forest Service, by local partners, or is subsidized by state RTP grants derived from the federal fuel tax paid by motorized trail users. Nonmotorized recreationists simply need to bring their own funding to the table if they want more groomed trails – like snowmobilers have done for decades.



ISMA photo

# Snowmobiling

## Planning for Multiple Use Winter Recreation

It's important to recognize that snowmobilers require significantly more miles of trail for typical day outings than nonmotorized recreationists do. And that a large percentage of cross-country skiers and snowshoers simply do not desire groomed trails for their backcountry experience.

Numerous studies show that the average distance traveled by snowmobilers in a day ranges from 60 to 120 miles in the West, and is around 100 to 200 miles per day in the Midwest and New England. In comparison, normal cross-country skiers and snowshoers are hard pressed to cover more than five to ten miles in a day's time. National forest planners commonly use a '3- to 6-mile radius' (6- to 12-mile round trip) from a trailhead as the distance traveled by average skiers or snowshoers during their typical day trips. Consequently, snowmobilers require 10 to 20 times more miles of trail and open riding areas than what cross-country skiers and snowshoers do for their 'average' daily outings. Thus, the 10 to 1 ratio in motorized versus nonmotorized winter trails available on western Forest Service lands is not inequity but rather what is minimally needed to provide a reasonable range of snowmobiling opportunities.

### Myth

**70% of U.S. Forest Service lands in the West are open to snowmobiles.**

### Facts

**While up to 81 million acres of national forest lands may currently be generically classified as 'open' to snowmobiles in older management plans, a significant number of acres do not have enough snow cover to regularly support snowmobile use or are too heavily timbered or too steep to be accessible by snowmobiles.**

Consequently, substantial portions of currently 'open' lands are reclassified as 'unsuitable' or 'not practical' for snowmobiling in new agency land use planning processes – erasing their 'open' status when local management plans are updated.



A good example of this is the White River National Forest in Colorado, which on the surface is a very significant, deep snow area with a large amount of winter sports opportunities. This national forest, however, determined through its winter travel planning that only 7.3% of its lands (168,000 acres out of a total of 2.3 million acres) were ‘practical’ for snowmobiling due to a combination of heavily forested areas and extremely steep topography (WRNF Travel Management Plan and Draft EIS, 2006). This scenario is also common in other national forests across the West.

While the exact number of total ‘unsuitable’ or ‘not practical’ acres is unknown, it often exceeds 25 to 50 percent of an individual national forest’s lands. Additionally, at least 10 percent (over 8 million acres) of all western national forest lands are located on the fringe of the Snowbelt and host zero miles of snowmobile trails. So reality is that the total ‘suitable’ snowmobiling acres on western national forests is really quite minimal and a far cry from being 70% of all forest lands.

## Myth

**Only 30% of U.S. Forest Service lands in the West are managed as nonmotorized recreation areas.**

## Facts

**Nearly 100% of all national forest lands are managed as ‘open’ to all nonmotorized winter recreation uses.**

Nonmotorized winter recreation can occur literally almost everywhere there is snowfall on national forest lands. Exceptions are generally only small areas where crucial wildlife winter range or other sensitive habitats have been closed to all human presence during winter; otherwise nonmotorized recreation can – and does – occur everywhere.

## Myth

**Two-thirds of nonmotorized zones in the West are Wilderness and shouldn’t really count since they are too far from plowed roads and trailheads. More areas with convenient access should be closed to motorized use and zoned ‘nonmotorized use only’ to compensate.**

## Facts

**Just because Wilderness may not be convenient or easily accessible to nonmotorized recreationists does not justify closing more public lands to snowmobiles.**

All Wilderness is closed to snowmobiles. Consequently, nonmotorized recreationists should first work with land managers to make better use of their existing exclusive use areas, by building more parking areas at or near Wilderness boundaries.

Unfortunately, those who advocate for more nonmotorized exclusive use areas that are ‘closer’ are often pushing ideological set-asides rather than accepting multiple use management. Those ‘closer’ areas are actually already open to their use – they just don’t want to share them. Consequently, it’s important that land managers guard against baseless ploys to ensure all nonmotorized set-asides are what’s truly best for local circumstances on public lands.



Photo by  
Kim Raap

# Twelve Principles

## for Minimizing Conflicts on Multiple Use Trails

The 'Twelve Principles' are recommendations from *Conflicts on Multiple Use Trails: Synthesis of the Literature and State of the Practice*, written by Roger Moore (1994). The American Council of Snowmobile Associations supports them as a way to maximize winter recreation opportunities while simultaneously managing public and private lands to minimize real conflicts.

### 1. Recognize Conflicts as Goal Interference

Do not treat conflict as an inherent incompatibility among different trail activities, but rather as goal interference attributed to another's behavior.

### 2. Provide Adequate Trail Opportunities

Offer adequate trail mileage and provide opportunities for a variety of trail experiences. This will help reduce congestion and allow users to choose the conditions that are best suited to the experience they desire.

### 3. Minimize Number of Contacts in Problem Areas

Each contact among trail users has the potential to result in conflict. So, as a general rule, reduce the number of user contacts whenever possible. This is especially true in congested areas and at trailheads.

### 4. Involve Users as Early as Possible

Identify the present and likely future users of each trail and involve them in the process of avoiding and resolving conflicts as early as possible, preferably before conflicts occur.

### 5. Understand User Needs

Determine the motivations, desired experiences, norms, setting preferences, and other needs of the present and likely future users of each trail. The 'customer' information is critical for anticipating and managing conflicts.

### 6. Identify the Actual Sources of Conflicts

Help users to identify the specific tangible causes of any conflicts they are experiencing. In other words, get beyond emotions and stereotypes as quickly as possible, and get to the roots of any problems that exist.

### 7. Work with Affected Users

Work with all parties involved to reach mutually agreeable solutions to these specific issues. Users who are not involved as part of the solution are more likely to be part of the problem now and in the future.

### 8. Promote Trail Etiquette

Minimize the possibility that any particular trail contact will result in conflict by aggressively promoting responsible trail behavior.

### 9. Encourage Positive Interaction among Different Users

Trail users are usually not as different from one another as they believe. Providing positive interactions both on and off the trail will help break down barriers and stereotypes, and build understanding, goodwill, and cooperation.

### 10. Favor 'Light-Handed Management'

Use the most 'light-handed approaches' that will achieve objectives. This is essential in order to provide the freedom of choice and natural environments that are so important to trail-based recreation. Intrusive design and coercive management are not compatible with high-quality experiences.

### 11. Plan and Act Locally

Whenever possible, address issues regarding multiple use trails at the local level. This allows better flexibility for addressing difficult issues on a case-by-case basis.

### 12. Monitor Progress

Monitor the ongoing effectiveness of the decisions made and programs implemented.



*“This country will not be a permanently good place for any of us to live in unless we make it a reasonably good place for all of us to live in.”*

*– Theodore Roosevelt, 1912*



ISMA photo



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# Winter Trails