Assessment of Wheeled UTV Use on Groomed Snowmobile Trails With Recommended Management Considerations

By Trails Work Consulting
For the American Council of Snowmobile Associations

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ACKNOWLEDGEMENTS AND DISCLAIMER

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The sole purpose of this report is educational only, with no intent other than to help expand trail managers' and local decision makers' knowledge. It should not be assumed that all contributors agree with every written word, but are opinions only. The authors, contributors, FHWA, Trails Work Consulting, ACSA and its members accept no liability resulting from the compliance or noncompliance with the findings or recommendations given herein, or for the accuracy or completeness of information contained herein.

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INTRODUCTION

2021 ASSESSMENT PURPOSE

This assessment's only intent is to help expand the body of information related to wheeled UTV/side-by-side operational characteristics on groomed over-snow trails and to identify any potential associated impacts from concurrent UTV operation on groomed snowmobile trails. This project is not intended to either encourage or discourage concurrent wheeled UTV use, or OHV use of any type, on groomed snowmobile trails. That decision can only be made at state and local levels in accordance with state and local circumstances and priorities. Consequently, this report's intent is solely to help state and local decisionmakers make informed decisions related to their winter trail management policies.

- For the purposes of this Assessment, the term 'UTV' means Utility Terrain Vehicle (UTV), which is also often referred to as a 'side-by-side' off-road / off-highway recreational vehicle (ORV/OHV). Since UTVs have also evolved in size and passenger capacity, the wheeled UTVs observed during this assessment included both single row and two-row seating capacity models.

- For the purposes of this Assessment, the term 'groomed snowmobile trails' is used in recognition that most motorized over-snow groomed trails typically began or still exist solely as 'snowmobile trails' built and funded by snowmobile clubs, alliances and associations. At the same time, it is recognized that an evolving number of other recreational uses now share some groomed winter trails in some jurisdictions. Consequently, this term is intended to apply generically to a range of other local descriptors including, but not limited to groomed snow trails, winter groomed trails, multi-use winter trails, concurrent use trails,' etc.

This Assessment Tiers to Previous Assessments: This *Assessment of Wheeled UTV Use on Groomed Snowmobile Trails* is the fourth in a series of reports intended to collect information to assist local trail managers with emerging winter trail management issues related to OHVs. The first assessment was completed in 2006 and focused on the *Evaluation of Wheeled ATV Use on Groomed Snowmobile Trails.* The second evaluation project, completed in 2014, was an *Assessment of Tracked OHV Use on Groomed Snowmobile Trails.* It was followed by a *Supplemental Assessment of Tracked OHV Use on Groomed Snowmobile Trails* in 2015. Each of these four assessments should be viewed in context with their particular documented conditions and can be applied according to their applicability to comparable local conditions. All four assessment reports are available at https://www.snowmobileinfo.org/snowmobile-access-education-tools.aspx under the 'Multiple Use Management on Snowmobile Trails' section. As a whole, they provide valuable insights which can be extrapolated to help shape local trail management decisions regarding concurrent OHV winter use.

BACKGROUND INFORMATION

Off-highway vehicle (OHV) use has rapidly evolved over the past two decades, challenging many trail managers to consider emerging public demands for access and more multiple-use approaches to winter trails management. Rapid growth of wheeled motorized recreation began with all-terrain vehicles (ATVs), eventually evolved to wider, longer, and heavier side-by-side utility vehicles (UTVs), and now also includes some ATVs and UTVs being equipped with winter track conversions. The sale of new UTVs is now immensely outpacing the sale of both new ATVs and snowmobiles. Consequently, this assessment project looks specifically at potential questions and issues related to current and potentially increased wheeled UTV use on groomed over-snow trails.

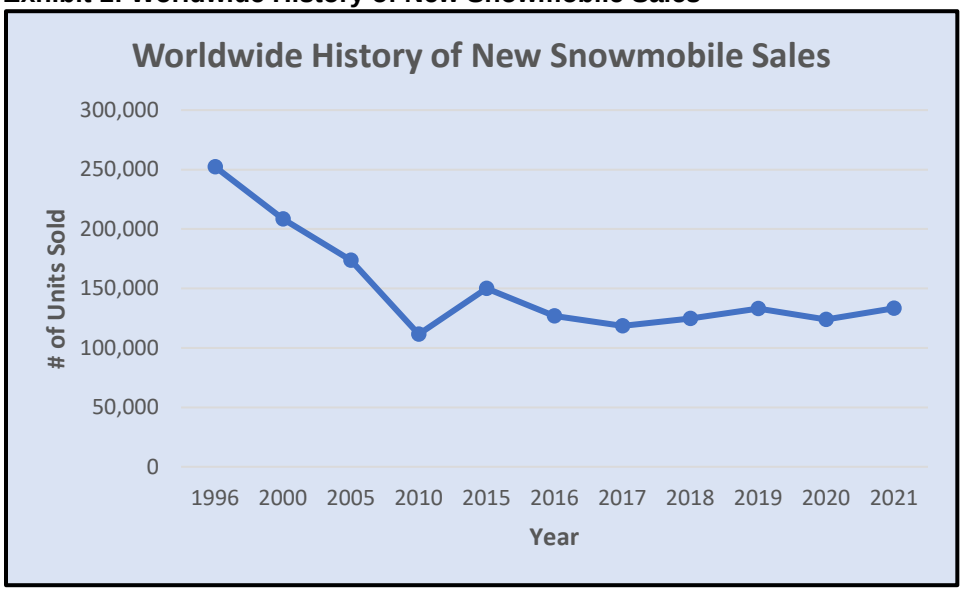
Cross-Over Ownership: It is well documented and important to recognize that many ATV/UTV owners are also current or former snowmobile owners. The International Snowmobile Manufacturers Association's (ISMA) most recent survey found that snowmobiler's #1 'other recreational pursuit' is ATV riding – it was the number one answer from 60% of their survey respondents. This means these riders are familiar with the location of snowmobile trails and that they likely have a continued desire for winter trail recreation, even if they no longer own both a snowmobile and ATV/UTV. Consequently, many current or former snowmobile riders are leading efforts to allow ATV and UTV riding upon the same winter trails they are familiar with through their past or continued snowmobile ownership.

One reason UTVs are gaining in popularity for winter users is that they can accommodate two to four passengers while, comparatively, the capacity of most new snowmobiles is typically only one person since there are very few new '2-up' snowmobile models available. This translates to a cost factor decision for many

families: purchase only one UTV versus having to buy two to four snowmobiles for a family outing. Additionally, many snowmobile owners have sold their sleds and switched entirely to wheeled OHV use for their year-round recreation. Consequently, local trail managers are more and more being faced with decisions about what's most appropriate for their area's winter trails: continuing to provide only 'single use' snowmobile trails – or integrating concurrent use for both snowmobiles and wheeled OHVs on some groomed winter trails. Since these trends appear like they will surely continue, integration of multiple uses on the same trail could well become simply a financial business decision for trail mangers as their winter grooming costs continue to increase while snowmobile registration numbers continue to comparatively decline.

Comparison of Sales and Registration Trends: Growth in OHV types and numbers has resulted in OHV sales overtaking and continuing to significantly outpace new snowmobile sales and ownership in the United States, Canada and worldwide – which has been steadily declining over recent years. As a baseline comparison, there were about 208,000 new snowmobile units sold worldwide in 2000, with around 140,000 of them being sold in the U.S. and 50,000 in Canada. New snowmobile sales for the 2020 model year were down to about 51,000 units in the U.S., 43,500 in Canada, and 124,000 worldwide. There was a slight COVID related rebound in 2021 model year sales to about 59,000 new units in the U.S., 50,000 in Canada, and 133,400 worldwide. Even though its participation rate has declined over recent years, snowmobiling remains a very viable activity enjoyed by millions. It's estimated there are currently about 1.2 million snowmobiles registered in the United States. (Source: International Snowmobile Manufacturers Association {ISMA})

Exhibit 1: Worldwide History of New Snowmobile Sales



The sale of new snowmobiles worldwide declined steeply from 252,324 in 1996 (the first year for which ISMA sales data is available) to a low of 111,492 units in 2010. After a slight rebound to 157,106 units sold in 2014 and 150,713 units in 2015, the total number of new units sold worldwide has remained in a range between 118,657 to 133,444 new units ever since. Today, total worldwide snowmobile sales do not come close to the total number of ATVs and UTVs being sold just in the United States.

Comparing current and past U.S. snowmobile sales numbers with OHV numbers shows striking contrasts:

- In 1997, new snowmobile sales in the U.S. peaked at 170,325 units
- By 2000, new snowmobile sales in the U.S. had fallen to 136,601 units (a 19.8% decrease)
- By 2005, new snowmobile sales in the U.S. had fallen to 100,896 units (a 40.8% decrease since the 1997 peak)
- By 2010, new snowmobile sales in the U.S. had fallen to 48,599 units (an all-time low and a 71.5% decrease from the 1997 peak)
- Since 2015, new snowmobile sales in the U.S. have remained in the 50,000 to 59,000 units range – plus or minus 70% below the peak level.
- In 2000, new ATV sales in the U.S. totaled about 550,000 units per year (only ATVs, does not include other OHV types)
- By 2002, ATV sales quickly rose to over 800,000 units per year and continued at that pace for a few years until gradually declining to around 222,000 units in 2015 (the last year of available data)

- In about 2003, the sale of UTVs began to explode with about 45,000 new units being sold. This UTV growth eventually cut into ATV sales numbers as consumers began switching from ATVs to UTVs.
- By 2008, about 270,000 UTV units were sold in the U.S.
- By 2018 (last year of available data), over 458,000 new UTV units were sold in the U.S.
- The last data available shows that ATVs were outselling snowmobiles at about a 4:1 ratio and UTVs were outselling snowmobiles by about an 8:1 ratio.

Exhibit 2: Comparison of New Snowmobile & OHV Product Sales in the U.S. by Calendar Year

Year	Snowmobile	ATV	UTV
1996	168,509		
1997	170,325		
1998	162,827		
1999	147,592		
2000	136,601	550,000	
2002	134,078	800,000	
2003	114,927		45,000
2005	100,896	700,000	
2008	79,815		270,000
2009	61,593	321,000	
2010	48,599	256,000	
2015	58,299	222,000	
2018	53,179		458,000
2020	51,036		
2021	59,234		

Note that snowmobile sales numbers for Exhibit 2 were provided by ISMA. They reflect actual total numbers provided by its four members: Arctic Cat, Bombardier, Polaris and Yamaha. Similar numbers are not publicly shared for total ATV and UTV sales; consequently, numbers in this table are the best available information which could be confidently found from available web searches.

Snowmobile registration numbers shown in Exhibit 3 below are regularly collected by ISMA from each state's registration agency, so are from a verified source. Unfortunately, registration and licensing laws for ATVs and UTVs vary widely from state to state – so no verifiable numbers are centrally available to make comparisons to snowmobile registrations.

Exhibit 3: History of U.S. Snowmobile Registrations by Year

1979	1990	1995	2000	2004 (*Peak Year*)	2005	2010	2015	2020	2021
1,612,798	1,042,938	1,218,900	1,605,328	1,774,232	1,750,502	1,504,678	1,340,585	1,112,810	1,189,466

- Snowmobile registrations in the United States peaked in 2004 at about 1.774 million. Most recently, total U.S. snowmobile registrations have been hovering at just under 1.2 million.
- While there were around a half million ATVs in use within the United States in the mid-1980s, there were an estimated 8 million units in use within the United States by 2005. (Source: Motorcycle Industry Council (MIC) and *Powersports Business*)
- While California leads the U.S. 'Off-Road Vehicles Market' with over 10% of the market share, it is notable that Wisconsin ranks second with over 5.5% of the total U.S. market share. (Source: *Global Market Insights*)

Quite conservatively – there are likely over 15 million OHVs currently in use just within the United States. While it's unknown exactly how many of these OHVs are in the Snowbelt, half or more could potentially be owned by people who live in non-snow states. However, if even only a quarter of the total U.S. OHV vehicle population is located within the Snowbelt, it's a still growing number that's already significantly larger than current snowmobile ownership.

While the current number of tracked OHVs in use across the United States is unknown and likely quite low, there does appear to be potential for that number to continue growing – whether for recreational on-trail use, access to cabins or ice fishing, or off-trail riding where allowed – since interest appears to be trending upward across the Snowbelt.

EXECUTIVE SUMMARY OF WHEELED UTV ASSESSMENT OBSERVATIONS

The ‘aggressive start’ and ‘aggressive stop’ test modes simulated potentially ‘worst-case’ operating scenarios while the ’35 mph pass-by’ mode simulated more normal operation of vehicles traveling down a trail. Overall assessment measurements showed no significant difference between the depth of UTV tire impressions on the trail compared to the depth of impressions made by snowmobiles on the same trail. The overall average stopping distance of all UTVs was shorter than the average stopping distance of all snowmobiles. Specific comparisons of each assessment mode include:

Aggressive Starts: During the Minnesota assessment, the deepest UTV tire impressions were exactly the same as the deepest snowmobile track impressions. During the Wisconsin assessment, the deepest snowmobile impressions were 0.4 inch deeper than the deepest UTV tire impressions. The overall deepest impressions from UTVs during testing ranged from 0.8 inch to 3.1 inches in depth, while the deepest snowmobile track impressions also ranged from 0.8 inch to 3.1 inches in depth.

35 mph Pass-Bys: There were no observed adverse impacts such as rutting or trenching of the trail surface from either UTVs or snowmobiles during normal pass-by mode. Tire and track impressions on the groomed trail surface were generally what is considered normal ‘surface chew’ from rubber tires and tracks. The worst-case observation was that one UTV created tire impressions that were 1.2 inches deeper than the deepest snowmobile track impressions during the Minnesota test. UTV tire impressions were only 0.4 inch deeper than the deepest snowmobile track impressions during the Wisconsin test. Overall. the deepest impressions from UTVs during 35 mph pass-bys ranged from 0.4 inch to 2.0 inches in depth, while the deepest snowmobile track impressions ranged from 0.4 inch up to 0.8 inch deep.

Footprints: Comparatively, footprints from foot traffic on the same 35 mph pass-by zone trail surfaces ranged from 0.8 to 2.8 inches in depth – 0.8 inch deeper than the deepest UTV tire impressions.

Aggressive Stops: The range of UTV tire depth and snowmobile track depth impressions were nearly identical. During the Minnesota assessment, UTV tire impressions ranged between 0.4 inch and 3.5 inches deep while snowmobile track impressions ranged between 0.4 inch up to 3.9 inches deep. During the Wisconsin assessment, UTV tire impressions ranged between 0.6 inch up to 1.6 inches deep while snowmobile track impressions also ranged between 0.6 inch up to 1.6 inches deep. Consequently, the range of impressions during the Wisconsin test were identical while the deepest snowmobile impressions during the Minnesota test were 0.4 inch deeper than the deepest UTV tire impressions.

Stopping Distance: The overall average stopping distance of all UTVs was shorter than the average stopping distance of all snowmobiles, with the overall average stopping distance of snowmobiles being 43.3% greater than the overall average UTV stopping distance.

Trail Conditions and Grooming: The Minnesota and Wisconsin assessment locations are located only about 30 miles apart as the crow flies. Both locations had similar snow conditions and trail grooming began at both locations during the Christmas to New Year’s Eve time period. However, the Minnesota trail had been groomed an average of once per week while the Wisconsin trail had been groomed an average of twice a week between commencement of grooming and the testing dates. Consequently, the Wisconsin trail based proved to be firmer than the nearby Minnesota site which had similar snow conditions but half as many trail grooming/compaction repetitions – highlighting the importance of frequent trail grooming to increase trail density and durability.

RECOMMENDED MANAGEMENT CONSIDERATIONS FOR CONCURRENT WINTER OHV USE ON GROOMED SNOWMOBILE TRAILS

There are several factors trail managers should consider before making decisions to either allow or disallow concurrent OHV use on groomed snowmobile trails – irrespective to whether it's wheeled or tracked UTVs and/or ATVs. The following topics have consistently been found to be of importance through all assessments dating back to 2006. While the significance of each factor may vary locally, it is recommended that the following issues be appropriately vetted in any local decisionmaking process:

1. **Funding:** It is essential that funding from OHV riders accompany any decision to allow concurrent UTV or ATV use on groomed snowmobile trails. Winter trail grooming is expensive, so all users need to share those costs. Any increase in use will likely also necessitate more trail grooming. While assessments have shown that normal UTV or ATV operation does not typically result in trail impressions more impactful than those caused by snowmobiles, traffic by all vehicle types simply wears snow out. Consequently, over-snow trails must be frequently groomed in order to be "restored" to a condition where they remain safe and pleasurable to ride.

   Since snowmobile trails are funded solely by registration fees, user fees, and/or gas taxes paid by snowmobilers, UTV and ATV riders must also contribute toward on-going trail development and maintenance costs if they wish shared access to existing snowmobile trails. It must also be recognized that many/most snowmobile trails were developed by volunteers and many are still operated by volunteer organizations. Consequently, this necessitates sensitivity to snowmobilers' "ownership" in "their" trails. All trail users must simply help support the cost of winter trail operations by paying their fair share.

   Funding assistance from OHV riders is critically important to the success of concurrent trail sharing and can be achieved several different ways:
   - **A. Direct Payment:** by requiring all winter users to purchase a 'snowmobile' trail permit/trail pass to operate during winter on groomed snowmobile trails.
   - **B. Indirectly:** by using funds from a jurisdiction's OHV/ORV account (funds received from the sale of OHV/ORV permits, registrations and/or gas tax) to help support a degree of snowmobile trail grooming, maintenance and operating costs where concurrent OHV use is allowed on groomed snowmobile trails during winter. (See Wisconsin example in Appendix 2 on page 40)
   - **C. Grants:** by utilizing federally funded grant programs like the Recreational Trails Program (RTP) or state-funded recreation grants that help manage multiple use on trails.

   The key in all situations is to build a coalition with OHV riders who desire winter access and are supportive of helping fund their concurrent use.

2. **Shoulder Season Regulation and Management:** It is necessary that the over-snow trail have a firmly compacted snow base if concurrent wheeled UTV or ATV use is to be successful. Therefore, it is important that regulation of the "shoulder season" (the beginning and end of the snowmobile trail grooming season when snow depth is thinner and temperatures may occasionally or regularly be above freezing) be considered based upon local factors and conditions and that OHV use on the trail corridor be managed accordingly.

   First and foremost, the trail's base *must* properly harden before it will withstand wheeled traffic from OHVs. This requires adequate "setup" time for groomed snow to re-freeze and properly harden. UTVs and ATVs typically have a higher pounds per square inch (PSI) of pressure in contact with the trail than the PSI exerted upon the trail by a snowmobile. This is because the weight of an UTV or ATV and its rider is spread over just the small surface area where its tires are in contact with the snow surface – versus a snowmobile, where the weight of the snowmobile and its rider is spread over a much larger surface area since its track and skis are all in contact with the snow surface. Consequently, the trail's groomed snow surface must be harder/firmer for wheeled OHV use compared to what is required for snowmobile-only use. So, proper trail setup/hardening at the beginning of the season is crucial to preventing on-going issues with rutted trails as winter progresses.

Second, many areas go from snow season to 'mud season' immediately after the snowmobile season. If the snow trail route is rocky or has been hardened with gravel or a similar surface, this may not be an issue. But if the route is subject to being soft and muddy, this may be an important consideration. In such cases, continued OHV use can potentially damage the underlying trail tread and surrounding resources. Consequently, consideration should be given to a 'drying out period' before OHV use is allowed to continue (if the route is open to summer OHV use). Past assessments and trail manager surveys found a variety of approaches employed by jurisdictions around the Snowbelt. Examples include:

- Some counties in Wisconsin stipulate that concurrent wheeled OHV use may not start on the snow trail until a week to ten days *after* the first day the snowmobile trail is groomed – which allows time for the trail to build base in terms of snow depth and, most importantly, an opportunity for the trail base to setup and harden properly.
- The Minnesota State DNR Trail where 2021 UTV testing occurred operates with a rule which allows shared ATV/UTV trail use on the groomed trail when the air temperature is '30 degrees Fahrenheit (F) and below.' Other trail areas regulate use by an air temperature within a range between '28 F and 32 F.'
- Several areas stipulate that OHV use must end on the snow trail when 'snowmobile season' ends or that the trail closes to all use on a specific date such as March 31 or April 1.
- Trail routes may or may not open again to OHV use after the 'mud season' – dependent upon what summer uses are allowed on that specific trail corridor.

- The Burnett County, Wisconsin trail where 2021 UTV testing occurred operates with the following policy (See sign example below): Winter concurrent snowmobile / OHV use is allowed from 'December 1 through March 31.' Trails are then subsequently closed to both snowmobile and OHV use from 'April 1 until the Friday of Memorial Day weekend' – depending upon conditions 'as determined by the county.'

3. **Off-Season Management:** Many OHV riders are familiar with snowmobile trails because they are also either current or former snowmobile owners. Consequently, OHV riders sometimes mistakenly believe OHVs can be operated on snowmobile trail routes, winter or otherwise, simply because in their mind they are 'public trails.' This familiarity requires aggressive education efforts to help safeguard against improper use of trail routes during non-winter seasons if OHV use is prohibited. If education efforts do not

sufficiently prevent unauthorized use, more aggressive on-the-ground signing, law enforcement, and/or gate/barrier installations may be required.

If OHV use is allowed, there should be a distinct 'snowmobile season' during which snowmobile trails are groomed and OHVs are allowed, as discussed above in #2. Outside this 'season,' snowmobile trails themselves cease to exist and consequently trail routes either transition to other prescribed trail uses or they cease to exist until the next snow season. Consequently, concurrent OHV use requires that trail managers provide extra effort to:

A. Educate all users as to when snowmobile trail routes are open or closed to various uses;
B. Work with landowners and land managers to heighten awareness and sensitivity to other prescribed uses along trail routes, including during non-winter seasons; and
C. Work with landowners and land managers to help prevent unauthorized OHV use on snowmobile trail routes during the non-winter seasons.

4. **Risk Management:** Proper risk management is a critical part of managing any recreational activity. If concurrent OHV use is added to a groomed snowmobile trail system, it may constitute a 'change in use' which could trigger the need for a new risk assessment by the trail's manager or insurer. Risk management factors, including liability insurance requirements, may be different depending upon whether the trail is managed by a government entity or by a snowmobile club/association.

   Government Agency Managed Trail: If a government entity manages the trail, special liability insurance may not be required for operation of the snowmobile trail. However, proper risk management that includes following 'best management practices' for the trail along with regular 'risk assessments' performed by qualified risk management professionals is often required. Trail managers must ensure all new activities or trail management policy changes are closely coordinated with their agency's risk management office.

   Club or Association Managed Trail: If a club or association provides day-to-day trail management, they typically are required to purchase special liability insurance covering their trail activities. Trail managers must check with their insurance company *prior to any decision to add OHV use (or any other new managed uses) to their snowmobile trail system* to ensure their liability insurance policy includes coverage for concurrent OHV trail use. It is essential that this issue be carefully researched and a formal 'risk assessment' may be required by the insurer.

5. **Landowner Permission:** ***It is imperative that all landowners (private including corporate, as well as public land managers) be involved in any decision to add concurrent OHV use to any snowmobile trail!***

   Private and Corporate Property: Permission for private and corporate lands access is always particularly sensitive since each landowner is but one link in a chain of many owners required to connect destinations. It takes a lot of effort to make things work and requires extreme sensitivity to landowners' varied perspectives and their other land uses during both winter and non-winter months.

   A landowner's use of their property during non-winter months is often a principal reason for their owning that property, particularly if it's in an agricultural area. Since snowmobile trail routes across private and corporate lands are generally for 'winter-only' snowmobile use, trail managers must often also help ensure steps are taken to prevent use conflicts outside the snowmobiling season – or they risk losing the trail route altogether for snowmobiling. Unfortunately, OHV trespass onto private and corporate lands during non-winter months is a leading cause of why landowners cancel snowmobile trail access agreements. Trail managers must recognize that allowing concurrent OHV use on snowmobile trails could potentially further exacerbate what is already a tenuous situation with landowners in some areas. So, if OHV use is added, trail managers typically must double-down on efforts to prevent off-season OHV trespass onto private and corporate lands.

   While permission from private landowners remains the single largest barrier to establishing concurrent OHV use on many groomed snowmobile trails, it's interesting to note that in some areas landowners who have historically opposed OHV use are beginning to change their position to being supportive of concurrent uses – because they own OHVs and want to be able to use them on the trails they're permitting across their

private property. In some cases, this has actually resulted in those landowners forcing trail managers to compromise and allow joint OHV use during winter – or lose snowmobile access. While this situation is certainly not the norm, it could potentially grow as more landowners purchase OHVs. Private lands access will always remain a time consuming and constantly moving target as land ownership continually changes hands, so it's tremendously important to be continually adaptive to landowners' changing needs and attitudes in order to keep trail access open.

Public Lands: Permission from public land managers is also required since there may be potential for conflict with their public land management plans and motorized/nonmotorized recreation use zoning. Consequently, public lands access requires permissive motorized vehicle use policies, which may or may not treat snowmobiles and other OHVs the same. If a snowmobile trail route is located on what's designated as a motorized road or trail during the non-winter season, concurrent winter OHV use may likely be permitted during winter – unless the area's motorized travel plan restricts or eliminates year-round OHV use through 'season of use' dates. But more often than not, designated motorized routes can typically provide year-round multiple use trail opportunities.

However, if the winter route is designated through a summer nonmotorized use zone, you will likely have to address how that nonmotorized designation is not jeopardized or improperly encroached upon during non-winter seasons. Consequently, if winter concurrent OHV use is added on a route not open to motorized use in the non-winter season, trail managers must proactively work to ensure off-season trespass or conflicts do not result in the loss of continued winter access for the snowmobile trail. While this can be accomplished with on-the-ground education, signing, barriers and enforcement, it cannot be successful without on-going, concerted partnership and buy-in from both trail managers and riders.

6. **Geography of the Trail System:** The geographic characteristics of the trail system can be an important indicator as to the suitability of concurrent use for that particular area. The series of field assessments conducted between 2006 and 2021 showed very little substantive difference between the impressions left on the trail by UTVs, ATVs and snowmobiles when the trail was straight and relatively flat. Therefore, trail corridors such as abandoned railroad grades are generally good candidates for concurrent use trails since they are typically straight, relatively wide, and normally have a grade that does not exceed 3%. Other non-railroad grade trails with relatively flat and straight corridors are also potentially strong candidates for concurrent use consideration.

   The 2006 Assessment showed that as curves, and particularly hills, are added to a trail's topography, tire impressions from ATVs started to get a bit deeper than those left by snowmobiles on the same groomed trail. While curves do not rule out a trail's candidacy for concurrent use, their presence should be a signal to trail managers that more grooming will likely be necessary. However, this is true on snowmobile-only trails as well – the presence of lots of curves necessitates more grooming than if the trail is straight.

   The 2006 Assessment showed that hills, and particularly steep grades, can definitely be a limiting factor for the viability of concurrent use by ATVs – particularly if the trail is not firmly compacted or if there is new, uncompacted snow on top of the compacted trail base. Field testing showed that ATVs clearly struggled on a compacted trail with a 19% grade, as well as on a grade of only 8% that was covered by fresh snowdrifts. While the sites used for the 2021 wheeled UTV assessment did not offer steep grades for similar testing, it is quite likely that wheeled UTVs would experience similar difficulties on steep grades, as well as if there is new uncompacted snow on top of the compacted trail base.

   Consequently, close consideration should be given to the suitability of encouraging winter operation by wheeled ATVs and UTVs on trail grades which begin to exceed 15% to 20% on compacted trails. And if the area has frequent heavy snowfalls or drifting, the maximum desirable grade may be as low as 8% to 10%.

7. **Trail Width, Compaction and Grooming:** ***A well compacted trail base is key to trail durability and the most essential ingredient for successful concurrent use.***

   The area must have a good trail grooming program that provides frequent grooming commensurate with both the overall volume of traffic on the trail and the amount and frequency of new snowfall in the area.

Heavy vehicle traffic and/or frequent big snowfalls will require a more frequent and more aggressive grooming schedule. Without good, consistent trail compaction, concurrent use will likely not be successful.

Full-Width Compaction: The trail must be consistently compacted to its intended full width from the very beginning of the season onward. If the trail is intended to be twelve-feet wide, for example – but is only groomed eight to ten feet wide initially and then widened to a full twelve-feet width later on as the season progresses – there will always be a soft zone, potentially at least one to three-feet wide, along the outside edges of the trail. These soft spots will be susceptible to a greater degree of tire rutting or trenching from ATVs and UTVs, as well as have an increased potential for OHV drivers to lose control or become stuck.

There were numerous incidents during 2006 field testing where just one tire of an ATV hitting an uncompacted area at the outside edge of the trail caused the ATV to get stuck or even flip over. So, full-width compaction is significantly important to preventing "soft spots" from forming along the outside edge of over-snow trails.

Minimum Trail Widths: The following are *minimum* widths needed for two-way vehicle traffic; wider groomed trail widths are recommended for a higher level of trail durability and safety:

Snowmobile: Most snowmobiles typically do not exceed a width of 4-feet; consequently, the *minimum* groomed trail width needed for two-way snowmobile traffic is 8-feet wide.

Wheeled ATV: Most wheeled ATVs typically do not exceed a width of 50-inches; consequently, the *minimum* groomed trail width needed for two-way wheeled ATV traffic is about 8½ feet wide.

Wheeled UTV: A wheeled UTV typically does not exceed a width of 5½ feet; consequently, the *minimum* groomed trail width needed for two-way wheeled UTV traffic is 11-feet wide.

Tracked ATV: A tracked ATV typically does not exceed a width of 4½ feet; consequently, the *minimum* groomed trail width needed for two-way tracked ATV traffic is 9-feet wide.

Tracked UTV: A tracked UTV typically does not exceed a width of 6-feet; consequently, the *minimum* groomed trail width needed for two-way tracked UTV traffic is 12-feet wide.

Grooming Frequency: Frequent trail grooming is required at a level commensurate with a trail's overall traffic volume, as well as the frequency and amounts of new snowfall received. Trails with heavy traffic and/or regular big snowfalls will require more frequent and aggressive grooming repetitions as use increases compared to trails where traffic is lower or snowfall less frequent.

Field testing has shown there is a noticeable difference in trail hardness between once-a-week average grooming repetitions versus twice-a-week average grooming repetitions – even in extreme cold conditions. Clearly, once per week trail grooming has been proven to be inadequate in almost all settings and circumstances in today's busy winter recreation world, even with only snowmobile traffic. Consequently, a minimum of at least two to three grooming repetitions per week should be considered the minimum best practice for all but extremely low use motorized over-snow trails. If all trail segments currently receive multiple weekly grooming repetitions, adding OHV use may or may not necessitate increased grooming frequencies. However, as OHV as well as snowmobile use increases, managers should pay close attention to ensure trail grooming levels sustain any increase in total vehicle use levels.

Type of Grooming Equipment: The type of grooming equipment used in an area may play a role in the viability of concurrent use. Field testing dating back to 2006 showed that trails groomed with multi-blade drags were generally well compacted and generally held up well to traffic from both OHVs and snowmobiles. Conversely, the one area tested (2006 – Wyoming 2) which had been groomed infrequently with a single blade drag had poor compaction and did not hold up well to ATV traffic. While this may be an isolated case, it is nonetheless an indicator that should be considered. Additionally, the trail base in the area (2006 – Idaho 1) that had been groomed with a tiller the morning of testing was also generally less dense than the trails groomed with multi-blade drags. While this trail base held up okay during field testing, it was noticeably softer, and would have hopefully been firmer with more setup time.

Uncompacted Snow: The depth of uncompacted snow, from freshly fallen snow or new snow deposited by wind drifting, on top of the compacted trail was found to be a potentially limiting issue for wheeled ATV operation during 2006 testing. While there wasn't any new snowfall on the trail during 2021 wheeled UTV testing, it would have also likely affected UTV operation to some degree. Anecdotal information shared by test riders during 2021 Wisconsin UTV testing related how UTV riders who left on freshly groomed trails in the morning sometimes struggle with heavy snowfall that accumulates during the day during their return trip back home later in the afternoon or evening. So, it must be recognized that winter trails can never be 'well compacted' 100% of the time due an extreme range of potential changing snow and weather conditions on any given winter day. Consequently, OHV riders will have to patiently accept varying, sometimes less than ideal, trail conditions between grooming rotations.

While snowmobiles generally 'float' on top or toward the top of uncompacted snow, ATVs do not. The 2006 field testing showed that ATV tires generally compressed new snow to a depth of 0.4 to 1.2 inches, an indication that they have virtually no flotation. Additionally, since an ATV's clearance is typically only about 7 to 10 inches, the vehicles struggled to negotiate deep snowfall. Despite not being able to test UTVs in uncompacted on-trail snow conditions during the 2021 assessment, it is likely that UTVs would also experience similar operational challenges similar to those seen with ATVs during 2006 testing. Regardless, it is very necessary that concurrent use trails be regularly groomed soon after new snowfalls to restore a compacted surface on the trail – since it's compaction that makes concurrent winter use possible.

8. **Potential Use Patterns:** Use patterns and the potential mixture and volume of uses on the trail are important factors to consider. The 2006 trail manager survey showed existing wheeled ATV use on concurrent use trail systems was considered to be "very light," varying from 1-2% up to 5-10% with isolated cases in low snow areas of up to 30-35% of total winter use. Likewise, the 2014 tracked OHV assessment's survey showed existing tracked OHV operation on concurrent use trail systems in the U.S. ranged from "minimal to nil" – with most managers estimating winter OHV use to be in a range between "5 to 10 percent" of total trail use where concurrent use is allowed. Additionally, many trail managers in both surveys commented that most winter OHV use was "local" – meaning riders typically ventured only a few miles from parking areas and/or communities in contrast with snowmobilers who routinely ventured long distances during a day of riding.

   A likely reason for 'typically only local' ATV riding patterns versus snowmobilers typically traveling longer distances is that riding an ATV during winter conditions can be very cold when compared to riding a snowmobile, as was experienced during field testing. While a snowmobile has hand warmers, a windshield, and cowling that directs some heat back toward the driver, a stock ATV typically offers nothing in regard to protection for the operator from winter elements. While hand warmers and a windshield can be added to an ATV, the issue of no protection and heat from a cowling remains. Additionally, 'safe touring speeds' on an ATV operating on a groomed snowmobile trail surface were judged during field testing to typically be at least 10 to 20 miles per hour slower than snowmobiles on the same trail.

   In comparison to an ATV, operating an UTV in winter conditions is much more appealing and can even be ultra-comfortable given a windshield, doors, or even fully enclosed cabs complete with a heater on UTVs. And with multi-seat capacity versus only single person seating on most modern snowmobiles, UTVs are becoming an attractive, less expensive alternative to snowmobiling for families.

   The volume of winter UTV use appears likely to continue growing, particularly in low to marginal snow areas and during low snowfall years, and appears to be driving some snowmobilers to switch to an UTV in addition to, or instead of, their historic use of a snowmobile for recreation. However, their familiarity with snowmobile trail systems can be a double-edged sword: good in respect to these recreationists being accustomed to paying fees and volunteering to support their trails, but not so good if they don't understand snowmobile trails may not be open to OHV use, winter or summer. This growing cross-over segment of OHV riders is important to the future of continued trail access, so they must not be discounted nor summarily dismissed as unimportant or a nuisance since their numbers will, in all likelihood, only continue to grow.

9. **Potential for Partnerships:** The potential importance and benefits of local partnerships must be considered when weighing the pros and cons of concurrent OHV use. Where common ground can be found, coalitions of motorized trail users working together can be instrumental in helping protect and enhance overall motorized recreation access. Coalitions are simply stronger and more effective than individual groups working alone. While concurrent use is certainly not appropriate for every local situation, there are likely suitable opportunities in many areas which can help advance multiple use objectives. When possible, these opportunities should be given thoughtful consideration for a chance to succeed.

   It's also important to cultivate state, regional and national alliances between snowmobile and OHV users. It's estimated there are over 15 million OHVs in the United States and that number continues to grow every year. Comparably, there are only about 1.2 million registered snowmobiles in the United States. Coalitions of snowmobilers working where appropriate with OHV riders have the potential to be very influential. Snowmobiling occurs over only about half of the U.S., while the 15 million OHV owners are scattered across all 50 states – so an alliance with them is crucial to helping broaden snowmobiling's support nationally.

   Since success begins and is ultimately judged at the grassroots level, local partnerships must not only exist but also must function well – otherwise even the best state, regional or national alliances are fruitless. Since 'divide and conquer' continues to be a tactic used by motorized recreation opponents, the old adage 'united we stand, divided we fall' continues to be an important approach for retaining future snowmobiling access. The bottom line is there is potentially much to be gained from snowmobilers building and strengthening alliances at every level with other user groups.

10. **Air Temperature:** The depth and frozen quality/density of a compacted snow trail's base is a more important potential impact indicator than concern about warm daily air conditions. Air temperatures ranged between a high of plus 46 degrees and a low of minus 15 degrees Fahrenheit (F) during various field tests conducted for the four Assessments completed between 2006 and 2021. Specific air temperatures recorded during individual Assessments included – 2006 Wheeled ATV Assessment: +11 F to +32 F; 2014 Tracked OHV Assessment: +41 F to +46 F; 2015 Supplemental Tracked OHV Assessment: +9 F to +39 F; and 2021 Wheeled UTV Assessment: +1 F to -15 F.

    Appendix 1 of the 2021 Wheeled UTV Assessment provides a 'Summary of All On-Trail Depth Impressions' observed during these four assessments. It clearly shows no substantial difference between depth impressions created when air temperatures were above freezing (+32 F) compared to when air temperatures were sub-zero; i.e., depth impressions from comparable vehicles were not egregious or more prominent when air temperatures were +39 to +46 F compared to when they were +11 to -15 F.

    Rather, the most important consideration factor goes back to the quality of grooming and constructing a firm, densely compacted trail base from the ground up early in the winter season. This premise is backed up by decades of working with snow trail grooming coupled with observations during this series of field assessments. If the ground is frozen solid, it helps act like a refrigerant to keep the primary base solid despite sunshine and intermittent warmer air temperatures. Consequently, the greatest potential influence to deterioration of a solid snow base includes inadequately frozen ground in the trail vicinity, rain events, and/or prolonged periods of extremely warm melting periods which produce water running down and/or across the frozen snow trail.

    Thus, one of the best management actions to help enhance soil freeze-up is to ensure trail grooming starts early (when there is 6 to no more than 12 inches of snow cover). Early grooming helps prevent allowing excessive snow cover to insulate the underlying ground and consequently delay or prevent prompt freeze-up of the underlying ground. By compressing early snowfall, you actually help drive frost down into the ground which ultimately leads to a firmer, more durable trail base.

2021 UTV ASSESSMENT PROCEDURES AND TESTING PROTOCOLS

Trails Work Consulting conducted controlled field testing at two different locations: one near Duquette, Minnesota on February 9, 2021 and the second near Danbury, Wisconsin on February 11, 2021 to collect data related to the goals outlined below. Both trail locations had been regularly groomed throughout the entire winter season, so data was collected from real-life public trail situations.

Photo 1: test site #1 near Duquette, Minnesota

Photo 2: test site #2 near Danbury, Wisconsin

Assessment Goal: Collect data and identify any potential impacts to the groomed snow trail surface related to snowmobile and wheeled UTV operation during 'aggressive starts,' 'aggressive stops,' and '35-mph pass-bys' on actual, regularly groomed snowmobile trails. Measurements were recorded related to the worst-case observations of the 'depth and width' impressions upon the trail surface along with the total distance the impact was observed from each individual start and stop on the trail.

Even though snowfall was below normal and temperatures were very cold on both testing days, conditions recorded at both sites provided representation of conditions likely to be present at some point during any given winter season.

This assessment focused only on evaluating potential impacts to the surface of regularly groomed (compacted) snow trails. It did not look at potential trail impacts prior to the start of trail grooming at the beginning of winter or after trail grooming ceases at the end of winter. Without doubt, impacts from both UTVs and snowmobiles will be different on uncompacted snow or on groomed trails when temperatures are warmer, as compared to the results of this field test on compacted trails when temperatures were well below freezing. While other management issues could theoretically always arise from UTV operation prior to the start of or after the end of the snowmobile trail grooming season, their consideration was outside the scope of this assessment project.

These particular field tests looked at "worst-case" results in regard to the depth and width of impressions caused by the operation of both UTVs and snowmobiles on actual groomed snowmobile trails. The reader should consult the Field Testing Journals which include photo documentation for a comprehensive discussion regarding specific test results from individual vehicles at each locale and then apply specifics similar to their local conditions to their decision making versus applying general/average results from this study to local decisions.

These results represent "snapshots" of impacts observed at the particular point in time, and under the very specific conditions documented at each test site. They are not intended to represent a comprehensive look at every potential issue under all possible scenarios one could find in potentially wide-ranging winter conditions. It should be recognized that these results are subject to change under other snow and weather conditions, with different or more vehicle traffic, and/or with different vehicle operators. Nonetheless, these "snapshots" provide new information to help further informed decisionmaking regarding concurrent UTV/snowmobile management. Also keep in mind that a primary factor of any groomed snow surface's durability is the cumulative number of vehicles that use it (snowmobiles or UTVs) between grooming repetitions *and* how well the trail surface is able to refreeze/set up prior to traffic resuming on the surface. Irrespective as to whether the vehicles are snowmobiles or UTVs, the results from these field tests, coupled with numbers and types of vehicles, can be used to approximate cumulative impacts from single or concurrent use since impressions will potentially deepen until an ice layer, the ground, or a road base is reached from repetitive trail traffic.

Test Track Layout and Test Protocols: A 450-feet long test track was delineated along each snowmobile trail's test site using four sets of traffic cones to delineate two side-by-side test lanes. Each cone set consisted of three cones: one cone was placed in the middle of the trail while the other two were placed at the far outside edge of the compacted trail. Cone sets were placed to define three different test zones: (1) the 'Aggressive Start' zone was 125 feet long and delineated by the first set of cones placed at the "zero" mark and the second set placed at the 125'mark; (2) the '35-mph Pass-By' zone was 200 feet long, starting at the second set of cones (125' mark on the test track) and ending at the third set of cones which were placed at the 325' mark along the test track; and (3) the 'Aggressive Stop' zone was also 125 feet long, starting at the third set of cones (325' mark on the test track) and ending at the fourth set of cones set at the 450' mark.

Each vehicle pass involved: (1) full throttle acceleration from a dead-stop (beginning at the first set of cones – the zero mark) for the 'start' mode, (2) settling into a constant '35 mph pass-by' speed between the second and third sets of cones, and (3) transitioning into an 'aggressive stop' mode by fully locking up the brakes at the third set of cones. Since the 'start' and 'stop' zones were the same length, testing was able to be conducted in both directions. Each snowmobile and UTV was run a total of four passes (twice in both directions), after which the test track was reset further down the trail to provide a fresh surface for the next pair of snowmobile/UTV test vehicles.

Test vehicles were provided by local volunteers and either each vehicle's owner or another volunteer operated each snowmobile or UTV during each series of tests.

The Assessment's Setting and Range of Conditions

- **Setting:** The field tests were conducted on actual groomed trails which were in good condition. Both areas were open to regular snowmobile and wheeled OHV traffic, so represented ordinary trail circumstances.
- **Temperature:** Air temperature during these tests was quite cold, ranging from minus 15 degrees Fahrenheit (-15 F) at the beginning up to plus 1 degree Fahrenheit (+1 F) at the end of the Minnesota testing. After an overnight low of -26 F, the start time for Wisconsin testing was delayed until late morning. Consequently, air temperature was up to minus 12 degrees Fahrenheit (-12 F) at the beginning of testing and had reached minus 4 degrees Fahrenheit (-4 F) by the end of the Wisconsin assessment.
- **Compacted Trail Depth:** Compacted snow depth on the trails ranged from 6 to 8 inches deep at the Minnesota test site and was between 4 to 6 inches deep at the Wisconsin test site. The trails at both assessment areas were firmly compacted to the ground with no ice layers.
- **Snow Depth Beside Trail:** The uncompacted snow depth alongside the Minnesota trail segments ranged from 14 to 16 inches deep, while uncompacted snow depth alongside the Wisconsin trail segments ranged from 12 to 16 inches deep.
- **Trail Grooming at Test Sites:**
  Minnesota Test Area
  - **Grooming Equipment:** 2020 Tucker Sno-Cat 2000 with 8'6" Arrowhead grooming drag
  - **Days Groomed This Season:** began grooming on December 31, 2020; was groomed three times in January (7, 19 & 25) and two times in February (1 & 8). So, area trails had been groomed a total of six times over a 40-day period (average of once every 6.7 days) prior to testing.
  - **Last Grooming:** last groomed late the prior afternoon (approximately 16 hours prior to start of testing) and was in good condition.

  Wisconsin Test Area
  - **Area Grooming Equipment:** 2019 John Deere 6430 4WD tractor with 8'6" Ultimate grooming drag
  - **Days Groomed this Season:** began grooming on December 25, 2020; was groomed two more times in December (30 & 31), five times in January (1, 4, 19, 25 & 27), and five times in February (1, 4 ,5, 9 & 10). So, area trails had been groomed a total of thirteen times over a 48-day period (average of once every 3.7 days) prior to testing.
  - **Last Grooming:** last groomed the prior day (approximately 30 hours prior to testing) and was in good condition with slight surface wear from light snowmobile traffic.

➢ **Trail Grooming and Compaction Differences:** Even though trail grooming started at about the same time in both test areas – between Christmas and New Years – the Wisconsin trail segments proved to be slightly firmer due to:

1) The Wisconsin trail segments had slightly over twice as many grooming repetitions as the Minnesota trail segments, with an average of about two grooming repetitions per week compared to only about one grooming per week average on the Minnesota trail segments.
2) There had been almost twice as much trail set-up time (refreeze time) between the last grooming repetition and the start of UTV testing on the Wisconsin trail segments – approximately 30 hours compared to about 16 hours in Minnesota. Even though both areas had overnight lows in the range of minus 18 to minus 25 degrees Fahrenheit prior to testing periods, this reaffirms that 'length of set-up time' is a more important factor than simply having 'cold air temperatures' in respect to managing ideal trail grooming times.

SUMMARY OF 2021 UTV FIELD TEST OBSERVATIONS

Observations from 'AGGRESSIVE START' (Worst-Case Mode) Vehicle Operation

- **FULL RANGE OF DEPTH IMPRESSIONS:** The full range of tire impression depths created by UTVs during aggressive starts was identical to the range of snowmobile track impression depths created during testing. Overall tire impression depths created by UTVs during aggressive starts ranged from 0.8 to 3.1 inches deep, while overall snowmobile track impression depths also ranged from 0.8 to 3.1 inches deep.

- **AVERAGE DEPTH OF AGGRESSIVE START IMPRESSIONS:** The average depth of UTV tire impressions were only slightly deeper than the average depth of snowmobile track impressions:

  UTVs: The average depth of tire impressions ranged from 1.0 inch to 2.5 inches deep.

Vehicle	Average Tire Impression Depth (Inch)
Minnesota	
2-passenger 1000cc Polaris General	1.9"
4-passenger 1000cc Polaris RZR	2.5"
Wisconsin	
2-passenger 500cc Polaris Ranger	1.0"
2-passenger 800cc Polaris RZR	1.5"
4-passenger 1000cc Polaris Ranger	1.4"

  SNOWMOBILES: The average depth of track impressions ranged from 0.8 inch to 2.0 inches deep.

Vehicle	Average Track Impression Depth (Inch)
Minnesota	
600cc Polaris RMK / 2.0-inch track lugs	1.4"
700cc Polaris SKS / 1.25-inch track lugs	0.8"
800cc Polaris Pro / 2.5-inch track lugs	2.0"
Wisconsin	
800cc Polaris Switchback Assault / 1.35-inch track lugs	1.4"
900cc Ski-Doo Renegade X / 1.25-inch track lugs	1.4"
900cc Ski-Doo Renegade / 1.25-inch track lugs	1.8"

- **MAXIMUM DEPTH OF AGGRESSIVE START IMPRESSIONS:** The maximum depth of UTV tire and snowmobile track impressions were similar, with both vehicles having an overall 3.1" maximum depth:

  UTVs: The maximum depth of tire impressions ranged from 1.6 inches to 3.1 inches deep.

Vehicle	Maximum Tire Impression Depth (Inch)
Minnesota	
2-passenger 1000cc Polaris General	2.4"
4-passenger 1000cc Polaris RZR	3.1"
Wisconsin	
2-passenger 500cc Polaris Ranger	1.6"
2-passenger 800cc Polaris RZR	2.0"
4-passenger 1000cc Polaris Ranger	1.6"

  SNOWMOBILES: The maximum depth of track impressions ranged from 0.8 inch to 3.1 inches deep.

Vehicle	Maximum Track Impression Depth (In.)
Minnesota	
600cc Polaris RMK / 2.0-inch track lugs	2.0"
700cc Polaris SKS / 1.25-inch track lugs	0.8"
800cc Polaris Pro / 2.5-inch track lugs	3.1"
Wisconsin	
800cc Polaris Switchback Assault /1.35-inch track lugs	2.0"
900cc Ski-Doo Renegade X / 1.25-inch track lugs	2.4"
900cc Ski-Doo Renegade / 1.25-inch track lugs	1.8"

- ✓ The deeper tire and track impression depths at the Minnesota test site are likely attributable to: (1) the Wisconsin test site had about twice the number of grooming repetitions over the same period of time, which ultimately would be expected to result in overall denser trail compaction from an average of twice a week grooming repetitions versus once a week average grooming repetitions, and (2) the Wisconsin trail had more hours of set-up (refreeze) time between the time of testing and its most recent trail grooming (approximately 30 hours versus approximately 16 hours in Minnesota).

- **MINIMUM DEPTH OF AGGRESSIVE START IMPRESSIONS:** The minimum depth of UTV tire and snowmobile track impressions were overall very similar, with the deepest UTV track being slightly deeper:

UTVs: The minimum depth of tire impressions ranged from 0.8 to 2.0 inches deep.

Vehicle	Minimum Tire Impression Depth (Inch)
Minnesota	
2-passenger 1000cc Polaris General	1.6”
4-passenger 1000cc Polaris RZR	2.0”
Wisconsin	
2-passenger 500cc Polaris Ranger	1.2”
2-passenger 800cc Polaris RZR	1.2”
4-passenger 1000cc Polaris Ranger	0.8”

SNOWMOBILES: The minimum depth of track impressions ranged from 0.8 to 1.6 inches deep.

Vehicle	Minimum Track Impression Depth (In.)
Minnesota	
600cc Polaris RMK / 2.0-inch track lugs	1.0”
700cc Polaris SKS / 1.25-inch track lugs	0.8”
800cc Polaris Pro / 2.5-inch track lugs	1.2”
Wisconsin	
800cc Polaris Switchback Assault /1.35-inch track lugs	1.2”
900cc Ski-Doo Renegade X / 1.25-inch track lugs	1.0”
900cc Ski-Doo Renegade / 1.25-inch track lugs	1.6”

- **RANGE OF WIDTH IMPRESSIONS FROM AGGRESSIVE STARTS:** UTV tires generally had some side-to side movement during take-off while snowmobile impressions were consistently the same width of each snowmobile’s track indicating firmer traction:

UTVs: Tire impression width ranged from 9 to 12 inches wide, indicating slight side-to-side spinning.

Vehicle	Range of Tire Impression Width (Inch)
Minnesota	
2-passenger 1000cc Polaris General	9 – 12”
4-passenger 1000cc Polaris RZR	10 – 11.5”
Wisconsin	
2-passenger 500cc Polaris Ranger	10 – 12”
2-passenger 800cc Polaris RZR	9 – 11”
4-passenger 1000cc Polaris Ranger	10 – 12”

SNOWMOBILES: Track impressions were consistently 15 inches wide from every aggressive start, indicating firm hook-up with no side-to-side fishtailing.

Vehicle	Range of Track Impression Width (Inch)
Minnesota	
600cc Polaris RMK / 2.0-inch track lugs	15”
700cc Polaris SKS / 1.25-inch track lugs	15”
800cc Polaris Pro / 2.5-inch track lugs	15”
Wisconsin	
800cc Polaris Switchback Assault /1.35-inch track lugs	15”
900cc Ski-Doo Renegade X / 1.25-inch track lugs	15”
900cc Ski-Doo Renegade / 1.25-inch track lugs	15”

- **LENGTH OF AGGRESSIVE START IMPRESSIONS**

UTVs: Tire impressions were visible for an average distance ranging from 42.4 feet up to 70 feet.

Vehicle	Length of Tire Impression (Feet)	
	Distance Range	Average Distance
Minnesota		
2-passenger 1000cc Polaris General	33 – 69’	42.4’
4-passenger 1000cc Polaris RZR	43 – 81’	70.0’
Wisconsin		
2-passenger 500cc Polaris Ranger	26 – 71’	49.25’
2-passenger 800cc Polaris RZR	43 – 75’	58.75’
4-passenger 1000cc Polaris Ranger	51 – 77’	60.3’

SNOWMOBILES: Track impressions were visible for an average distance ranging from 19.75 feet up to 67.5 feet.

Vehicle	Length of Track Impression (Feet)	
	Distance Range	Average Distance
Minnesota		
600cc Polaris RMK / 2.0-inch track lugs	14 – 25’	19.75’
700cc Polaris SKS / 1.25-inch track lugs	35 – 37’	36’
800cc Polaris Pro / 2.5-inch track lugs	26 – 95’	47.5’
Wisconsin		
800cc Polaris Switchback Assault /1.35-inch track lugs	35 – 38’	36.5’
900cc Ski-Doo Renegade X / 1.25-inch track lugs	44 – 82’	67.5’
900cc Ski-Doo Renegade / 1.25-inch track lugs	31 – 54’	40.75’

Observations from ‘35 MPH PASS-BY’ (Normal Mode) Vehicle Operation

UTVs: Tire impressions from normal 35 mph pass-bys averaged between 0.5 and 1.5 inches deep.

Vehicle	Depth of Tire Impression (Inches)	
	Depth Range	Average Depth
Minnesota		
2-passenger 1000cc Polaris General	0.6 – 1.2”	0.9”
4-passenger 1000cc Polaris RZR	0.8 – 2.0”	1.5”
Footprints on Trail	1.6 – 2.8”	2.0”
Wisconsin		
2-passenger 500cc Polaris Ranger	0.4 – 1.2”	0.7”
2-passenger 800cc Polaris RZR	0.4 – 1.2”	0.8”
4-passenger 1000cc Polaris Ranger	0.4 – 0.6”	0.5”
Footprints on Trail	0.8 – 1.6”	1.3”

SNOWMOBILES: Track impressions averaged between 0.4 and 0.8 inches deep.

Vehicle	Depth of Track Impression (Inches)	
	Depth Range	Average Depth
Minnesota		
600cc Polaris RMK / 2.0-inch track lugs	0.6 – 0.8”	0.7”
700cc Polaris SKS / 1.25-inch track lugs	0.4”	0.4”
800cc Polaris Pro / 2.5-inch track lugs	0.4 – 0.8”	0.5”
Footprints on Trail	1.6 – 2.8”	2.0”
Wisconsin		
800cc Polaris Switchback Assault /1.35-inch track lugs	0.8”	0.8”
900cc Ski-Doo Renegade X / 1.25-inch track lugs	0.4 – 0.8”	0.5”
900cc Ski-Doo Renegade / 1.25-inch track lugs	0.4 – 0.8”	0.7”
Footprints on Trail	0.8 – 1.6”	1.3”

- Neither vehicle type created severe rutting or trenching of the trail surface. Tire and track impressions on the snow surface were generally what is considered normal "surface chew." The overall average UTV tire impression depths were only 0.28 inch deeper than the average depth of snowmobile track impressions (0.88-inch overall average from UTVs versus 0.60-inch from snowmobiles).
- Comparatively, footprints on the trail ranged between 0.8 inch and 2.8 inches in depth – with an average depth of 2.0 inches during Minnesota testing and 1.3 inches during Wisconsin testing (a 1.65-inch-deep average = twice as deep as UTVs and 2.75 times deeper than snowmobiles).

Observations from 'AGGRESSIVE STOPS' (Worst-Case Mode) Vehicle Operation

- **FULL RANGE OF DEPTH IMPRESSIONS:** The full range of tire impression depths created by UTVs during aggressive stops were nearly identical to the range of snowmobile track impression depths created during testing. Overall tire impression depths created by UTVs during aggressive stops ranged from 0.4 to 3.5 inches deep, while overall snowmobile track impression depths ranged from 0.4 to 3.9 inches deep.

- **AVERAGE DEPTH OF AGGRESSIVE STOP IMPRESSIONS:** The average depth of UTV tire impressions was generally similar to the average depth of snowmobile track impressions:

  UTVs: The average depth of tire impressions ranged from 0.8 inch to 2.0 inches deep.

Vehicle	Average Tire Impression Depth (Inch)
Minnesota	
2-passenger 1000cc Polaris General	1.2"
4-passenger 1000cc Polaris RZR	2.0"
Wisconsin	
2-passenger 500cc Polaris Ranger	0.8"
2-passenger 800cc Polaris RZR	1.2"
4-passenger 1000cc Polaris Ranger	0.75"

  SNOWMOBILES: The average depth of track impressions ranged from 0.6 inch to 2.2 inches deep.

Vehicle	Average Track Impression Depth (Inch)
Minnesota	
600cc Polaris RMK / 2.0-inch track lugs	0.7"
700cc Polaris SKS / 1.25-inch track lugs	0.6"
800cc Polaris Pro / 2.5-inch track lugs	2.2"
Wisconsin	
800cc Polaris Switchback Assault / 1.35-inch track lugs	0.8"
900cc Ski-Doo Renegade X / 1.25-inch track lugs	0.7"
900cc Ski-Doo Renegade / 1.25-inch track lugs	1.0"

- **MAXIMUM DEPTH OF AGGRESSIVE STOP IMPRESSIONS:** The maximum depth of UTV tire impressions were, generally, slightly deeper than snowmobile track impressions even though the deepest snowmobile track impression was 3.9 inches deep compared to the deepest UTV tire impression being only 3.5 inches deep:

  UTVs: The maximum depth of tire impressions ranged from 0.8 inch to 3.5 inches deep.

Vehicle	Maximum Tire Impression Depth (Inch)
Minnesota	
2-passenger 1000cc Polaris General	2.0"
4-passenger 1000cc Polaris RZR	3.5"
Wisconsin	
2-passenger 500cc Polaris Ranger	1.2"
2-passenger 800cc Polaris RZR	1.6"
4-passenger 1000cc Polaris Ranger	0.8"

SNOWMOBILES: The maximum depth of track impressions ranged from 0.6 inch to 3.9 inches deep.

Vehicle	Maximum Track Impression Depth (In.)
Minnesota	
600cc Polaris RMK / 2.0-inch track lugs	1.0”
700cc Polaris SKS / 1.25-inch track lugs	0.6”
800cc Polaris Pro / 2.5-inch track lugs	3.9”
Wisconsin	
800cc Polaris Switchback Assault /1.35-inch track lugs	0.8”
900cc Ski-Doo Renegade X / 1.25-inch track lugs	0.8”
900cc Ski-Doo Renegade / 1.25-inch track lugs	1.6”

- **MINIMUM DEPTH OF AGGRESSIVE STOP IMPRESSIONS:** The minimum depth of UTV tire and snowmobile track impressions were overall very similar, except for one UTV’s impression being 0.4 inch deeper.

UTVs: The minimum depth of tire impressions ranged from 0.4 to 1.2 inches deep.

Vehicle	Minimum Tire Impression Depth (Inch)
Minnesota	
2-passenger 1000cc Polaris General	0.4”
4-passenger 1000cc Polaris RZR	1.2”
Wisconsin	
2-passenger 500cc Polaris Ranger	0.6”
2-passenger 800cc Polaris RZR	0.8”
4-passenger 1000cc Polaris Ranger	0.6”

SNOWMOBILES: The minimum depth of track impressions ranged from 0.4 to 0.8 inches deep.

Vehicle	Minimum Track Impression Depth (In.)
Minnesota	
600cc Polaris RMK / 2.0-inch track lugs	0.4”
700cc Polaris SKS / 1.25-inch track lugs	0.6”
800cc Polaris Pro / 2.5-inch track lugs	0.8”
Wisconsin	
800cc Polaris Switchback Assault /1.35-inch track lugs	0.8”
900cc Ski-Doo Renegade X / 1.25-inch track lugs	0.6”
900cc Ski-Doo Renegade / 1.25-inch track lugs	0.6”

- **WIDTH OF IMPRESSIONS FROM AGGRESSIVE STOPS:** The majority of both vehicle types experienced a slight degree of side-to side movement during 35 mph stops.

UTVs: Tire impression width ranged from 9 to 12 inches wide, indicating slight side-to-side sliding by 3 of the 5 UTVs.

Vehicle	Width of Tire Impression (Inches)	
	Width Range	Average Width
Minnesota		
2-passenger 1000cc Polaris General	9 – 12”	9.4”
4-passenger 1000cc Polaris RZR	10 – 11.5”	10.9”
Wisconsin		
2-passenger 500cc Polaris Ranger	9”	9”
2-passenger 800cc Polaris RZR	10 – 11”	10.5”
4-passenger 1000cc Polaris Ranger	12”	12”

SNOWMOBILES: Track impression width ranged from 15 to 19 inches wide, indicating slight side-to-side sliding by 2 of the 6 snowmobiles and a more significant amount of sliding by the 800 Assault.

Vehicle	Length of Track Impression (Feet)	
	Distance Range	Average Distance
Minnesota		
600cc Polaris RMK / 2.0-inch track lugs	15 – 16”	15.25”
700cc Polaris SKS / 1.25-inch track lugs	15”	15”
800cc Polaris Pro / 2.5-inch track lugs	15”	15”
Wisconsin		
800cc Polaris Switchback Assault /1.35-inch track lugs	18 – 19”	18.5”
900cc Ski-Doo Renegade X / 1.25-inch track lugs	15 – 17”	16”
900cc Ski-Doo Renegade / 1.25-inch track lugs	15 – 16”	15.5”

- **COMPARISON OF STOPPING DISTANCE AT 35 MPH:** The overall average stopping distance for all UTVs was shorter than all snowmobiles, with the overall average snowmobile stopping distance being 43.3% greater than the overall average UTV stopping distance:

UTVs: The average stopping distance ranged from 38.25 feet up to 50.6 feet.

Vehicle	Length of Tire Impression (Feet)	
	Distance Range	Average Distance
Minnesota		
2-passenger 1000cc Polaris General	32 – 66’	49.4’
4-passenger 1000cc Polaris RZR	32.5 – 71’	49.4’
Wisconsin		
2-passenger 500cc Polaris Ranger	22 – 48’	38.25’
2-passenger 800cc Polaris RZR	36.5 – 55’	46.1’
4-passenger 1000cc Polaris Ranger	40 – 60’	50.6’

SNOWMOBILES: The average stopping distance ranged from 52.25 feet up to 112.25 feet.

Vehicle	Length of Track Impression (Feet)	
	Distance Range	Average Distance
Minnesota		
600cc Polaris RMK / 2.0-inch track lugs	42 – 70’	53.1’
700cc Polaris SKS / 1.25-inch track lugs	65 – 66’	65.5’
800cc Polaris Pro / 2.5-inch track lugs	48 – 75’	62.6’
Wisconsin		
800cc Polaris Switchback Assault /1.35-inch track lugs	95 – 127’	112.25’
900cc Ski-Doo Renegade X / 1.25-inch track lugs	46 – 66’	56.25’
900cc Ski-Doo Renegade / 1.25-inch track lugs	44 – 67’	52.25’

2021 UTV TESTING RESULTS AS COMPARED TO ALL OTHER PREVIOUS ASSESSMENTS

Appendix 1 on page 34 provides a summary of all depth impression measurements collected during the four assessments conducted by Trails Work Consulting between 2006 and 2021. Accordingly, Appendix 1 tables include data collected during the 2006 Assessment of Wheeled ATV Use on Groomed Snowmobile Trails, the 2014 Assessment of Tracked OHV Use on Groomed Snowmobile Trails, the 2015 Supplemental Assessment of Tracked OHVs on Groomed Snowmobile Trails, and the most current 2021 Assessment of Wheeled UTV Use on Groomed Snowmobile Trails. All assessments had similar results showing that impressions created by wheeled ATVs and UTVs are very similar to those created by snowmobiles operated on the same groomed snowmobile trails under the same conditions, while impressions created by tracked ATVs and UTVs were found to be less than those created by snowmobiles operated on the same groomed snowmobile trails under the same conditions. This overall similarity prevailed despite air temperatures ranging between plus 46 degrees Fahrenheit and minus 15 degrees Fahrenheit during the four separate assessment events.

UTV Field Testing Journal: February 9, 2021
Duquette, Minnesota (MN 1)

Field Study Code/Number: MN 1
Location: Nemadji State Forest near Erickson Parking Area; east of Duquette, MN
Elevation: 1190
Temperature Range: minus 15 (start) to plus 1 (end) degrees F
Time of Day: 9:30 AM to 12:15 PM
Weather: cloudy, calm and cold
Trail Aspect: flat
Trail Conditions: firmly packed and smooth; last groomed late the prior afternoon (approximately 16 hours prior to start of testing) and was in good condition
Compacted Snow Depth: 6 to 8 inches – firmly packed to the ground
Uncompacted snow depth adjacent to the trail: 14 to 16 inches
Area Grooming Equipment: 2020 Tucker Sno-Cat 2000 with 8'6" Arrowhead grooming drag
Days Groomed this Season: began grooming on December 31, 2020; was groomed three times in January (7, 19 & 25) and two times in February (1 & 8); so, had been groomed a total of six times over a 40-day period (average of once every 6.7 days) prior to testing

TEST VEHICLES

UTV #1	**2020 Polaris General 1000cc**: 2-seat, 4x4, auto transmission, 27 x 9-14 front & 27 x 11-14 rear tires / 0.75" lugs, 64" width, 1,712# dry weight
UTV #2	**2019 Polaris RZR 1000cc**: 4-seat, 4x4, auto transmission, 29 x 9-14 front & 29 x 11-14 rear tires / 0.75" lugs, 64" width, 1,659# dry weight
Snowmobile #1	**2020 Polaris Pro RMK 800cc**: 155 x 15 x 2.5" track, 43.5" width, 413# dry weight
Snowmobile #2	**2020 Polaris RMK 600cc**: 144 x 15 x 2.0" track, 46.5" width, 480# dry weight
Snowmobile #3	**1999 Polaris SKS 700cc**: 120 x 15 x 1.25" track, 46.5" width, 512# dry weight

INDIVIDUAL VEHICLE OBSERVATIONS

UTV #1: 2020 Polaris General 1000cc, 2-seat

Aggressive Starts: resulted in tire tracks that varied from 4 to 6 centimeters (1.6 to 2.4 inches) deep, with an average depth of 1.9 inches. Tire tracks varied from 9 to 12 inches wide during the aggressive starts, with an average width of 10.9 inches. Tires tracks at this depth were visible for 33 to 69 feet from the take-off point, with the average visible distance at this depth being 42.4 feet.

35 mph Pass-Bys: resulted in visible tire tracks 1.5 to 3 centimeters (0.6 to 1.2 inches) deep, with an average depth of about 0.9 inch. The vehicle left no visible trenching or rutting when operating in the pass-by zone.

Aggressive Stops: resulted in tire impressions that varied from 1 to 5 centimeters (0.4 to 2.0 inches) deep, with an average depth of 1.2 inches, and ranged from 9 to 12 inches wide with an average width of 9.4 inches. Stopping distance at 35 mph ranged from 32 to 66 feet, with an average stopping distance of 49.4 feet.

Photos 4 & 5: front and rear views of UTV #1

UTV #2: 2019 Polaris RZR 1000cc, 4-seat

Aggressive Starts: resulted in tire tracks that varied from 5 to 8 centimeters (2.0 to 3.1 inches) deep, with an average depth of 2.5 inches. Tire tracks varied from 10 to 11.5 inches wide during the aggressive starts, with an average width of 10.9 inches. Tires tracks at this depth were visible for 43 to 81 feet from the take-off point, with the average visible distance at this depth being 70 feet.

35 mph Pass-Bys: resulted in visible tire tracks 2 to 5 centimeters (0.8 to 2 inches) deep, with an average depth of 1.5 inches. The vehicle left no visible trenching or rutting when operating in the pass-by zone.

Aggressive Stops: resulted in tire impressions that varied from 3 to 9 centimeters (1.2 to 3.5 inches) deep, with an average depth of 2 inches, and were 10 to 11.5 inches wide with an average width of 10.9 inches. Stopping distance at 35 mph ranged from 32.5 to 71 feet, with an average stopping distance of 49.4 feet.

Photos 6 & 7: front and rear views of UTV #2

Snowmobile #1: 2020 Polaris Pro 800cc (155 x 15 x 2.5" track)

Aggressive Starts: resulted in track marks that were 3 to 8 centimeters (1.2 to 3.1 inches) deep, with an average depth of 2.0 inches. Track impressions were consistently 15 inches in width, indicating firm track hook-up with no side-to-side fishtailing. Track impressions in the trail were visible for 26 to 95 feet from the take-off point, with an average visible distance at this depth being 47.5 feet.

35 mph Pass-Bys: resulted in visible track impressions 1 to 2 centimeters (0.4 to 0.8 inch) deep, with an average depth of 0.5 inch. The vehicle left no visible trenching or rutting when operating in the pass-by zone, only what would be considered normal surface chew from a track.

Aggressive Stops: Stops resulted in trail surface impressions that were 2 to 10 centimeters (0.8 to 3.9 inches) deep, with an average depth of 2.2 inches. Impressions were consistently 15 inches wide with no side-to-side fishtailing. Stopping distance at 35 mph ranged from 48 to 75 feet, with an average stopping distance of 62.6 feet.

Photos 8 & 9: front and rear views of Snowmobile #1

Snowmobile #2: 2020 Polaris RMK 600cc (144 x 15 x 2.0" track)

Aggressive Starts: resulted in track marks that were 2.5 to 5 centimeters (1.0 to 2.0 inches) deep, with an average depth of 1.4 inches. Track impressions were consistently 15 inches in width, indicating firm track hook-up with no side-to-side fishtailing. Track impressions in the trail were visible for 14 to 25 feet from the take-off point, with an average visible distance at this depth being 19.75 feet.

35 mph Pass-Bys: resulted in visible track impressions 1.5 to 2 centimeters (0.6 to 0.8 inch) deep, with an average depth of 0.7 inch. The vehicle left no visible trenching or rutting when operating in the pass-by zone, only what would be considered normal surface chew from a track.

Aggressive Stops: Stops resulted in trail surface impressions that were 1 to 2.5 centimeters (0.4 to 1.0 inch) deep, with an average depth of 0.7 inch, and were 15 to 16 inches wide, indicating a slight amount of side-to-side fishtailing with an average width of 15.25 inches. Stopping distance at 35 mph ranged from 42 to 70 feet, with an average stopping distance of 53.1 feet.

Photos 10 & 11: front and rear views of Snowmobile #2

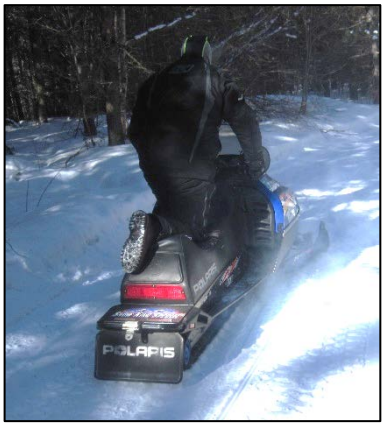
Snowmobile #3: 1999 Polaris SKS 700cc (120 x 15 x 1.25" track)

Aggressive Starts: resulted in track marks that were consistently 2 centimeters (0.8 inch) deep. Track impressions were consistently 15 inches in width, indicating firm track hook-up with no side-to-side fishtailing. Track impressions in the trail were visible for 35 to 37 feet from the take-off point, with an average visible distance at this depth being 36 feet.

35 mph Pass-Bys: resulted in visible track impressions that were consistently 1 centimeter (0.4 inch) deep. The vehicle left no visible trenching or rutting when operating in the pass-by zone, only what would be considered minimal surface chew from a track.

Aggressive Stops: Stops resulted in trail surface impressions that were consistently 1.5 centimeters (0.6 inch) deep and consistently 15 inches wide. Stopping distance at 35 mph ranged from 65 to 66 feet, with an average stopping distance of 65.5 feet.

Photos 12 & 13: front and rear views of Snowmobile #3



SUMMARY OF OBSERVATIONS

35 mph Pass-Bys

In this 'normal operation' testing scenario, tire and track impressions ranged from 1 to 5 centimeters (0.4 to 2 inches) deep, with the average snowmobile track impressions being in the 0.4 to 0.7-inch range and the average UTV tire impressions being slightly deeper in the 0.9 to 1.5-inch range. All impressions were consistent with what is considered normal 'surface chew' when tires or tracks are operated over a well compacted snow surface. None of the vehicles created noticeable adverse impacts when operated in the 35-mph pass-by mode.

Aggressive Starts

In this 'worst-case' testing scenario, the range of impressions in the trail created by UTVs and snowmobiles were very similar. Aggressive starts resulted in UTV tire impressions that ranged from 3 to 8 centimeters (1.2 to 3.1 inches) deep that were 9 to 12 inches wide. Snowmobile track impressions ranged from 2 to 8 cm (0.8 to 3.1 inches) deep and were consistently 15 inches wide. The deepest UTV tire and snowmobile track impressions during starts were both 8 centimeters / 3.1 inches deep from the RZR 1000 UTV and the 800 Pro snowmobile with 2 ½" track lugs.

Photo 14: impressions from aggressive starts – (left side of photo) UTV #2 / RZR 1000 and (right side of photo) snowmobile #2 / RMK 600

Stopping Distances

The two UTVs stopped in a shorter distance than all three of the snowmobiles. The average UTV stopping distance at 35 mph was 49.4 feet for both vehicles, while the average snowmobile stopping distance ranged from 53.1 to 65.5 feet. The minimum average UTV stopping distance (the 4-seat RZR and 2-seat General, both at 49.4 feet) was 3.7 feet (7.5%) less than the shortest average snowmobile stopping distance (the RMK at 53.1 feet), while the maximum average snowmobile stopping distance (the SKS at 65.5 feet) was 32.6% greater than the average UTV stopping distance of 49.4 feet. The 4-seat RZR logged the greatest single distance to stop of the two UTVs at 71 feet, while the 800 Pro Polaris snowmobile logged the greatest single distance to stop of the three snowmobiles at 75 feet.

Footprints

For comparative purpose, footprints from foot traffic on the groomed trail surface during testing generally ranged from 4 to 7 centimeters (1.6 to 2.8 inches) deep, with an average depth of 2.0 inches.

Photo 15: footprint on trail

Aggressive Stops

In this 'worst-case' testing scenario, the range of impressions created in the trail by UTVs and snowmobiles were also relatively similar. Aggressive stops resulted in UTV tire impressions that were 1 to 9 centimeters (0.4 to 3.5 inches) deep and 10 to 11.5 inches wide while snowmobile track impressions were 1 to 10 centimeters (0.4 to 3.9 inches) deep and between 15 to 16 inches wide due to very slight side-to-side fishtailing. The deepest UTV tire track impressions during stops were 9 centimeters (3.5 inches) deep from the RZR 1000, while the deepest snowmobile track impressions during stops were 10 centimeters (3.9 inches) deep from the 800 Pro snowmobile with 2 ½" track lugs.

Photo 16: impressions from aggressive stop– (right) snowmobile #1 / Pro 800

Photo 17: impressions from aggressive stop– (below) UTV #1 / General 1000

Photo 18: impressions from aggressive stop– (below) UTV #2 / RZR 1000

Regulatory Signing

This groomed trail allows shared use by OHVs and snowmobiles when the air temperature is 30 degrees Fahrenheit and below. Class I OHVs are ATVs and Class II OHVs are UTVs (side-by-sides).

UTV Field Testing Journal: February 11, 2021
Danbury, Wisconsin (WI 1)

Field Study Code/Number: WI 1
Location: State Corridor Trail 45, adjacent to Tower Road east of Danbury, Wisconsin
Elevation: 1008
Temperature Range: minus 12 (start) to minus 4 (end) degrees F
Time of Day: 11:00 AM to 1:15 PM
Weather: clear, calm and cold
Trail Aspect: flat
Trail Conditions: hard packed and very slight surface wear from traffic; last groomed the prior day (approximately 30 hours prior to testing) and was in good condition even though there had been some snowmobile traffic on the trail
Compacted Snow Depth: 4 to 6 inches – firmly packed to the ground
Uncompacted snow depth adjacent to the trail: 12 to 16 inches
Area Grooming Equipment: 2019 John Deere 6430 with 8'6" Ultimate grooming drag
Days Groomed this Season: began grooming on December 25, 2020; was groomed two more times in December (30 & 31), five times in January (1, 4, 19, 25 & 27), and five times in February (1, 4 ,5, 9 & 10); so, had been groomed a total of thirteen times over a 48-day period (average of once every 3.7 days) prior to testing.

TEST VEHICLES

UTV #1	**2019 Polaris Ranger 1000cc**: 4-seat, 4x4, auto transmission, 27 x 9-12 front & 27 x 11-12 rear tires / 0.75" lugs, 62.5" width, 1,936# dry weight
UTV #2	**2015 Polaris RZR 800cc**: 2-seat, 4x4, auto transmission, 25 x 8-12 front & 25 x 10-12 rear tires / 0.75" lugs, 50" width, 993# dry weight
UTV #3	**2008 Polaris Ranger 500cc**: 2-seat, 4x4, auto transmission, 25 x 10-12 front & 25 x 11-12 rear tires / 0.25" lugs, 60" width, 1,185# dry weight w/o cab
Snowmobile #1	**2019 Ski-Doo Renegade X 900cc**: 137 x 15 x 1.25" track, 47.9" width, 528# dry weight
Snowmobile #2	**2019 Ski-Doo Renegade 900cc**: 137 x 15 x 1.25" track, 47.9" width, 499# dry weight
Snowmobile #3	**2019 Polaris Switchback Assault 800cc**: 144 x 15 x 1.35" track, 47" width, 456# dry weight

INDIVIDUAL VEHICLE OBSERVATIONS

<u>UTV #1: 2019 Polaris Ranger 1000cc, 4-seat</u>
Aggressive Starts: resulted in tire tracks that varied from 2 to 4 centimeters (0.8 to 1.6 inches) deep, with an average depth of 1 inch. Tire tracks varied from 10 to 12 inches wide during the aggressive starts, with an average width of 11.5 inches. Tires tracks at this depth were visible for 51 to 77 feet from the take-off point, with the average visible distance at this depth being 60.3 feet.

35 mph Pass-Bys: resulted in visible tire tracks 1 to 1.5 centimeters (0.4 to 0.6 inch) deep, with an average depth of about 0.5 inch. The vehicle left no visible trenching or rutting when operating in the pass-by zone.

Aggressive Stops: resulted in tire impressions that varied from 1.5 to 2 centimeters (0.6 to 0.8 inch) deep, with an average depth of 0.75 inch, and were consistently about 12 inches wide. Stopping distance at 35 mph ranged from 40 to 60 feet, with an average stopping distance of 50.6 feet.

Photos 19 & 20: front and rear views of UTV #1

UTV #2: 2015 Polaris RZR 800cc, 2-seat

Aggressive Starts: resulted in tire tracks that varied from 3 to 5 centimeters (1.2 to 2 inches) deep, with an average depth of 1.5 inches. Tire tracks varied from 9 to 11 inches wide during the aggressive starts, with an average width of 10.5 inches. Tires tracks at this depth were visible for 43 to 75 feet from the take-off point, with the average visible distance at this depth being 58.75 feet.

35 mph Pass-Bys: resulted in visible tire tracks 1 to 3 centimeters (0.4 to 1.2 inch) deep, with an average depth of 0.8 inch. The vehicle left no visible trenching or rutting when operating in the pass-by zone.

Aggressive Stops: resulted in tire impressions that varied from 2 to 4 centimeters (0.8 to 1.6 inches) deep, with an average depth of 1.2 inches, and were 10 to 11 inches wide with an average width of 10.5 inches. Stopping distance at 35 mph ranged from 36.5 to 55 feet, with an average stopping distance of 46.1 feet.

Photos 21 & 22: front and rear views of UTV #2

UTV #3: 2008 Polaris Ranger 500cc, 2-seat

Aggressive Starts: resulted in tire tracks that varied from 3 to 4 centimeters (1.2 to 1.6 inches) deep, with an average depth of 1.4 inches. Tire tracks varied from 10 to 12 inches wide during the aggressive starts, with an average width of 11 inches. Tires tracks at this depth were visible for 26 to 71 feet from the take-off point, with the average visible distance at this depth being 49.25 feet.

35 mph Pass-Bys: resulted in visible tire tracks 1 to 3 centimeters (0.4 to 1.2 inch) deep, with an average depth of 0.7 inch. The vehicle left no visible trenching or rutting when operating in the pass-by zone.

Aggressive Stops: resulted in tire impressions that varied from 1.5 to 3 centimeters (0.6 to 1.2 inches) deep, with an average depth of 0.8 inch, and were consistently about 9 inches wide. Stopping distance at 35 mph ranged from 22 to 48 feet, with an average stopping distance of 38.25 feet.

Photos 23 & 24: front and rear views of UTV #3

Snowmobile #1: 2019 Ski-Doo Renegade X 900cc (137 x 15 x 1.25" track)

Aggressive Starts: resulted in track marks that were 2.5 to 6 centimeters (1 to 2.4 inches) deep, with an average depth of 1.4 inches. Track impressions were consistently 15 inches in width, indicating firm track hook-up with no side-to-side fishtailing. Track impressions in the trail were visible for 44 to 82 feet from the take-off point, with an average visible distance at this depth being 67.5 feet.

35 mph Pass-Bys: resulted in visible track impressions 1 to 2 centimeters (0.4 to 0.8 inch) deep, with an average depth of 0.5 inch. The vehicle left no visible trenching or rutting when operating in the pass-by zone, only what would be considered normal surface chew from a track.

Aggressive Stops: Stops resulted in trail surface impressions that were 1.5 to 2 centimeters (0.6 to 0.8 inches) deep, with an average depth of 0.7 inch, and were 15 to 17 inches wide indicating a slight amount of side-to-side fishtailing, with an average width of 16 inches. Stopping distance at 35 mph ranged from 46 to 66 feet, with an average stopping distance of 56.25 feet.

Photos 25 & 26: front and rear views of Snowmobile #1

Snowmobile #2: 2019 Ski-Doo Renegade 900cc (137 x 15 x 1.25" track)

Aggressive Starts: resulted in track marks that were 4 to 5 centimeters (1.6 to 2 inches) deep, with an average depth of 1.8 inches. Track impressions were consistently 15 inches in width, indicating firm track hook-up with no side-to-side fishtailing. Track impressions in the trail were visible for 31 to 54 feet from the take-off point, with an average visible distance at this depth being 40.75 feet.

35 mph Pass-Bys: resulted in visible track impressions 1 to 2 centimeter (0.4 to 0.8 inch) deep, with an average depth of 0.7 inch. The vehicle left no visible trenching or rutting when operating in the pass-by zone, only what would be considered normal surface chew from a track.

Aggressive Stops: Stops resulted in trail surface impressions that were 1.5 to 4 centimeters (0.6 to 1.6 inches) deep, with an average depth of 1.0 inch, and were 15 to 16 inches wide indicating only a very slight amount of side-to-side fishtailing, with an average width of 15.5 inches. Stopping distance at 35 mph ranged from 44 to 67 feet, with an average stopping distance of 52.25 feet.

Photos 27 & 28: front and rear views of Snowmobile #2

Snowmobile #3: 2019 Polaris Switchback Assault 800cc (144 x 15 x 1.35" track)

Aggressive Starts: resulted in track marks that were 3 to 4.5 centimeters (1.2 to 1.8 inches) deep, with an average depth of 1.4 inches. Track impressions were consistently 15 inches in width, indicating firm track hook-up with no side-to-side fishtailing. Track impressions in the trail were visible for 35 to 38 feet from the take-off point, with an average visible distance at this depth being 36.5 feet.

35 mph Pass-Bys: resulted in visible track impressions that were consistently 2 centimeters (0.8 inch) deep. The vehicle left no visible trenching or rutting when operating in the pass-by zone, only what would be considered normal surface chew from a track.

Aggressive Stops: Stops resulted in trail surface impressions that were consistently 2 centimeters (0.8 inch) deep and 18 to 19 inches wide, indicating a greater amount of side-to-side fishtailing, with an average width of 18.5 inches. Stopping distance at 35 mph ranged from 95 to 127 feet, with an average stopping distance of 112.25 feet.

Photos 29 & 30: front and rear views of Snowmobile #3

SUMMARY OF OBSERVATIONS

35 mph Pass-Bys

In this 'normal operation' testing scenario, tire and track impressions ranged from 1 to 3 centimeters (0.4 to 1.2 inches) deep, with the average snowmobile track and UTV tire impressions both being in the 0.5 to 0.8-inch range. All impressions were consistent with what is considered normal 'surface chew' when tires or tracks are operated over a well compacted snow surface. None of the vehicles created noticeable adverse impacts when operated in the 35-mph pass-by mode.

Footprints

For comparative purpose, footprints on the groomed trail surface during testing generally ranged from 2 to 4 centimeters (0.8 to 1.6 inches) deep, with an average depth of 1.3 inches.

Photo 31: footprint on trail

Stopping Distances

All three UTVs stopped in a shorter distance than what the three snowmobiles did. The average UTV stopping distance at 35 mph ranged from 38.25 to 50.6 feet, while the average snowmobile stopping distance ranged from 52.25 to 112.25 feet. The minimum average UTV stopping distance (the 2-seat Ranger at 38.25 feet) was 14 feet (26.7%) less than the shortest average snowmobile stopping distance (the Renegade at 52.25 feet), while the maximum average snowmobile stopping distance (the Assault at 112.25 feet) was 121.8% greater than the longest average UTV stopping distance (4-seat Ranger at 50.6 feet). The average stopping distance of the 2-seat Ranger was the shortest of the three UTVs, while the average stopping distance of the Renegade (snowmobile #2) was the shortest of the three snowmobiles. The 4-seat Ranger logged the

greatest single distance to stop of the three UTVs at 60 feet, while the Assault logged the greatest single distance to stop of the three snowmobiles at 127 feet.

Aggressive Starts

In this 'worst-case' testing scenario, impressions in the trail created by snowmobiles were just slightly deeper than impressions created by UTVs. Aggressive starts resulted in UTV tire impressions that ranged from 2.5 to 5 centimeters (0.8 to 2 inches) deep and from 9 to 12 inches wide. Snowmobile track impressions ranged from 2.5 to 6 cm (1 to 2.4 inches) deep and were consistently 15 inches wide. The deepest snowmobile track impressions were only slightly deeper (1 centimeter / 0.4 inch) than the deepest UTV tire impressions.

Photo 32: (above) impressions from Snowmobile #1 / 900 Renegade X's aggressive start

Photo 33: (left) impressions from UTV #1 / Ranger 1000's aggressive start

Photo 34: (below) impressions from Snowmobile #2 / 900 Renegade' aggressive start

Photo 35: (below) impressions from UTV #2 / RZR 800's aggressive start

Aggressive Stops

In this 'worst-case' testing scenario, there were no differences between impressions created by UTVs and snowmobiles. Aggressive stops resulted in UTV tire impressions that were 1.5 to 4 centimeters (0.6 to 1.6 inches) deep and 9 to 12 inches wide while snowmobile track impressions were also 1.5 to 4 centimeters (0.6 to 1.6 inches) deep and ranged between 15 to 19 inches wide due to slight side-to-side fishtailing. The deepest UTV tire tracks and snowmobile track impressions were exactly the same at 4 centimeters (1.6 inches) deep.

Photo 36: impression from Snowmobile #3 / 800 Assault's aggressive stop

Photo 37: impression from UTV #2 / 800 RZR's aggressive stop

Regulatory Signing

This trail is open to joint ATV/UTV and snowmobile use from December 1 through March 31.

NOTE: Refer to Appendix 2 on page 40 for information about how concurrent use is funded in Wisconsin.

Exhibit 4: 2021 UTV Testing – Combined Results Table

MINNESOTA VEHICLES	Aggressive Start						35 mph Pass-By		Aggressive Stop					
	Depth Range	Avg. Depth	Width Range	Avg. Width	Distance Range	Avg. Distance	Depth Range	Avg. Depth	Depth Range	Avg. Depth	Width Range	Avg. Width	Distance Range	Avg. Distance
Wheeled UTVs														
2020 Polaris General 1000cc, 2-seat (27 x 9-14 front & 27 x 11-14 rear tires /0.75" lugs)	1.6 – 2.4"	1.9"	9 – 12"	10.9"	33 – 69'	42.4'	0.6 – 1.2"	0.9"	0.4 – 2"	1.2"	9 – 12"	9.4"	32 – 66'	49.4'
2019 Polaris RZR 1000cc, 4-seat (29 x 9-14 front & 29 x 11-14 rear tires / 0.75" lugs)	2 – 3.1"	2.5"	10 – 11.5"	10.9"	43 – 81'	70'	0.8 – 2"	1.5"	1.2 – 3.5"	2"	10 – 11.5"	10.9"	32.5 – 71'	49.4'
Snowmobiles														
2020 Polaris Pro 800cc (155 x 15 x 2.5" track)	1.2 – 3.1"	2"	15"	15"	26 – 95'	47.5'	0.4 – 0.8"	0.5"	0.8 – 3.9"	2.2"	15"	15"	48 – 75'	62.6'
2020 Polaris RMK 600cc (144 x 15 x 2.0" track)	1 – 2"	1.4"	15"	15"	14 – 25'	19.75'	0.6 – 0.8"	0.7"	0.4 – 1"	0.7"	15 – 16"	15.25"	42 – 70'	53.1'
1999 Polaris SKS 700cc (120 x 15 x 1.25" track)	0.8"	0.8"	15"	15"	35 – 37'	36'	0.4"	0.4"	0.6"	0.6"	15"	15"	65 – 66'	65.5'
Footprints on groomed trail							1.6 – 2.8"	2"						

WISCONSIN VEHICLES	Aggressive Start						35 mph Pass-By		Aggressive Stop					
	Depth Range	Avg. Depth	Width Range	Avg. Width	Distance Range	Avg. Distance	Depth Range	Avg. Depth	Depth Range	Avg. Depth	Width Range	Avg. Width	Distance Range	Avg. Distance
Wheeled UTVs														
2019 Polaris Ranger 1000cc, 4-seat (27 x 9-12 front & 27 x 11-12 rear tires /0.75" lugs)	0.8 – 1.6"	1"	10 – 12"	11.5"	51 – 77'	60.3'	0.4 – 0.6"	0.5"	0.6 – 0.8"	0.75"	12"	12"	40 – 60'	50.6'
2015 Polaris RZR 800cc, 2-seat (25 x 8-12 front & 25 x 10-12 rear tires / 0.75" lugs)	1.2 – 2"	1.5"	9 - 11"	10.5"	43 – 75'	58.75'	0.4 – 1.2"	0.8"	0.8 – 1.6"	1.2"	10 – 11"	10.5"	36.5 – 55'	46.1'
2008 Polaris Ranger 500cc, 2-seat (25 x 10-12 front & 25 x 11-12 rear tires / 0.25" lugs)	1.2 – 1.6"	1.4"	10 – 12"	11"	26 – 71'	49.25'	0.4 – 1.2"	0.7"	0.6 – 1.2"	0.8"	9"	9"	22 – 48'	38.25'
Snowmobiles														
2019 Ski-Doo Renegade X 900cc (137 x 15 x 1.25" track)	1 – 2.4"	1.4"	15"	15"	44 – 82'	67.5'	0.4 – 0.8"	0.5"	0.6 – 0.8"	0.7"	15 - 17"	16"	46 – 66'	56.25'
2019 Ski-Doo Renegade 900cc (137 x 15 x 1.25" track)	1.6 – 2"	1.8"	15"	15"	31 – 54'	40.75'	0.4 – 0.8"	0.7"	0.6 – 1.6"	1"	15 – 16"	15.5"	44 – 67'	52.25'
2019 Polaris Switchback Assault 800cc (144 x 15 x 1.35" track)	1.2 – 1.8"	1.4"	15"	15"	35 – 38'	36.5'	0.8"	0.8"	0.8"	0.8"	18 - 19"	18.5"	95 – 127'	112.25'
Footprints on groomed trail							0.8 – 1.6"	1.3"						

APPENDIX 1: SUMMARY OF ALL ON-TRAIL DEPTH IMPRESSIONS DURING ALL FOUR ASSESSMENTS – FROM 2021, 2015, 2014 & 2006 REPORTS

AGGRESSIVE START Test Mode

Test Year	Vehicle Type	Make/Model /Engine Size / (Snowmobiles: also Track Size; UTVs: also 2- or 4-seat capacity)	Testing State	Min. Depth (in.)	Max. Depth (in.)	Avg. Depth (in.)
2021	Snowmobile	2020 Polaris Pro 800 / 2.5”	MN	1.2	3.1	2.0
	Snowmobile	1999 Polaris SKS 700 / 1.25”	MN	0.8	0.8	0.8
	Snowmobile	2020 Polaris RMK 600 / 2.0”	MN	1.0	2.0	1.4
	Snowmobile	2019 Ski-Doo Renegade X 900 / 1.25”	WI	1.0	2.4	1.4
	Snowmobile	2019 Ski-Doo Renegade 900 / 1.25”	WI	1.6	2.0	1.8
	Snowmobile	2019 Polaris Assault 800 / 1.35”	WI	1.2	1.8	1.4
					Overall Snowmobile Average:	**1.5**
	UTV	2020 Polaris General 1000 / 2	MN	1.6	2.4	1.9
	UTV	2019 Polaris RZR 1000 / 4	MN	2.0	3.1	2.5
	UTV	2019 Polaris Ranger 1000 / 4	WI	0.8	1.6	1.0
	UTV	2015 Polaris RZR 800 / 2	WI	1.2	2.0	1.5
	UTV	2008 Polaris Ranger 500 / 2	WI	1.2	1.6	1.4
					Overall Wheeled UTV Average:	**1.7**
2014	Snowmobile	2003 Arctic Cat Fire Cat 500 / 1.0”	WI	0.6	0.8	0.7
	Snowmobile	2012 Arctic Cat T570 / 1.0”	WI	1.2	2.0	1.7
					Overall Snowmobile Average:	**1.2**
	ATV/tracks	2009 Yamaha Grizzly 700 4x4	WI	0.4	1.0	0.6
	UTV/tracks	2009 Polaris Ranger 700 XP / 2	WI	0.8	1.2	0.9
	UTV/tracks	2012 John Deere Gator 825i / 2	WI	0.4	0.8	0.6
					Overall Tracked OHV Average:	**0.7**
2006	Snowmobile	2006 Polaris Switchback 900 / 1.25”	SD#1	0.8	1.2	1.0
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	SD#2	1.2	2.4	2.0
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	WY	1.0	2.0	1.6
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	WI	2.0	2.4	2.2
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	ID	1.6	2.0	1.8
					Control Snowmobile #1 Overall Average:	**1.7**
	Snowmobile	2006 Polaris RMK 700 / 2.0”	SD#1	2.0	2.4	2.2
	Snowmobile	2006 Polaris RMK 700 / 2.0”	SD#2	1.2	2.8	2.2
	Snowmobile	2006 Polaris RMK 700 / 2.0”	WY	1.2	1.6	1.4
	Snowmobile	2006 Polaris RMK 700 / 2.0”	WI	1.2	2.0	1.7
	Snowmobile	2006 Polaris RMK 700 / 2.0”	ID	1.6	2.8	2.4
					Control Snowmobile #2 Overall Average:	**1.8**
	Snowmobile	2005 Arctic Cat F7 / 1.375” / picks	SD#1	1.6	3.9	2.8
	Snowmobile	2004 Arctic Cat Turbo 660 /0 .75”	WY	0.4	0.4	0.4
	Snowmobile	Yamaha Viper 700	WI	0.8	1.6	1.2
	Snowmobile	Arctic Cat Bearcat 660	WI	1.6	2.0	1.8
					Other Snowmobiles Overall Average:	**1.6**
					All Snowmobiles – Overall Average:	**1.7**
	ATV	2005 Polaris Sportsman EFI 700 4x4	SD#1	0.8	2.8	2.0
	ATV	2005 Polaris Sportsman EFI 700 4x4	SD#2	0.8	2.0	1.5
	ATV	2005 Polaris Sportsman EFI 700 4x4	WY	0.8	2.0	1.6
	ATV	2005 Polaris Sportsman EFI 700 4x4	WI	0.8	1.2	1.0

	ATV	2005 Polaris Sportsman EFI 700 4x4	ID	1.2	2.4	1.8
					Control ATV #1 Overall Average:	**1.6**
	ATV	2006 Polaris Predator 500 2x4	SD#2	1.6	2.0	1.8
	ATV	2006 Polaris Predator 500 2x4	SD#1	1.2	2.4	2.0
	ATV	2006 Polaris Predator 500 2x4	WY	1.2	3.1	2.3
	ATV	2006 Polaris Predator 500 2x4	WI	2.0	2.4	2.2
	ATV	2006 Polaris Predator 500 2x4	ID	2.0	4.7	3.5
					Control ATV #2 Overall Average:	**2.4**
	ATV	2005 Bombardier Traxter XL 500 4x4	WY	0.8	2.0	1.7
	ATV	2003 Polaris Sportsman 500 6x6	WY	0.8	1.2	1.0
	ATV	2002 Yamaha Kodiak 400 4x4	WY	0.8	0.8	0.8
	ATV	Kawasaki Brute Force 750	WI	1.6	3.1	2.4
	ATV	Honda Foreman 450	WI	0.8	1.0	0.9
	ATV	2003 Suzuki Vinson 500 4x4	ID	1.2	2.0	1.7
	ATV	2001 Polaris Scrambler 500 4x4	ID	1.2	2.0	1.7
					Other ATVs Overall Average:	**1.5**
					All ATVs – Overall Average:	**1.8**

35-MPH PASS-BY Test Mode

Test Year	Vehicle Type	Make/Model /Engine Size / (Snowmobiles: also Track Size; UTVs: also 2- or 4-seat capacity)	Testing State(s)	Min. Depth (in.)	Max. Depth (in.)	Avg. Depth (in.)
2021	Snowmobile	2020 Polaris Pro 800 / 2.5”	MN	0.4	0.8	0.5
	Snowmobile	1999 Polaris SKS 700 / 1.25”	MN	0.4	0.4	0.4
	Snowmobile	2020 Polaris RMK 600 / 2.0”	MN	0.6	0.8	0.7
	Snowmobile	2019 Ski-Doo Renegade X 900 / 1.25”	WI	0.4	0.8	0.5
	Snowmobile	2019 Ski-Doo Renegade 900 / 1.25”	WI	0.4	0.8	0.7
	Snowmobile	2019 Polaris Assault 800 / 1.35”	WI	0.8	0.8	0.8
					Overall Snowmobile Average:	**0.6**
	UTV	2020 Polaris General 1000 / 2	MN	0.6	1.2	0.9
	UTV	2019 Polaris RZR 1000 / 4	MN	0.8	2.0	1.5
	UTV	2019 Polaris Ranger 1000 / 4	WI	0.4	0.6	0.5
	UTV	2015 Polaris RZR 800 / 2	WI	0.4	1.2	0.8
	UTV	2008 Polaris Ranger 500 / 2	WI	0.4	1.2	0.7
					Overall Wheeled UTV Average:	**0.9**
	Footprints		MN	1.6	2.8	2.0
	Footprints		WI	0.8	1.6	1.3
					Overall Footprint Average:	**1.7**
2015	UTV/tracks	2014 Polaris RZR 570 / 2	SD, WY	1.0	1.0	1.0
	ATV/tracks	2014 Yamaha Grizzly 700 / 1	WY	1.0	1.0	1.0
	Footprints		WY	1.0	1.0	1.0
2014	Snowmobile	2003 Arctic Cat Fire Cat 500 / 1.0”	WI	0.8	0.8	0.8
	Snowmobile	2012 Arctic Cat T570 / 1.0”	WI	0.8	0.8	0.8
					Overall Snowmobile Average:	**0.8**
	ATV/tracks	2009 Yamaha Grizzly 700 / 1	WI	1.2	1.2	1.2
	UTV/tracks	2009 Polaris Ranger 700 XP / 2	WI	1.2	1.2	1.2
	UTV/tracks	John Deere Gator 825i / 2	WI	1.2	1.2	1.2
					Overall Tracked OHV Average:	**1.2**
	Footprints		WI	1.2	2.0	**1.7**

2006	Snowmobile	2006 Polaris Switchback 900 / 1.25”	SD#1	0.8	1.2	1.0
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	SD#2	0.8	1.2	1.0
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	WY	0.8	0.8	0.8
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	WI	1.2	1.2	1.2
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	ID	1.2	1.2	1.2
					Control Snowmobile #1 Overall Average:	**1.0**
	Snowmobile	2006 Polaris RMK 700 / 2.0”	SD#1	1.0	1.6	1.4
	Snowmobile	2006 Polaris RMK 700 / 2.0”	SD#2	0.8	1.2	1.0
	Snowmobile	2006 Polaris RMK 700 / 2.0”	WY	0.8	1.6	1.0
	Snowmobile	2006 Polaris RMK 700 / 2.0”	WI	1.0	1.2	1.1
	Snowmobile	2006 Polaris RMK 700 / 2.0”	ID	1.2	1.6	1.4
					Control Snowmobile #1 Overall Average:	**1.2**
	Snowmobile	2005 Arctic Cat F7 / 1.375”	SD#1	0.8	1.2	1.0
	Snowmobile	2004 Arctic Cat Turbo 660 /0 .75”	WY	0.4	0.4	0.4
	Snowmobile	Yamaha Viper 700	WI	0.6	0.8	0.7
	Snowmobile	Arctic Cat Bearcat 660	WI	0.8	1.0	0.9
					Other Snowmobiles Overall Average:	**0.8**
					All Snowmobiles – Overall Average:	**1.0**
	ATV	2005 Polaris Sportsman EFI 700 4x4	SD#1	0.8	1.2	1.0
	ATV	2005 Polaris Sportsman EFI 700 4x4	SD#2	1.2	1.2	1.2
	ATV	2005 Polaris Sportsman EFI 700 4x4	WY	0.8	0.8	0.8
	ATV	2005 Polaris Sportsman EFI 700 4x4	WI	0.4	0.8	0.7
	ATV	2005 Polaris Sportsman EFI 700 4x4	MN	0.8	1.6	1.2
	ATV	2005 Polaris Sportsman EFI 700 4x4	ID	1.2	1.2	1.2
					Control ATV #1 Overall Average:	**1.0**
	ATV	2006 Polaris Predator 500 2x4	SD#1	0.8	0.8	0.8
	ATV	2006 Polaris Predator 500 2x4	SD#2	1.2	1.2	1.2
	ATV	2006 Polaris Predator 500 2x4	WY	1.2	1.2	1.2
	ATV	2006 Polaris Predator 500 2x4	WI	0.8	1.2	1.0
	ATV	2006 Polaris Predator 500 2x4	MN	0.4	1.6	1.1
	ATV	2006 Polaris Predator 500 2x4	ID	0.8	2.0	1.5
					Control ATV #2 Overall Average:	**1.1**
	ATV	2005 Bombardier Traxter XL 500 4x4	WY	0.8	0.8	0.8
	ATV	2003 Polaris Sportsman 500 6x6	WY	0.8	0.8	0.8
	ATV	2002 Yamaha Kodiak 400 4x4	WY	0.8	0.8	0.8
	ATV	Kawasaki Brute Force 750	WI	0.8	0.8	0.8
	ATV	Honda Foreman 450	WI	0.6	0.8	0.7
	ATV	2003 Suzuki Vinson 500 4x4	ID	0.6	0.6	0.6
	ATV	2001 Polaris Scrambler 500 4x4	ID	1.2	1.2	1.2
					Other ATVs Overall Average:	**0.8**
					All ATVs – Overall Average:	**1.0**
	Footprints		SD#2	0.8	0.8	0.8
	Footprints		WI	1.2	1.2	1.2
	Footprints		ID	2.0	2.0	2.0
	Footprints		MN	0.4	0.4	0.4
					Overall Footprint Average:	**1.1**

AGGRESSIVE STOP Test Mode

Test Year	Vehicle Type	Make/Model /Engine Size / (Snowmobiles: also Track Size; UTVs: also 2- or 4-seat capacity)	Testing State(s)	Min. Depth (in.)	Max. Depth (in.)	Avg. Depth (in.)
2021	Snowmobile	2020 Polaris Pro 800 / 2.5”	MN	0.8	3.9	2.2
	Snowmobile	1999 Polaris SKS 700 / 1.25”	MN	0.6	0.6	0.6
	Snowmobile	2020 Polaris RMK 600 / 2.0”	MN	0.4	1.0	0.7
	Snowmobile	2019 Ski-Doo Renegade X 900 / 1.25”	WI	0.6	0.8	0.7
	Snowmobile	2019 Ski-Doo Renegade 900 / 1.25”	WI	0.6	1.6	1.0
	Snowmobile	2019 Polaris Assault 800 / 1.35”	WI	0.8	0.8	0.8
					Overall Snowmobile Average:	**1.0**
	UTV	2020 Polaris General 1000 / 2	MN	0.4	2.0	1.2
	UTV	2019 Polaris RZR 1000 / 4	MN	1.2	3.5	2.0
	UTV	2019 Polaris Ranger 1000 / 4	WI	0.6	0.8	0.75
	UTV	2015 Polaris RZR 800 / 2	WI	0.8	1.6	1.2
	UTV	2008 Polaris Ranger 500 / 2	WI	0.6	1.2	0.8
					Overall Wheeled UTV Average:	**1.19**
2014	Snowmobile	2003 Arctic Cat Fire Cat 500 / 1.0”	WI	1.2	3.1	2.4
	Snowmobile	2012 Arctic Cat T570 / 1.0”	WI	1.8	2.8	2.3
					Overall Snowmobile Average:	**2.35**
	ATV/tracks	2009 Yamaha Grizzly 700 / 1	WI	1.2	2.4	1.8
	UTV/tracks	2009 Polaris Ranger 700 XP / 2	WI	0.6	2.0	1.3
	UTV/tracks	John Deere Gator 825i / 2	WI	0.8	2.0	1.4
					Overall Tracked OHV Average:	**1.5**
2006	Snowmobile	2006 Polaris Switchback 900 / 1.25”	SD#1	0.8	1.2	1.0
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	SD#2	0.8	1.2	1.0
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	WY	2.0	2.0	2.0
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	WI	0.8	2.0	1.5
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	ID	1.2	2.0	1.6
					Control Snowmobile #1 Overall Average:	**1.4**
	Snowmobile	2006 Polaris RMK 700 / 2.0”	SD#1	2.0	2.4	2.2
	Snowmobile	2006 Polaris RMK 700 / 2.0”	SD#2	0.8	1.2	1.0
	Snowmobile	2006 Polaris RMK 700 / 2.0”	WY	1.2	1.6	1.4
	Snowmobile	2006 Polaris RMK 700 / 2.0”	WI	1.2	2.0	1.7
	Snowmobile	2006 Polaris RMK 700 / 2.0”	ID	1.6	2.0	1.8
					Control Snowmobile #2 Overall Average:	**1.6**
	Snowmobile	2005 Arctic Cat F7 / 1.375”	SD#1	1.2	1.6	1.4
	Snowmobile	2004 Arctic Cat Turbo 660 /0 .75”	WY	0.4	0.8	0.6
	Snowmobile	Yamaha Viper 700	WI	0.8	1.2	1.0
	Snowmobile	Arctic Cat Bearcat 660	WI	0.8	2.0	1.4
					Other Snowmobiles Overall Average:	**1.1**
					All Snowmobiles – Overall Average:	**1.4**
	ATV	2005 Polaris Sportsman EFI 700 4x4	SD#1	0.8	5.1	2.4
	ATV	2005 Polaris Sportsman EFI 700 4x4	SD#2	0.8	1.2	1.0
	ATV	2005 Polaris Sportsman EFI 700 4x4	WY	0.8	1.6	1.3
	ATV	2005 Polaris Sportsman EFI 700 4x4	WI	0.8	1.2	1.0
	ATV	2005 Polaris Sportsman EFI 700 4x4	ID	1.2	2.0	1.6
					Control ATV #1 Overall Average:	**1.5**
	ATV	2006 Polaris Predator 500 2x4	SD#1	1.6	2.0	1.8
	ATV	2006 Polaris Predator 500 2x4	SD#2	1.2	1.6	1.4
	ATV	2006 Polaris Predator 500 2x4	WY	1.2	1.6	1.4

	ATV	2006 Polaris Predator 500 2x4	WI	0.8	1.6	1.3
	ATV	2006 Polaris Predator 500 2x4	ID	1.2	2.8	2.1
					Control ATV #2 Overall Average:	**1.6**
	ATV	2005 Bombardier Traxter XL 500 4x4	WY	0.8	3.9	2.4
	ATV	2003 Polaris Sportsman 500 6x6	WY	0.8	3.1	2.1
	ATV	2002 Yamaha Kodiak 400 4x4	WY	0.8	1.6	1.2
	ATV	Kawasaki Brute Force 750	WI	1.2	2.0	1.6
	ATV	Honda Foreman 450	WI	0.8	1.0	0.9
	ATV	2003 Suzuki Vinson 500 4x4	ID	0.8	1.6	1.2
	ATV	2001 Polaris Scrambler 500 4x4	ID	1.0	2.4	1.7
					Other ATVs Overall Average:	**1.6**
					All ATVs – Overall Average:	**1.6**

STOPPING DISTANCE Test Mode

Test Year	Vehicle Type	Make/Model /Engine Size / (Snowmobiles: also Track Size; UTVs: also 2- or 4-seat capacity)	Testing State(s)	Min. Length (ft.)	Max. Length (ft.)	Avg. Length (ft.)
2021	Snowmobile	2020 Polaris Pro 800 / 2.5”	MN	48	75	62.6
	Snowmobile	1999 Polaris SKS 700 / 1.25”	MN	65	66	65.5
	Snowmobile	2020 Polaris RMK 600 / 2.0”	MN	42	70	53.1
	Snowmobile	2019 Ski-Doo Renegade X 900 / 1.25”	WI	46	66	56.25
	Snowmobile	2019 Ski-Doo Renegade 900 / 1.25”	WI	44	67	52.25
	Snowmobile	2019 Polaris Assault 800 / 1.35”	WI	95	127	112.25
					Overall Snowmobile Average:	**67.0**
	UTV	2020 Polaris General 1000 / 2	MN	32	66	49.4
	UTV	2019 Polaris RZR 1000 / 4	MN	32.5	71	49.4
	UTV	2019 Polaris Ranger 1000 / 4	WI	40	60	50.6
	UTV	2015 Polaris RZR 800 / 2	WI	36.5	55	46.1
	UTV	2008 Polaris Ranger 500 / 2	WI	22	48	38.25
					Overall Wheeled UTV Average:	**46.8**
2014	Snowmobile	2003 Arctic Cat Fire Cat 500 / 1.0”	WI	169	194	182
	Snowmobile	2012 Arctic Cat T570 / 1.0”	WI	155	185	168
					Overall Snowmobile Average:	**175**
	ATV/tracks	2009 Yamaha Grizzly 700 / 1	WI	25	40	32
	UTV/tracks	2009 Polaris Ranger 700 XP / 2	WI	11	22	17
	UTV/tracks	John Deere Gator 825i / 2	WI	12	20	16
					Overall Tracked OHV Average:	**21.7**
2006	Snowmobile	2006 Polaris Switchback 900 / 1.25”	SD#1			77.4
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	SD#2			81.5
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	WY			89.9
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	WI			67.5
	Snowmobile	2006 Polaris Switchback 900 / 1.25”	ID			76.1
					Control Snowmobile #1 Overall Average:	**78.5**
	Snowmobile	2006 Polaris RMK 700 / 2.0”	SD#1			70.5
	Snowmobile	2006 Polaris RMK 700 / 2.0”	SD#2			82.0
	Snowmobile	2006 Polaris RMK 700 / 2.0”	WY			80.8
	Snowmobile	2006 Polaris RMK 700 / 2.0”	WI			60.8
	Snowmobile	2006 Polaris RMK 700 / 2.0”	ID			74.5
					Control Snowmobile #2 Overall Average:	**73.7**

	Snowmobile	2005 Arctic Cat F7 / 1.375”	SD#1			56.8
	Snowmobile	2004 Arctic Cat Turbo 660 /0 .75”	WY			65.3
	Snowmobile	Yamaha Viper 700	WI			73.5
	Snowmobile	Arctic Cat Bearcat 660	WI			74.2
Other Snowmobiles Overall Average:						**67.5**
All Snowmobiles – Overall Average:						**73.6**
	ATV	2005 Polaris Sportsman EFI 700 4x4	SD#1			65.0
	ATV	2005 Polaris Sportsman EFI 700 4x4	SD#2			83.6
	ATV	2005 Polaris Sportsman EFI 700 4x4	WY			69.2
	ATV	2005 Polaris Sportsman EFI 700 4x4	WI			49.0
	ATV	2005 Polaris Sportsman EFI 700 4x4	ID			36.7
Control ATV #1 Overall Average:						**60.7**
	ATV	2006 Polaris Predator 500 2x4	SD#1			90.7
	ATV	2006 Polaris Predator 500 2x4	SD#2			64.4
	ATV	2006 Polaris Predator 500 2x4	WY			76.0
	ATV	2006 Polaris Predator 500 2x4	WI			37.4
	ATV	2006 Polaris Predator 500 2x4	ID			53.5
Control ATV #2 Overall Average:						**64.4**
	ATV	2005 Bombardier Traxter XL 500 4x4	WY			52.2
	ATV	2003 Polaris Sportsman 500 6x6	WY			48.7
	ATV	2002 Yamaha Kodiak 400 4x4	WY			59.7
	ATV	Kawasaki Brute Force 750	WI			52.8
	ATV	Honda Foreman 450	WI			45.1
	ATV	2003 Suzuki Vinson 500 4x4	ID			60.4
	ATV	2001 Polaris Scrambler 500 4x4	ID			47.6
Other ATVs Overall Average:						**52.4**
All ATVs – Overall Average:						**58.4**

APPENDIX 2: Case Study – Funding Wisconsin Snowmobile Trails That Allow Concurrent Winter ATV/UTV Use

The following information was provided by Dave Newman, President of the Association of Wisconsin Snowmobile Clubs (AWSC). It includes an overview of the entire Wisconsin snowmobile trail funding program to help put funding for concurrent winter ATV/UTV use into context.

Concurrent Winter Use Background: There are currently a total of 19,392 miles of funded snowmobile trails in the state of Wisconsin. A total of 4,431 miles (22.8%) of those 19,392 miles of snowmobile trails are currently open and funded for concurrent wheeled ATV/UTV use during winter. Funded concurrent ATV use on snowmobile trails began around the 2000 winter season. As UTVs came into existence, some Counties allowed them with no additional money (with no additional money – they were just treated as another type of ATV). UTV registrations began in 2012 and the winter funding program was amended starting with the 2019-2020 season to include an additional $100 per mile if UTVs were also allowed.

Snowmobile Program: The Snowmobile Trails Program is managed by the Wisconsin DNR and is funded by registration fees ($30/3years), trail pass revenue (club members $10/year, non-club members $30/year, and non-residents $50/year), and gas tax on 50 gallons of gas per registered sled.

The State contracts with each County for the number of miles that are approved for funding in that county. In most cases, the Counties contract with individual Clubs or Alliances of clubs for the miles they maintain. There are also a few cases where the County maintains sections of trails themselves. The Clubs own the equipment, and in most cases, members volunteer their time to operate the groomers (although there are a couple of cases where Clubs do pay their operators). Clubs and Counties qualify for reimbursement up to $300 per mile per year for costs incurred to maintain their snowmobile trails. They are required to submit their time spent and materials purchased through an online system. Labor is funded at $8.00 per hour and equipment is funded according to rates set by the state for type of equipment used. (See current rate sheet on the following pages). When a County reaches $300 per mile in their incurred expenses and meets certain requirements, they qualify for supplemental payments which can reimburse clubs up to $900 per mile – a provision in place to help compensate Counties with higher tourism and snow levels.

ATV/UTV Program: The ATV/UTV Program works similar to the Snowmobile Program and is funded by registration fees, non-resident trail passes and gas tax from both ATVs and UTVs. Under this program, Counties are eligible to apply for winter use trails. Winter use trails refers to trails that are open to snowmobiling and also allow concurrent ATV or UTV use specifically only for the time during which the trail is open to snowmobiles. When applying for winter use, a County must have approval from the Club or Alliance that maintains/grooms that section of trail. Typically, a Club would only agree to winter use if ALL landowners on that section of trail agree to include ATV/UTV use. In cases where the trail is located on public property, it will depend upon what uses are allowed under the master plan for that property and what is approved by the property manager. Whether just ATVs are allowed or both ATVs and UTVs are allowed typically depends upon whether the trail system can accommodate the wider and heavier UTVs. Some snowmobile trails on public lands are ATV/UTV trails in the summer, so are wider. Some Counties do impose additional restrictions for ATV/UTV use, such as not allowing them for the first week the trail is open in order to allow the trail a chance to set up first, or they may ban them when temperatures become too warm.

Concurrent Snowmobile/ATV/UTV Funding: Once the State approves a trail for winter ATV/UTV use funding, the contract with that County will include those miles and, likewise, so would the contract the County has with a Club or Alliance to maintain that trail. The Club or Alliance would then be eligible for up to an additional $100/mile for ATV use and an additional $100/mile if UTVs are also allowed – with that extra money coming from the ATV/UTV Program. This extra amount is in addition to the amount the Club or Alliance receives from snowmobile funding. Reimbursement is based upon the same rates used for snowmobile funding and duplicate expenses are not allowed through both Programs. The Program is meant to help cover any additional grooming expense incurred by the Club or Alliance when allowing ATV/UTVs – at no additional cost to the Snowmobile Program.

Consequently, all concurrent use winter trails can receive up to $500 per mile per year ($300 Snowmobile + $100 ATV + $100 UTV) for trail grooming and maintenance. And if they're in a County eligible for supplemental funding due to higher tourism or snow levels, they can receive up to $1,100 per mile per year ($900 supplemental + $100 ATV + $100 UTV) for trail grooming and maintenance. For Counties which receive supplemental funding, that $200 in additional ATV/UTV funding represents a 22% boost in annual funding, while in all other Counties that additional $200 per mile can be a nearly 67% boost in annual funding for their winter trail maintenance.

Wisconsin DNR – Equipment and Labor Rates for 2020-21 Season
Adopted by Snowmobile Recreation Council & Off-Road Vehicle Council

I. SNOW TRAIL GROOMING EQUIPMENT RATES - All rates include power unit, grooming drag & operator(s).

AAA and AA are "add-ons" for specific powers units.		
Class	**Description**	**Rate/Hour**
AAA	All heavy duty **tracked** units constructed specifically for snow grooming with a minimum of 150 horsepower and capable of pulling on a sustained basis a hydraulically operated grooming drag of at least 7'6" (90 inches) frame width. OR All **fully tracked agricultural tractors** with a minimum of 125 horsepower. OR Trucks: minimum 1-ton (4-wheel drive), minimum payload of 3,500 lbs., fully-tracked with a minimum manufactured 15,000 GWV track system.	*$5 more than AA* *AAA1 - $90* *AAA2 - $80* *AAA3 - $70* *AAA4 - $60*
AA	All heavy duty **tracked** units constructed specifically for snow grooming **having between 149 - 106 horsepower** and capable of pulling on a sustained basis a hydraulically operated grooming drag of at least 7'6" (90 inches) frame width. OR All **fully tracked agricultural tractors** with 106 – 124 horsepower.	*$5 more than A* *AA1 - $85* *AA2 - $75* *AA3 - $65* *AA4 - $55*
A	All wheeled or half-track agricultural tractors with all-wheel drive, minimum of **105 horsepower** and capable of pulling on a sustained basis a hydraulically operated grooming drag of at least 7'6" (90 inches) frame width.	*A1 - $80* *A2 - $70* *A3 - $60* *A4 - $50*
1	Drag is a minimum of 11'6" (138 inches) frame width with a minimum weight of 4,000 pounds and a length of at least 20 feet **including snow packing pan but excluding the tongue.**	Wings increase frame width with all following conditions: - hydraulically operated - must cut and pack snow - similar structural material as main frame -24" minimum width -extend full length of the main frame
2	Drag is a minimum of 9'6" (114 inches) frame width with a minimum weight of 3,000 pounds and a length of at least 18 feet **including snow packing pan but excluding the tongue**. This class includes rollers with a minimum of 9'6" (114 inches) frame width and a minimum of 24" diameter.	
3	Drag is a minimum of 7'6" (90 inches) frame width with a minimum weight of 2,000 pounds and a length of at least 18 feet **including snow packing pan but excluding the tongue**. This class includes rollers with a minimum of 7'6" (90 inches) frame width and a minimum of 24" diameter.	
4	Drag is a minimum of 7'6" (90 inches) frame width.	
B	All medium duty (including pick-up trucks) **tracked** units constructed or adapted specially for snow grooming and capable of pulling on a sustained basis a grooming drag 5'10" to 7'5" (70-89 inches) frame width. OR All **wheel type** agricultural tractors with all-wheel drive or four- wheel drive assist with a range of 65-104 horsepower.	$40.00
C	All light duty power units constructed or adapted for snowmobile trail grooming and capable of pulling on a sustained basis a grooming drag 4' to 5'9" (48-69 inches) frame width. Examples of the class of power units would include: ATVs/UTVs and snowmobiles. This class also includes all equipment not addressed in other classes.	$25.00

Notes regarding correct rates for grooming equipment:

1. A Class A power unit pulling either an 11'6" or 9'6" grooming drag that does **not** meet the specifications for either 1, 2 or 3 drags will be placed at level 4 for rate purposes.
2. A Class A power unit **not** pulling a 7'6" grooming drag will be placed in Class B for rate purposes.
3. A Class B power unit **not** pulling a 5'10" grooming drag will be placed in Class C for rate purposes.
4. A power unit will **not** be placed in a higher class if it pulls a larger grooming drag than specified for the class.
5. The following tractors have been grandfathered-in as Class A power units for 5 years ('17-18 through '21-22): **John Deere** 6400, 6410, 5625, 2955; **Case**: 5130, 5230; **Massey**: 3075-4, 300T; **Ford**: 7740; **New Holland**: drag; **New Holland**: 7740.

Equipment and Labor Rates for 2020-21 Season

II. NON-GROOMING MAINTENANCE LABOR AND EQUIPMENT RATES

A. MAINTENANCE LABOR (For other than trail grooming)

A labor rate of $8.00 per hour maximum is established for all non-grooming labor performed under the maintenance agreement by snowmobile clubs and or other similar organizations with the sponsoring county. Maintenance will generally include mowing and brushing, sign and post replacement, plowing of parking lots and roads, shelter and toilet maintenance and normal repair and replacement of structures and facilities.

The allowable labor rate for county employees and others included in labor contracts will be as specified by contract.

B. EQUIPMENT RATES (For other than trail grooming)

The following schedule is based on frequently used pieces of equipment for non-grooming maintenance. The Department of Transportation rates are considered when these rates are reviewed each year.

Equipment rates for pieces of equipment not found on this list will be found in the DOT rates. Unless specified otherwise, these rates for equipment are based on **hourly** use. These rates do **not** include the operator. Where the Department of Transportation issues rates that reflect an adjustment due to fuel rates, these rates shall be the rates utilized for the season.

Class	Description	Rate
101	All trucks pickups	$15.00
105	All trucks single axle dual-tire over 26,000 lbs.	$25.00
128	All Trucks, tandem, tri, quad axle	$55.00
203	All Tired tractors, skid-steers & end-loaders up to 49 hp	$23.00
205	All Tired tractors, skid-steers & end-loaders 50-99 hp	$34.00
206	All Tired tractors, skid-steers & end-loaders 100-149 hp	$49.00
207	All Tired tractors, skid-steers & end-loaders 150 hp and up	$56.00
215	All Tracked dozers, tractors & skid-steers up to 99 hp	$41.00
217	All Tracked dozers, tractors & skid-steers 100 - 149 hp	$54.00
218	All Tracked dozers, tractors & skid-steers 150 hp and up	$69.00
401	Air compressor all types	$17.00
410	Motorized mower over 23" (self-contained)	$15.00
413	Mower—tractor mounted	$13.00
414	Sickle attached to power unit	$16.00
490	Trailer less than 1 ton (use mfr. rated capacity)	$10.00
491	Trailer 1-4 tons (use mfr. rated capacity)	$13.00
493	All Trailers over 4 ton	$25.00
550	Rubber tired Backhoe (80 HP and over) was # 250	$43.00
555	Excavator Track type (less than 100 HP)	$42.00
558	Excavator Track type (100 - 149HP)	$54.00
559	Excavator Track type (150HP and over)	$60.00
802	Portable electric generator (all types)	$10.00
902	Chipper self-contained (minimum 25 hp)	$24.00
914	Chain Saw, pole saw, power pruner, brush saw, weed eaters	$6.00
914T	Trailblazer brush cutter (attachment)	$6.00
915	Auger (attachment for tractor/ skid steer), Post pounder-hydraulic	$26.00

916	Hand-held motorized post-hole digger	$12.00
919	Disc/spring tooth harrow/cultimulcher/cultipacker/rototiller	$10.00
922	Welder	$3.00
932	Brush Cutter - hydraulic driven	$30.00
940	Brush Cutter—PTO driven	$18.00
953	Boom for brush cutter	$14.00
9042	Gas drill	$6.00
9145	Snowmobile/ATV/UTV	$18.00
9152	Stump grinder (all) hydraulic/self-powered	$34.00
9205	Rear blade/box scraper/pull behind grader/packing pan	$6.00
9406	Chipper, PTO driven	$24.00

ATV Summer Supplement

Spring/Summer/Fall Trail Grooming Drags

Class	Description	Rate Per Hour
Class I	Drag is a minimum of 7'6" in frame width with a minimum length of at least 16' excluding the tongue. Drag contains at least 2 sets of replaceable cutting blades	$10.50
Class 2	Drag is a minimum of 7'6" in frame width	$8.00
Class 3	Box Scraper	$6.00