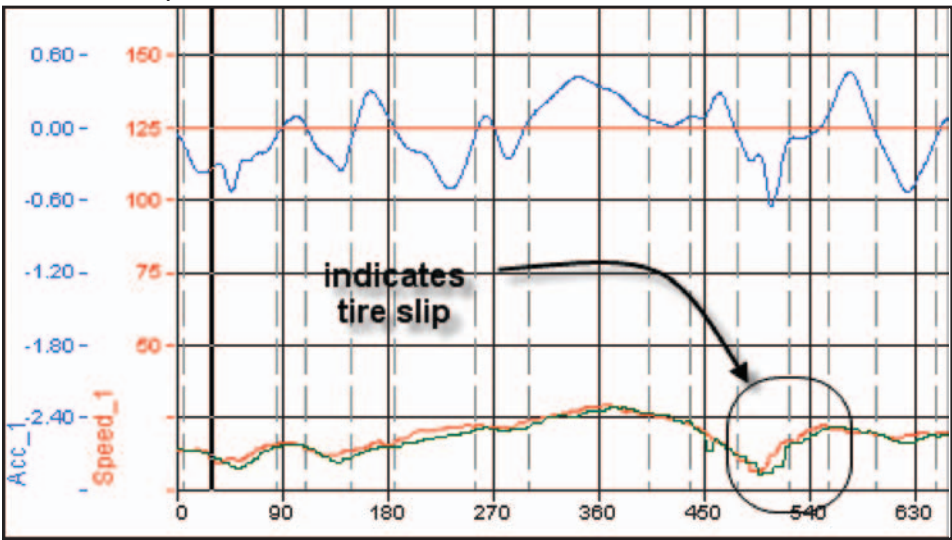

APPENDIX B. ATV and Rider Effects

Table B1 is a graphical representation of the speed and acceleration data collected from the AIM MYCHRON XGLOG data recorder. The graphs indicate a difference in speed between the front (orange) and rear (green) tire. A high rear tire speed, as shown, is an indication of tire slip. The dip in the speed graph (blue) occurs at a turn.

Table B1—Speed and acceleration.



Riders and Riding Style

American Safety Institute (ASI) instructors and volunteer riders from different ATV clubs were used as test riders. All of the riders had been through an ATV safety course. The majority of the riders had completed the safety course provided through ASI.

The riders were instructed to maintain the established lap times for each loop (table B2). The riders were also instructed not to modify their riding style. For example, riders were allowed to ride on top of the ruts instead of following the groove if that is their normal practice.

Riders were rotated every 20 laps within the loops. This rotation time varied depending on rider fatigue. Riders on test-loop A were rotated every 10 laps rather than at 20 laps because of rider fatigue. Riders were moved to different loops throughout the day. The rotations were necessary to control speeds and even-out riding styles. As a rider becomes familiar with the course, the rider tends to ride faster. Rotating riders—along with monitoring the lap times—reduced this tendency.

Table B2—Average speeds.

Loop	Loop Length (feet)	Average			Test Section Average Speed (mph)			
		Lap Time (sec)	Max. Speed (mph)	Min. Speed (mph)	Straight	Uphill	Downhill	Turn
A	987.5	135	10.9	3.9	10	9	8	8
B	633.2	53.5	11.9	3.5	11	9	6.6	5
C	1,755	106	23.8	6.5	22	19	18	7
D	856.3	104	15.9	4.6	~	12	~	6

Trail Layouts for Each Loop

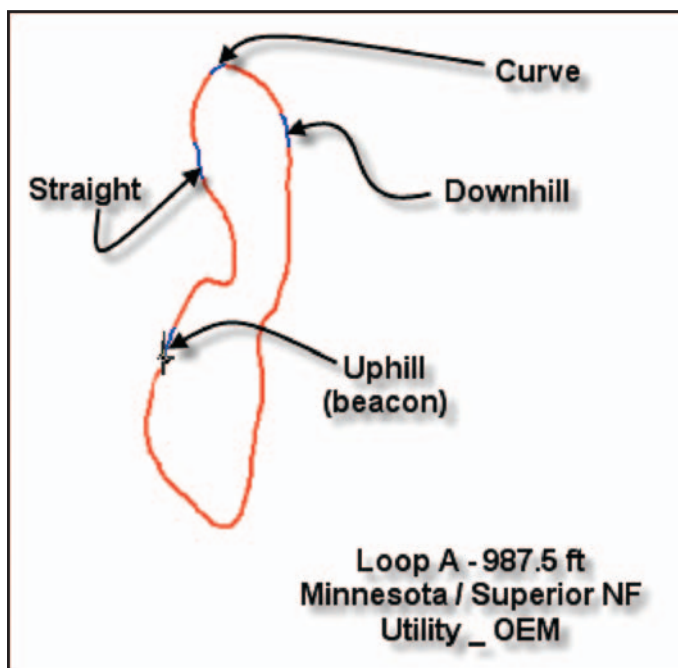


Figure B1—Loop A, 987.5 feet, on the Minnesota DLR and Superior NF. Utility ATV with original equipment tires.

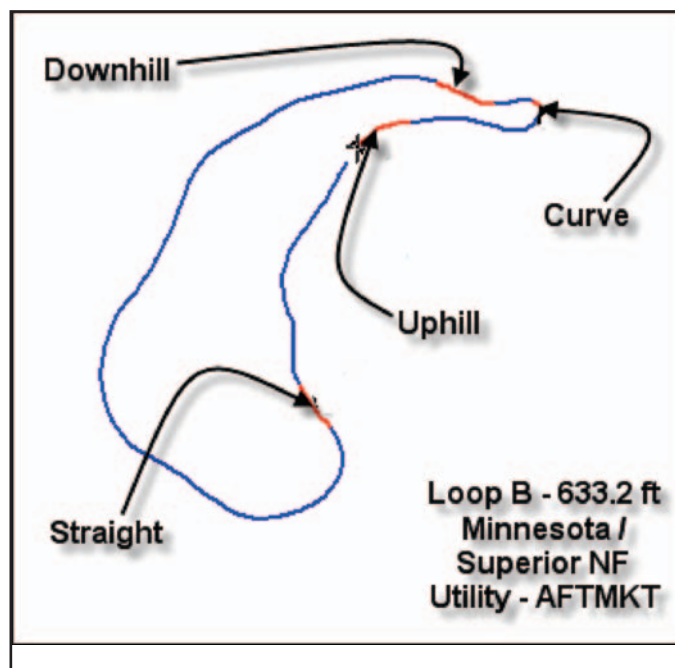


Figure B2—Loop B, 633.2 feet, on the Minnesota DLR and Superior NF. Utility ATV with aftermarket tires.

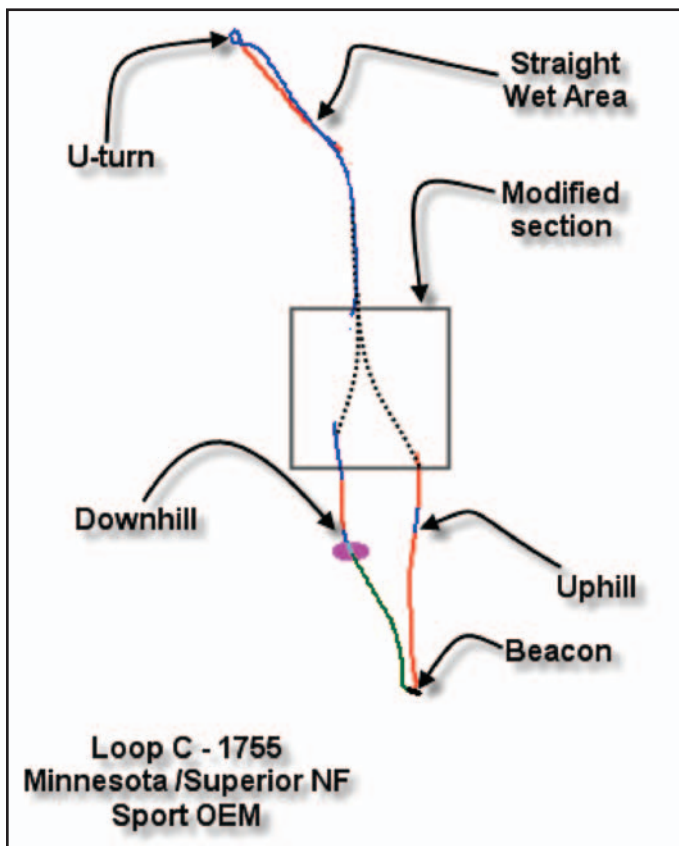


Figure B3—Loop C, 1,755 feet, on the Minnesota DLR and Superior NF. Sport ATV with original equipment tires.

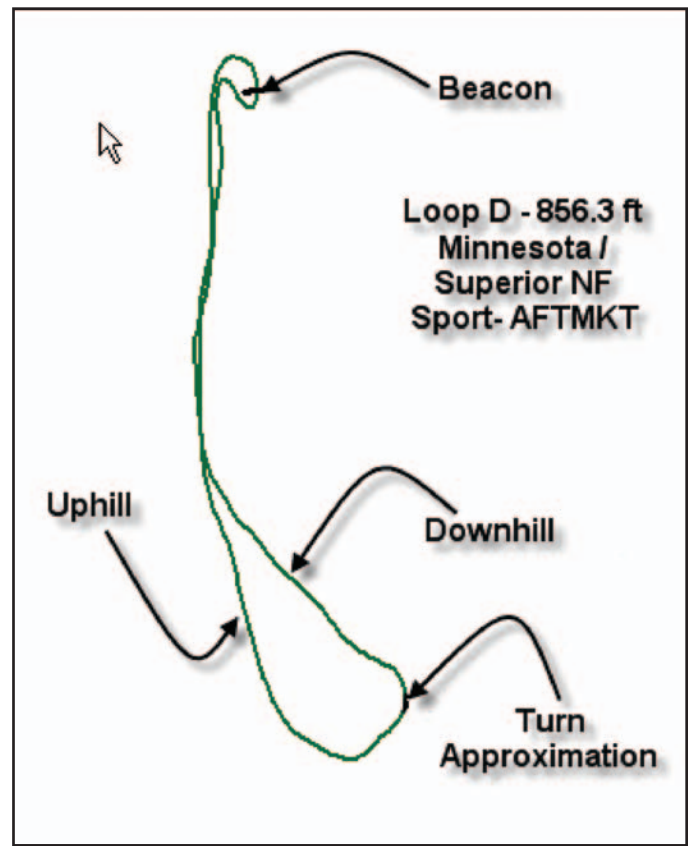


Figure B4—Loop D, 856.3 feet, on the Minnesota DLR and Superior NF. Sport ATV with aftermarket tires.

Observations

1. Rider behavior and riding style make a significant change to the ground. A more aggressive riding style with higher speeds into and out of a turn displaces more soil. Data recorders (persons) reported more visible change on the test loop after an aggressive rider rode the course for 20 laps. Table B3 shows a significant increase in speeds. Riders reduced speed more rapidly going into the turn and accelerated more quickly out of the turn.
2. Rut depth is dependent on the ATV's clearance. The ATV's undercarriage will scrape the top of the rut, preventing it from getting deeper. However, a rider can "knock down" the ruts by straddling the berm and moving the soil back into the groove. This tends to increase the track width because the rider has to take a different path.

