

**Appendix C**  
**Soil Erosion and**  
**Vegetation Impact**  
**Assumptions and Estimates**

# APPENDIX C

## SOIL EROSION AND VEGETATION IMPACT ASSUMPTIONS AND ESTIMATES

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This appendix outlines the assumptions and calculations used to estimate impacts to soil and vegetation from military vehicles for Fort Lewis and YTC.

### C.1 STRYKER FOOTPRINT

The average Stryker tire width is 12.5 inches (actual tire width varies due to variable operational tire pressure), according to the following four sources:

width	citation
12.2"	Jones 2002
13.3"	Alaska Army EIS
13.5"	Jeff Hoerauf, Stryker environmental coordinator
11.0"	Ayers et al. 2002
12.5"	average

Stryker footprint is therefore  $(12.5'' * 2 \text{ tracks}) / 12 \text{ inches/foot} = 2.08 \text{ feet}$

### C.2 IMPACT FACTOR

For each vehicle-mile traveled, approximately  $\frac{1}{4}$  acre would be impacted:

$$(2.08 \text{ feet} * 5,280 \text{ feet/mile}) / 43,560 \text{ feet}^2/\text{acre} = 0.25 \text{ acres/mile}$$

### C.3 MAXIMUM IMPACTED AREA

The maximum number of acres impacted under the various alternatives is estimated by multiplying the impact factor (0.25 acres/mile) by the total number of miles traveled under the alternative. As an example:

Fort Lewis	Alternative 1	156,000 off-road miles * 0.25 acres/mile = 39,000 acres
YTC	Alternative 1	370,000 off-road miles * 0.25 acres/mile = 92,500 acres

This maximum impact reflects the *unrealistic* assumption that Stryker vehicles would operate independently traveling in single-file lanes, not cross another vehicle's lane, or make multiple passes on a single travel lane. A more realistic training scenario would involve vehicles traveling in small groups or clusters. Most of the off-road training would occur at the company level. The number of Strykers in a company ranges from three in a headquarters company to about 20 in an infantry company, with an average of about 15 Strykers per company.

During company-level off-road training maneuvers, vehicles would tend to move in small groups of two to four, rather than completely spread out or single-file (Tom Oxford, personal conversation). Therefore, the actual number of acres impacted by off-road training would be expected to be less than the maximum values presented above but the impact would be more severe, with several passes occurring on a given area. Various company-level maneuver scenarios were estimated to evaluate the

amount of acres impacted by training under the various alternatives (**Table C–1** and **Table C–2**). These scenarios range from all 15 Strykers traveling in 15 individual lanes (impacting a maximum number of acres) to all 15 Strykers traveling in one single lane (impacting a minimum number of acres). For example, three travel lanes would impact 3/15 of the maximum area, but each lane would receive five passes instead of one. The number of acres disturbed was then evaluated in the context of the total acreage of available training lands.

Under these probable training scenarios, Strykers would travel in groups of two to four vehicles. Areas impacted would therefore receive about two to four vehicle passes. There are approximately 56,000 acres of training lands on Fort Lewis that are available for off-road vehicle travel. On YTC, approximately 80,000 acres of training lands are suitable for off-road Stryker vehicle training and 225,000 acres are available for off-road training by support vehicles. For the purposes of calculations in this Appendix, 225,000 acres is used.

## C.4 SUMMARY OF IMPACTS

**Table C–1** summarizes the areal extent of effects at Fort Lewis. **Table C–2** summarizes the areal extent of effects at Yakima Training Center. **Table C–3** summarizes the overall range of effects at Fort Lewis and YTC for all four alternatives.

Areas impacted would receive between 2 and 4 vehicle passes.

**Table C–1 Estimates of Area Impacted at Fort Lewis under Each Alternative**

Number of Travel Lanes	Approximate Number of Vehicle Passes Per Lane	Areal Extent of Effects (acres)			
		Alternative 1	Alternative 2	Alternative 3	Alternative 4
1	15	2,600	3,917	3,983	4,217
2	7–8	5,200	7,833	7,967	8,433
3	5	7,800	11,750	11,950	12,650
<b>4</b>	<b>3–4</b>	<b>10,400</b>	<b>15,667</b>	<b>15,933</b>	<b>16,867</b>
<b>5</b>	<b>3</b>	<b>13,000</b>	<b>19,583</b>	<b>19,917</b>	<b>21,083</b>
<b>6</b>	<b>2–3</b>	<b>15,600</b>	<b>23,500</b>	<b>23,900</b>	<b>25,300</b>
7	2–3	18,200	27,417	27,883	29,517
8	1–2	20,800	31,333	31,867	33,733
9	1–2	23,400	35,250	35,850	37,950
10	1–2	26,000	39,167	39,833	42,167
11	1–2	28,600	43,083	43,817	46,383
12	1–2	31,200	47,000	47,800	50,600
13	1–2	33,800	50,917	51,783	54,817
14	1–2	36,400	54,833	55,767	59,033
15	1	39,000	58,750	59,750	63,250

**Table C–2 Estimates of Area Impacted at Yakima Training Center under Each Alternative**

Number of Travel Lanes	Approximate Number of Vehicle Passes Per Lane	Areal Extent of Effects (acres)			
		Alternative 1	Alternative 2	Alternative 3	Alternative 4
1	15	6,167	9,000	9,167	9,500
2	7–8	12,333	18,000	18,333	19,000
3	5	18,500	27,000	27,500	28,500
<b>4</b>	<b>3–4</b>	<b>24,667</b>	<b>36,000</b>	<b>36,667</b>	<b>38,000</b>
<b>5</b>	<b>3</b>	<b>30,833</b>	<b>45,000</b>	<b>45,833</b>	<b>47,500</b>
<b>6</b>	<b>2–3</b>	<b>37,000</b>	<b>54,000</b>	<b>55,000</b>	<b>57,000</b>
7	2–3	43,167	63,000	64,167	66,500
8	1–2	49,333	72,000	73,333	76,000
9	1–2	55,500	81,000	82,500	85,500
10	1–2	61,667	90,000	91,667	95,000
11	1–2	67,833	99,000	100,833	104,500
12	1–2	74,000	108,000	110,000	114,000
13	1–2	80,167	117,000	119,167	123,500
14	1–2	86,333	126,000	128,333	133,000
15	1	92,500	135,000	137,500	142,500

**Table C–3 Summary of Effects by Alternative**

Installation	Alternative	Areal Extent of Impacts/Year	Portion of Total Maneuver Areas
		(acres)	(percent)
Fort Lewis	1	10,400 – 15,600	19 – 28
	2	15,667 – 23,500	28 – 42
	3	15,933 – 23,900	28 – 43
	4	16,867 – 25,300	30 – 45
YTC	1	24,667 – 37,000	11 – 16
	2	36,000 – 54,000	16 – 24
	3	36,667 – 55,000	16 – 24
	4	38,000 – 57,000	17 – 25

**References Cited**

- Ayers, P. K. J. Simmons, A. Fiscor, K. Christian, and A. Anderson. 2002. Light Armored Vehicle (LAV) Impact and Recovery Study Fort Lewis, Washington. June 2002 Preliminary Report. Integrated Training Area Management Program. Fort Lewis, Washington.
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