Table 36. Area, by Suppression Capability rating for the WTAA.

Suppression Capability Rating	Area (ha)	Area (%)
Best	149,449	7%
Moderate	1,209,260	54%
Less	858,329	39%
Least	3,265	0%
Total	2,220,302	100%

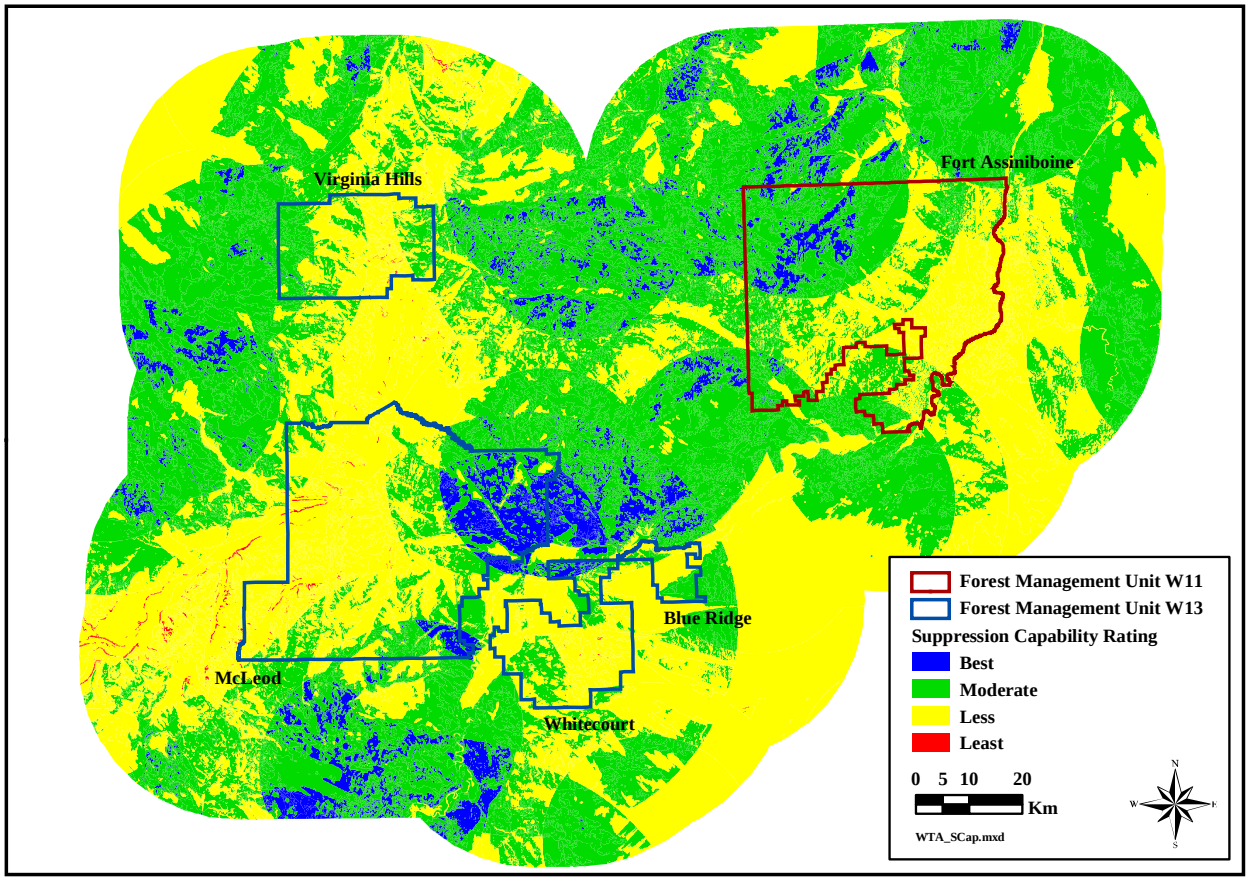

Figure 46. Distribution of area by Suppression Capability rating on the WTAA.

6.2 Fire Regime Analysis

As described in Section 2.3, the DFA lies within Central Mixedwood Natural Subregion of the Boreal Natural Region and the Lower Foothills and Upper Foothills Natural Subregions of the Foothills Natural Region. These areas have all evolved in the presence of, and in response to, wildfire. Wildfire is the primary form of natural disturbance throughout the Boreal forest (Rowe and Scotter 1973), and the fire history of the DFA reflects this.

Since wildfire history within and around the DFA exhibits significant variation in terms of fire frequency, size and intensity, the fire regime analysis has been completed using a study area significantly larger than that of the DFA. Restricting the examination to the DFA would likely result in large variations in fire statistics, making it difficult to identify wildfire trends.

An area of approximately 3.2 million ha was selected to characterize historic fire trends within the vicinity of the DFA; this area is referred to as the "study area" (Figure 47). The study area encompasses a similar proportion of Natural Subregions as the DFA, with the exception of the inclusion of area within the Dry Mixedwood Natural Subregion. Despite this, general fire trends should be applicable to the DFA.

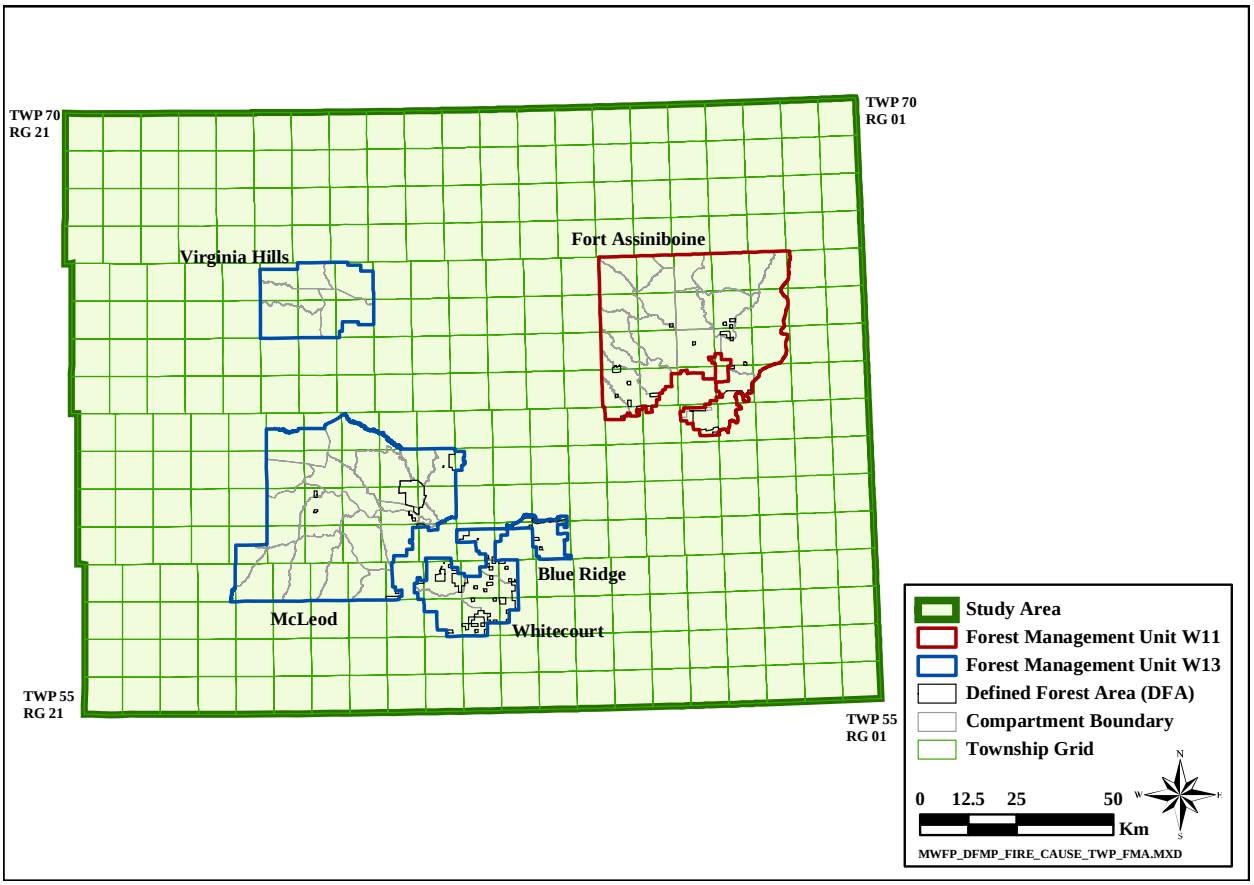

Figure 47. Study area for the Fire Regime Analysis.

This section provides historically-based summaries of fire season, type, cause, size and frequency. These summaries are based on data obtained from the Alberta government's website, which contains both spatial and non-spatial data covering periods between the years of 1961 and 2006 (http://www.srd.gov.ab.ca/wildfires/default.aspx).

6.2.1 Fire Season

Fires starts are most frequent during the summer months, from May to August (Table 37 and Figure 48). Approximately 74% of the fires starts (3,305) and 98% (1,027,152 ha) of the burn

area occur during these four months. May is the dominant fire month, with 86% of the area burned annually accounted for by fires starting during this period (Table 37 and Figure 49).

Table 37. Total fire starts and area burned, by month, within the study area (1930 – 2006).

Month	# Fires	Area (ha)	Avg. Area (ha)
January	57	154	3
February	35	1,913	55
March	89	89	1
April	376	4,074	11
May	998	902,788	905
June	919	46,500	51
July	834	2,613	3
August	554	75,251	136
September	223	9,568	43
October	211	2,021	10
November	138	621	4
December	52	147	3
Unknown	1	7,047	7,047
Total	4,487	1,052,787	235

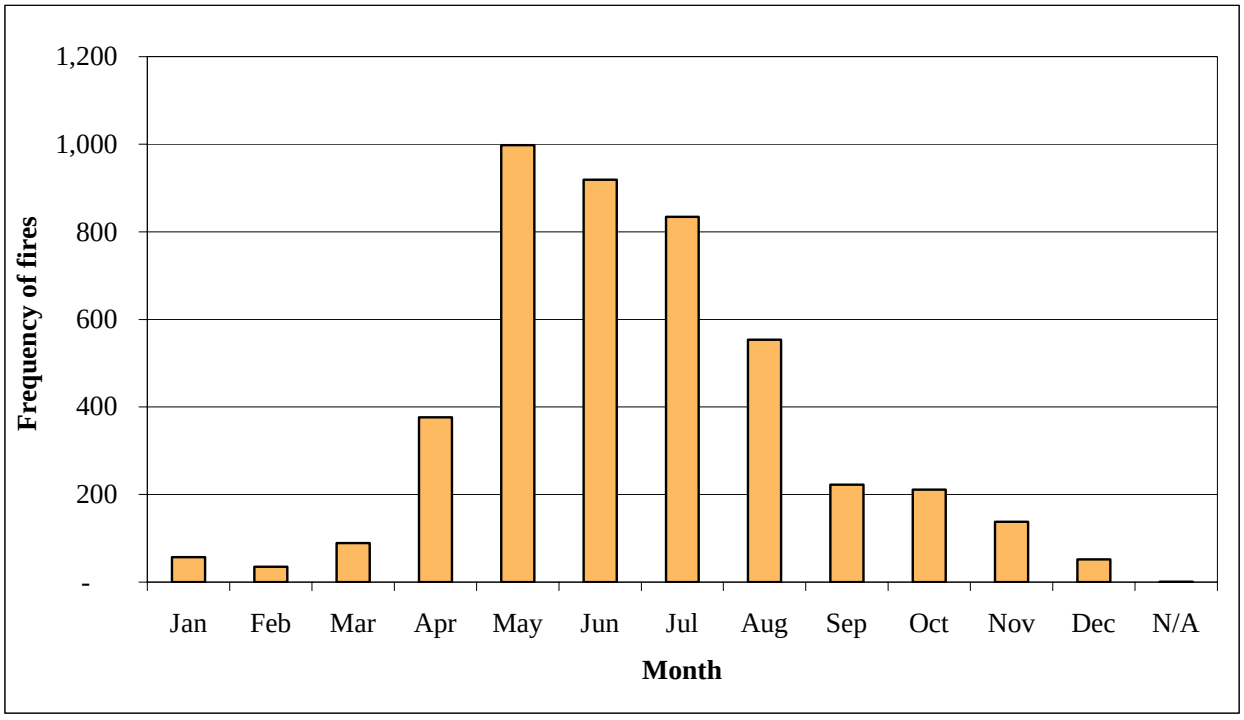

Figure 48. Total fire starts, by month, within the study area (1930 – 2006).

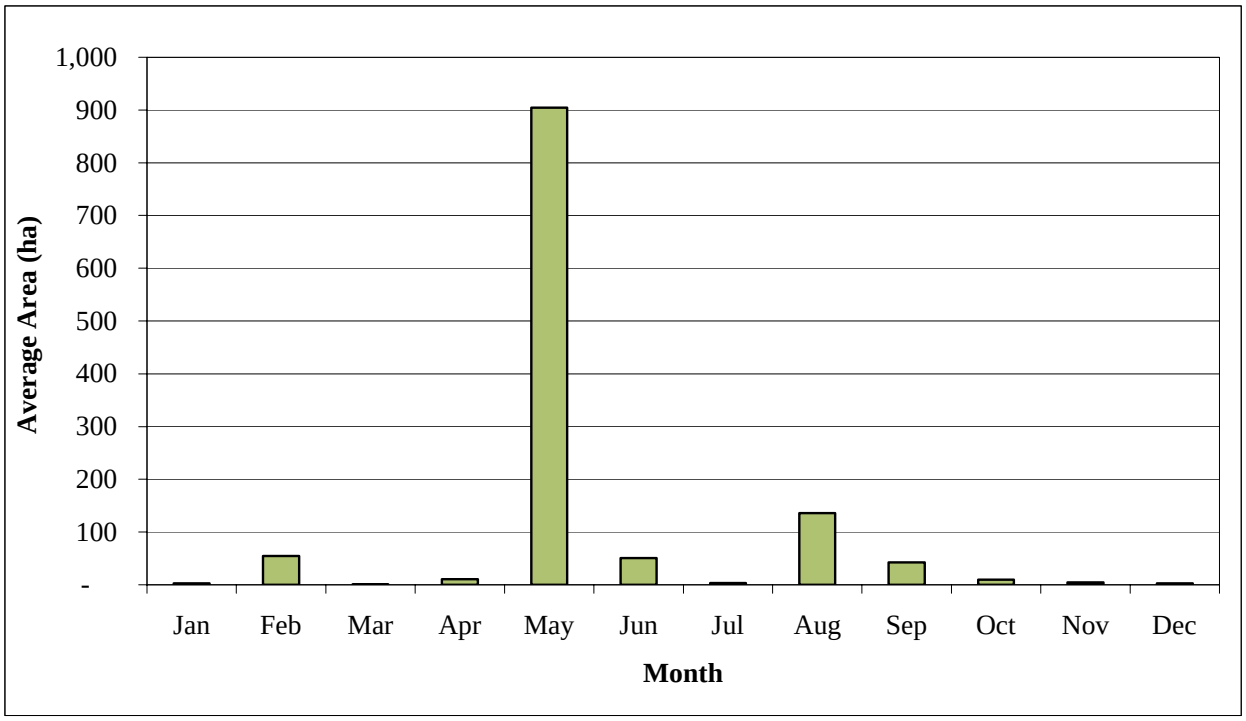

Figure 49. Average area burned, by month, within the study area (1930 – 2006).

6.2.2 Fire Type

In the context of this assessment, "fire type" refers to the portion of the forest mainly impacted by the fire (i.e. ground, surface or crown).

From 1983 onward, the Alberta government's fire records contain fire-type information for all fires. During the period 1983 – 2006, surface fires were most prevalent, accounting for 63% of all fires (Table 38). During the 1990's and 2000's, the vast majority of the area burned was attributed to crown fires (Table 38 and Figure 50). This was the result of fires in 1998 and in 2001 that accounted for 163,138 and 104,534 ha, respectively.

Table 38. Total fire starts and area burned, by fire type within the study area (1983 – 2006).

	Ground		Surface		Crown		Total	
Years	#	Area (ha)	#	Area (ha)	#	Area (ha)	#	Area (ha)
1983 - 1989	193	118	481	2,327	76	1,893	750	4,338
1990 - 1999	246	1,527	509	37,618	106	180,151	861	219,296
2000 - 2006	225	36	512	2,584	53	118,939	790	121,559
Total	664	1,681	1,502	42,530	235	300,982	2,401	345,193

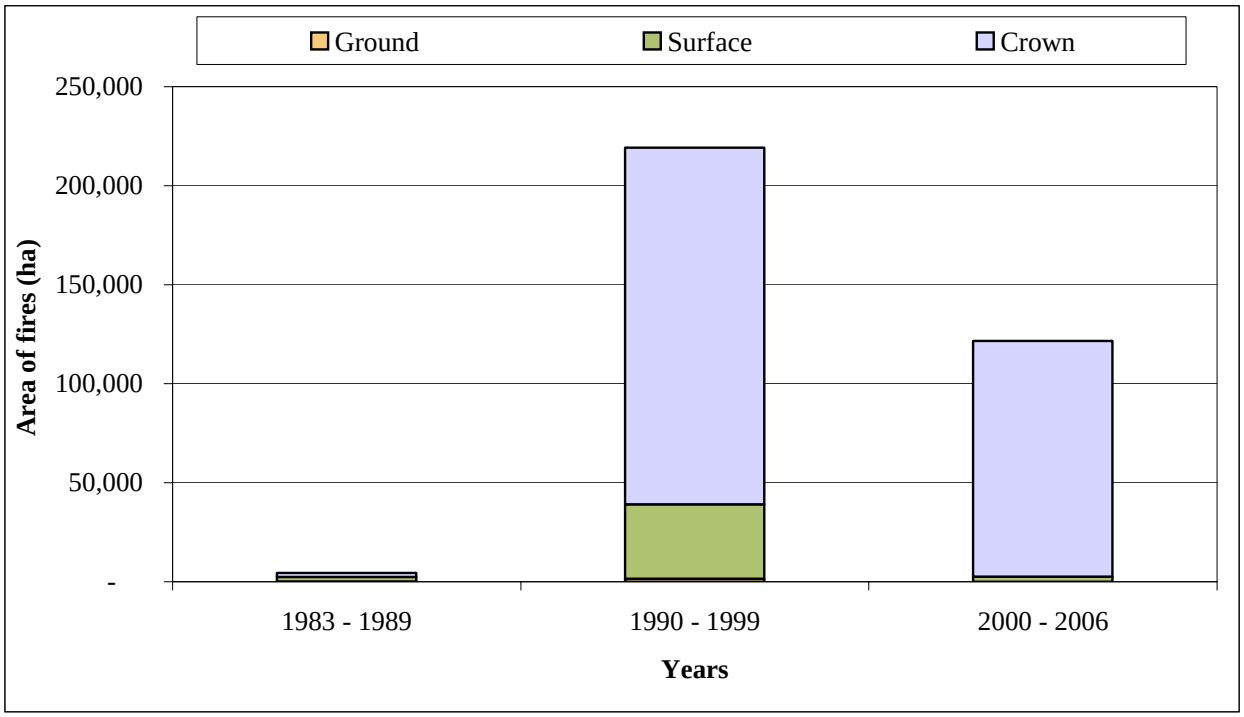

Figure 50. Total area burned, by fire type, within the study area (1983 – 2006).

In the vicinity of the DFA, crown fires are more likely to occur in the summer months (Table 39 and Figure 51) than at any other time during the year. As indicated in Table 39, crown fires originating in May have historically accounted for much of the total area burned (due to a few, extremely large fires).

Table 39. Monthly total fire starts and area burned, by fire type within the study area (1983 – 2006).

	Ground		Surface		Crown		Total	
Month	**#**	**Area (ha)**	**#**	**Area (ha)**	**#**	**Area (ha)**	**#**	**Area (ha)**
January	11	6	18	33	2	63	31	102
February	10	1	13	1,901	-	-	23	1,902
March	11	4	36	60	2	0	49	64
April	21	44	178	603	11	42	210	689
May	78	22	333	1,297	56	297,107	467	298,426
June	115	10	285	215	50	619	450	844
July	162	15	286	117	59	2,041	507	2,173
August	126	20	223	36,672	41	873	390	37,566
September	37	1,484	53	121	3	10	93	1,615
October	39	50	38	1,258	3	41	80	1,349
November	43	13	23	157	5	170	71	341
December	11	12	16	95	3	16	30	122
Total	664	1,681	1,502	42,530	235	300,982	2,401	345,193

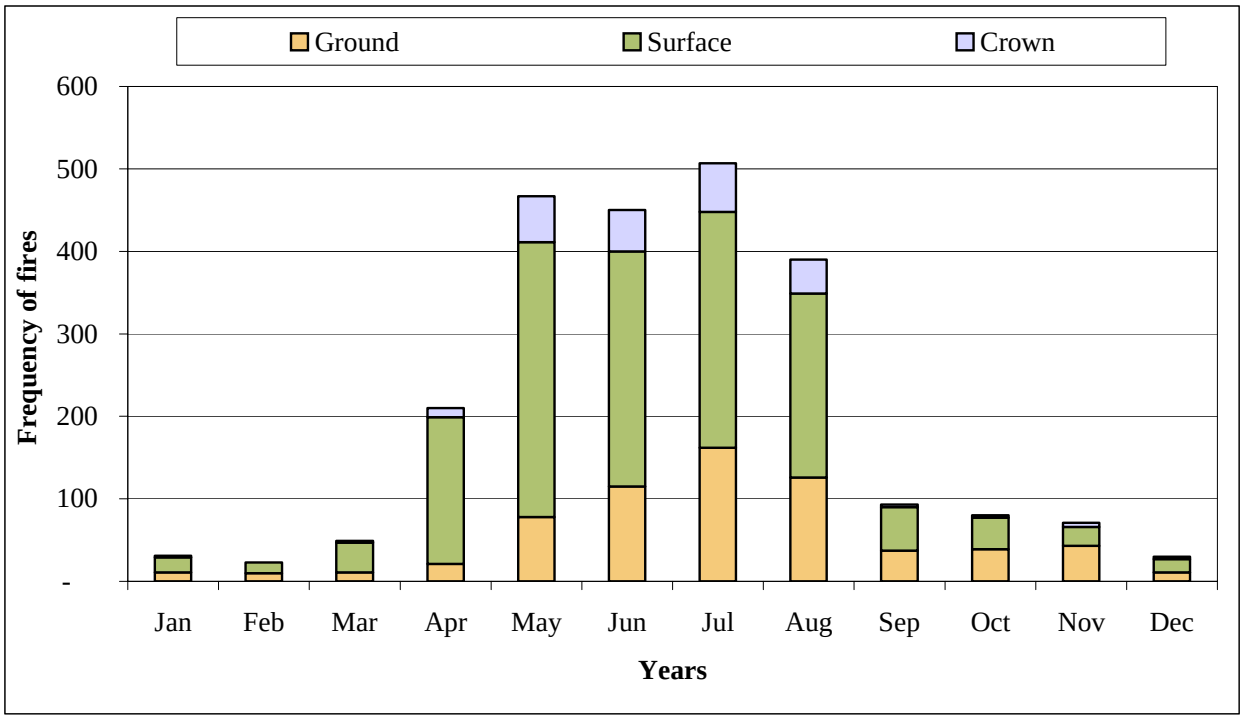

Figure 51. Monthly total fire starts by fire type within the study area (1983 – 2006).

6.2.3 Fire Cause

Within the study area, nearly half of the fires were directly attributed to lightning strikes, with the remainder considered to be related to human activities or having an unknown origin (Table 40). Although fires directly attributed to human causes accounted for approximately 30% of the total fire starts, these fires accounted for more than 50% of the total area burned (Table 41 and Figure 52). This is due to the extremely large fire in 1968 that was attributed to human causes.

Table 40. Cause of fire starts for the study area (1961 – 2006).

	Fire Size Class (ha.)					
Cause	**0.01 - 0.1**	**0.2 - 4.0**	**4.1 - 40.0**	**40.1 - 200.0**	**> 200.0**	**Total**
Lightning	1,547	422	67	25	25	2,086
Human	672	447	149	38	18	1,324
Unknown	527	391	64	15	12	1,009
Total	2,746	1,260	280	78	55	4,419

Table 41. Area burned, by cause, for the study area (1961 – 2006).

	Fire Size Class (ha.)					
Cause	**0.01 - 0.1**	**0.2 - 4.0**	**4.1 - 40.0**	**40.1 - 200.0**	**> 200.0**	**Total**
Lightning	62	659	2,002	4,186	345,959	352,867
Human	21	1,027	5,208	7,201	534,770	548,228
Unknown	15	598	1,283	2,767	147,029	151,691
Total	98	2,283	8,493	14,154	1,027,758	1,052,787

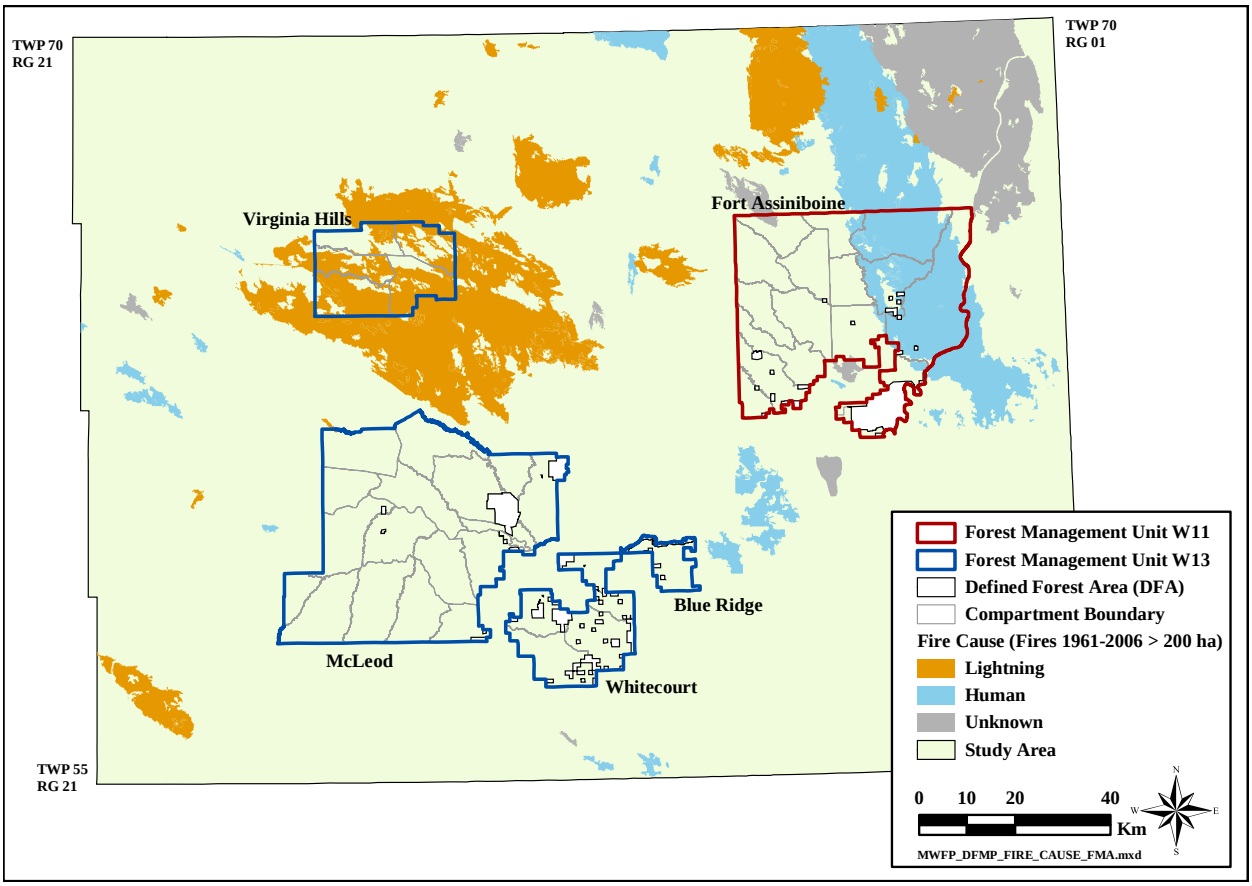

Figure 52. Fires greater than 200 ha, by cause, within the study area (1930 – 2006).

6.2.4 Fire Size

The distribution of fire sizes remains relatively consistent over time (i.e., frequent small fires and infrequent large fires) (Table 42 and Figure 53). The area impacted by fire is highly variable over time and is strongly impacted by a few, very large fires (Figure 52). The largest number of fires occurred during the 1980's, which was the decade with the second lowest burn area (Figure 54).

Table 42. Area burned, by decade and fire size class, within the study area (1961 – 2006).

	Area burned by Fire Size Class (ha.)					
Years	**0.01 - 0.1**	**0.2 - 4.0**	**4.1 - 40.0**	**40.1 - 200.0**	**> 200.0**	**Total**
1961 - 1969	5	726	3,831	6,720	596,285	607,566
1970 - 1979	-	607	1,689	3,574	43,412	49,282
1980 - 1989	40	567	2,029	2,413	50,035	55,083
1990 - 1999	38	227	622	1,309	217,101	219,296
2000 - 2006	15	156	323	139	120,926	121,559
Total	98	2,283	8,493	14,154	1,027,758	1,052,787

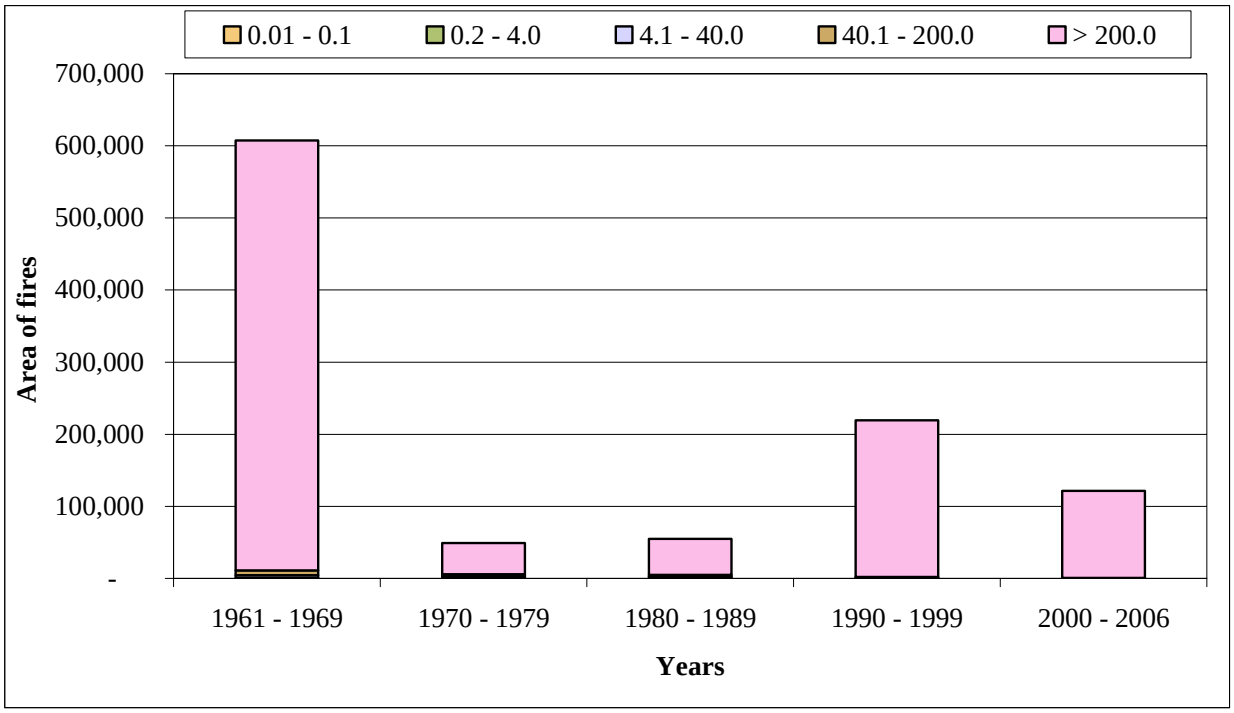

Figure 53. Area burned, by decade and fire size class, within the study area (1961 – 2006).

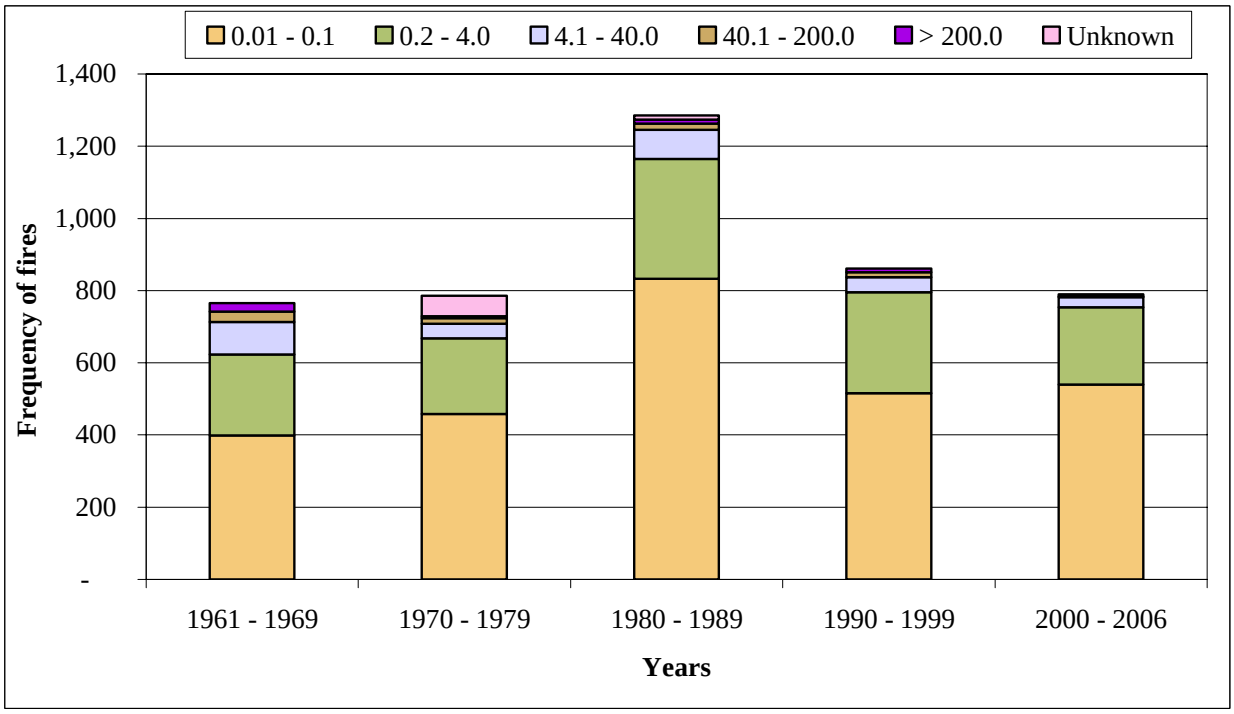

Figure 54. Frequency of fires, by decade and fire size class, within the study area (1961 – 2006).

6.2.5 Fire Frequency

Fire frequency summaries, by decade and fire size class, are provided in Table 43. More than half the fires recorded were extremely small (i.e., 0.1 hectares or less), and only 10% of the fires exceeded four hectares. Almost 98% of the area impacted by wildfire was associated with infrequent large fires (i.e., exceeding 200 hectares in size). Three extremely large fires (i.e., > 100,000 ha) occurred during the 46-year period for which information is available: in 1968 (401,327 ha), 1998 (163.138 ha), and 2001 (104,534 ha).

Table 43. Wildfire frequency, by decade and fire size class, within the study area (1961 – 2006).

	Number of fires by Fire Size Class (ha.)						
Years	**0.01 - 0.1**	**0.2 - 4.0**	**4.1 - 40.0**	**40.1 - 200.0**	**> 200.0**	**Unknown**	**Total**
1961 - 1969	399	224	90	29	23		765
1970 - 1979	458	210	40	16	5	57	786
1980 - 1989	833	332	81	17	11	11	1,285
1990 - 1999	516	280	41	14	10		861
2000 - 2006	540	214	28	2	6		790
Total	2,746	1,260	280	78	55	68	4,487

7. Land Use

7.1 Timber

One of the most apparent industrial activities on the DFA is timber harvesting, with the majority of harvesting being conducted by Millar Western. By virtue of its FMA with the Alberta government, Millar Western is permitted to harvest deciduous and coniferous timber on most of the forested land within the W11 and W13 FMUs. As well, a coniferous timber quota (CTQ) allows the company to harvest coniferous timber outside of the FMA area but within FMU W13 (Table 44).

In addition to Millar Western, four other forest products companies have access to fibre in the DFA through four timber quotas: Fort Assiniboine Lumber Ltd., O.K. Lumber Ltd. and Spruceland Millworks Inc. each have one CTQ within W11, and Weyerhaeuser has a deciduous timber allocation (DTA) within W13.

The only other allocation is through the Community Timber Permit Program. Under this initiative, eight Commercial Timber Permits (CTP) have been issued to individuals or small companies, enabling them to access small volumes of timber in W13.

Table 44. DFA Forest Tenure summary prior to implementation of 2007 DFMP.

FMU	Tenure Type	Tenure Holder	Tenure ID	Coniferous Vol. (m3)	Coniferous Vol. (% AAC[1])	Deciduous Vol. (m3)
W11	FMA	Millar Western Forest Products Ltd.	FMA9700034	-	-	109,863
	CTQ	Fort Assiniboine Lumber Ltd.	CTQW110004	5,947	6.26%	-
		O.K. Lumber Ltd.	CTQW110005	19,998	21.05%	-
		Spruceland Millworks Inc.	CTQW110006	69,055	72.70%	-
Total				95,000	N/A	109,863
W13	FMA	Millar Western Forest Products Ltd.	FMA9700034	300,922	N/A	146,797
	CTQ	Millar Western Forest Products Ltd.	CTQW130001	1,824	0.46%	-
			CTQW130002	15,388	4.42%	-
	DTA	Weyerhaeuser Canada Ltd.	DTAW130001	-	-	45,000
	CTPP	N/A - multiple holders	N/A	30,000	N/A	-
Total				348,134	N/A	191,797
Grand Total				443,134	N/A	301,660

[1] % AAC applies only to CTQs and is the percentage of the Sustainable AA C for the FMUnit.

Timber harvesting occurs almost year-round on the DFA, peaking in the frozen winter conditions and all but ceasing for a two-month period in the spring, when the ground thaw renders operations difficult to conduct in an efficient, safe and environmentally responsible manner.

7.2 Trapping

The DFA is home to a total of 50 Registered Fur Management Areas (RFMA), all of which are situated on Crown land. (Refer to Figure 55 for the spatial distribution of the trap lines within the FMU boundaries.)

Of the 18 commercially licensed fur-bearing animals that are trapped within Alberta, 15 are found in and around the DFA (Table 45). In addition, other animals that are not considered commercially licensed fur-bearing animals (e.g. rabbits and porcupines) are harvested.

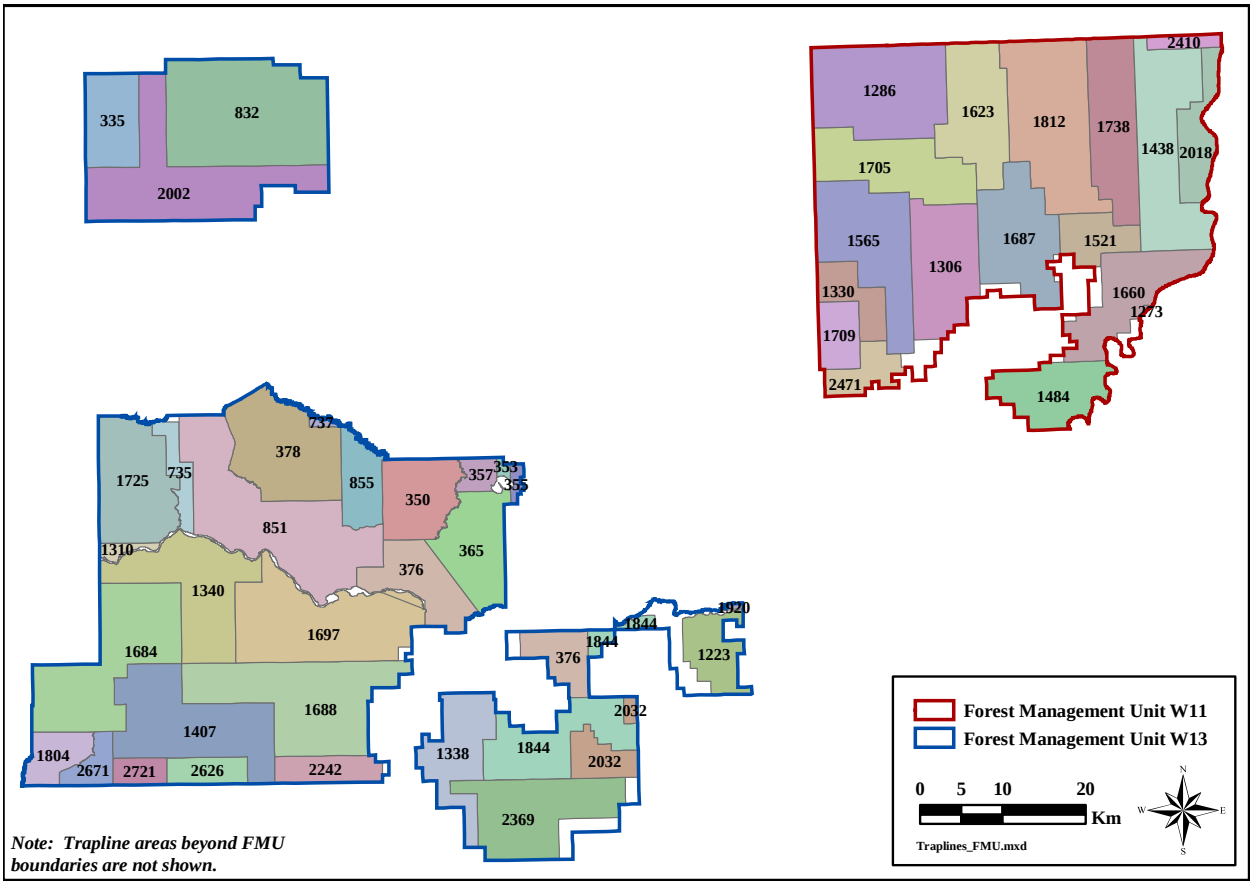

Figure 55. Trap line areas within the W11 and W13 FMUs.

Table 45. Commercially licensed fur-bearing animals trapped on Millar Western's DFA.

Common Names			
Beaver	Fox	Muskrat	Weasel
Black bear[1]	Lynx	Otter	Wolf
Coyote	Marten	Skunk	Wolverine
Fisher	Mink	Squirrel	

[1] Black bear is not trapped, but can be shot by trappers.

7.3 Grazing

With the exception of the Virginia Hills subunit in W13, grazing dispositions are located on all operating areas within the DFA (Figure 56). The types of grazing dispositions include forest grazing licenses (FGL), grazing leases (GRL) and grazing permits (GRP). There are a total of 39 grazing dispositions in the DFA, accounting for 14,000 ha, or approximately 3% of the DFA area (Table 46). The majority of the grazing dispositions are located within the Whitecourt subunit (9,091 ha), followed by the Fort Assiniboine (3,740 ha), Blue Ridge (829 ha) and McLeod (340 ha) subunits.

Table 46. Count and area summary of grazing dispositions within the FMUs.

FMU	Operating Area	FGL		GRL		GRP		Total	
		Count	Area (ha)	Count	Area (ha)	Count	Area (ha)	Count	Area (ha)
W11	Ft. Assiniboine	2	316	9	3,424	-	-	11	3,740
	Total	2	316	9	3,424	-	-	11	3,740
W13	Blue Ridge	-	-	2	829	-	-	2	829
	McLeod	1	98	1	227	1	15	3	340
	Virginia Hills	-	-	-	-	-	-	-	-
	Whitecourt	10	3,306	12	5,717	1	68	23	9,091
	Total	11	3,404	15	6,773	2	83	28	10,260
Grand Total		13	3,720	24	10,197	2	83	39	14,000

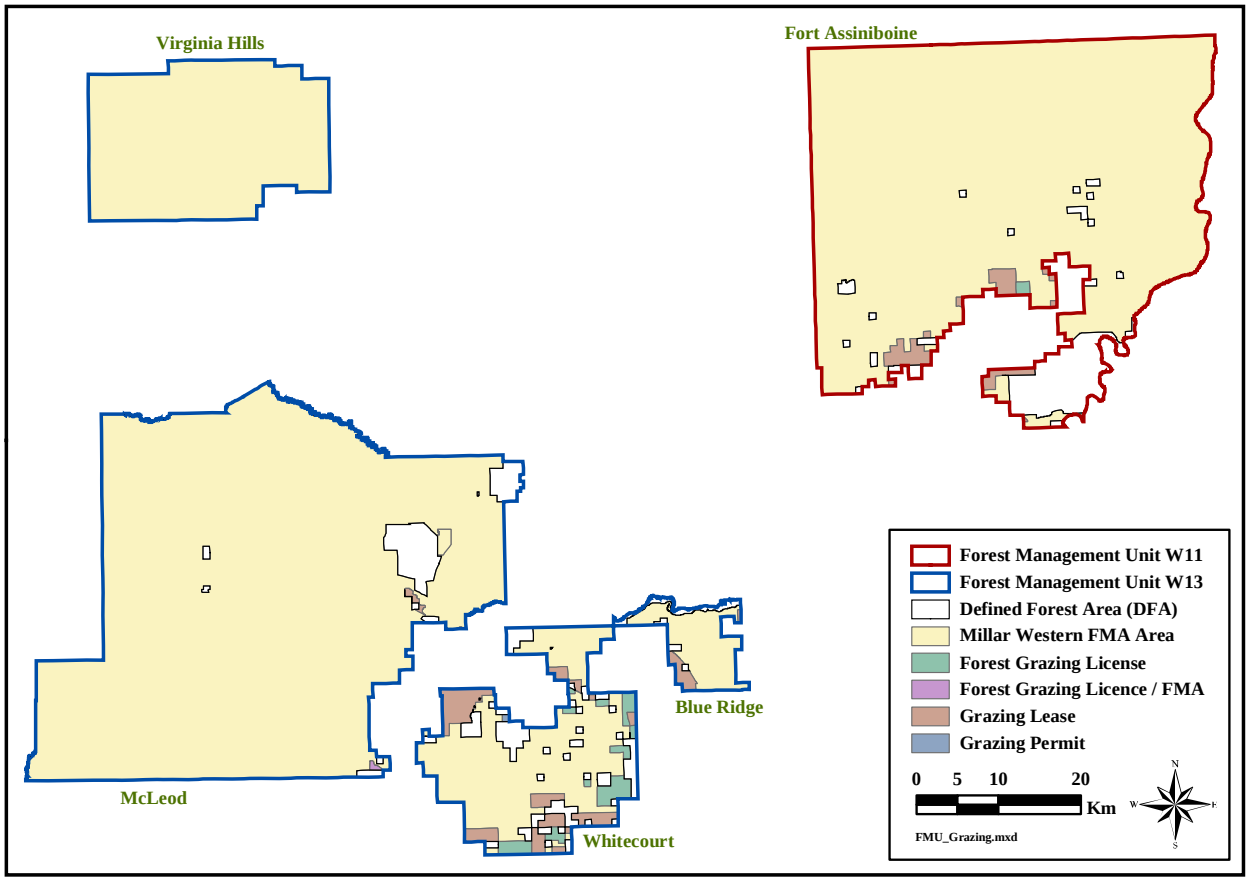

Figure 56. Grazing dispositions within the DFA.

7.4 Oil and Gas Industry

As described in Section 5.7 of this chapter, the DFA has been home to a significant amount of oil and gas development. In the past five years, the level of activity has increased steadily, in tandem with an appreciation in the economic value of these resources. As a result, a substantial

portion of the DFA has been disturbed by energy sector infrastructure such as seismic lines, wellsites, roads, pipelines and powerlines.

In addition to contending with forest clearings associated with oil-and-gas exploration and installations, Millar Western has had to invest significant effort to integrate its forest management activities with the activities of companies involved in oil-and-gas and aggregate extraction sectors, to ensure a balanced use of the forested landbase and sustainability of forest resources. Coordination of travel corridors, isolation of the Managed forest landbase and protection of plantations continue to be points of conflict between the forest industry and the energy and aggregate sectors, ones Millar Western will be working to resolve during the 2007-2016 DFMP implementation period.

7.5 Recreation

The DFA possesses a wealth of opportunities for recreational activity. While numerous designated recreational areas have been set aside for this purpose, the public is free to pursue recreational activities anywhere on the DFA, since it is situated on Crown land.

The primary recreational activities that occur on the DFA are hunting, fishing, camping, riding of all-terrain vehicles, snowmobiling, horseback riding, cross-country skiing, hiking and wildlife viewing.

7.6 Tourism

Tourism within and around the DFA seems to be largely intra-provincial and associated with the many recreational opportunities available in the area. Although Millar Western does not collect or maintain information on the tourism specifically, the company suspects that the majority of visitors to the DFA originate from the greater Edmonton area and participate in hunting, fishing, all-terrain vehicle riding and/or snowmobiling.

7.7 Outfitting

According to the Alberta Professional Outfitter Society (APOS), a total of seven registered outfitters reside in communities in and around the DFA: three in Whitecourt, one in Swan Hills and three in Fort Assiniboine; however, Millar Western has not confirmed that any of these outfitters actually operates within the DFA. The primary species offered for hunting by these outfitting companies include black bear, mule deer, white-tailed deer, moose and elk, all of which are present on the DFA.

In addition to these seven known outfitters, other unregistered local outfitters may also operate in the DFA, as well as registered and unregistered outfitters from outside the DFA.

7.8 Cultural and Historic Resources

Cultural and historic resources are found throughout the DFA. As well as collecting its own information on cultural and historic resources during its operational assessment process (not depicted below), Millar Western relies on the Listing of Significant Historic Sites and Areas that forms part of the Historic Resources Act, which is published by the Alberta Tourism, Parks, Recreation and Culture, to identify resources of cultural and historic importance. Figure 57 illustrates the spatial distribution of resources included in this listing throughout the DFA, while Table 47 summarizes the cultural and historic designated areas in each FMU and subunit of the DFA. The definitions of the various historic resource value codes and categories are defined in Table 48 and Table 49, respectively.

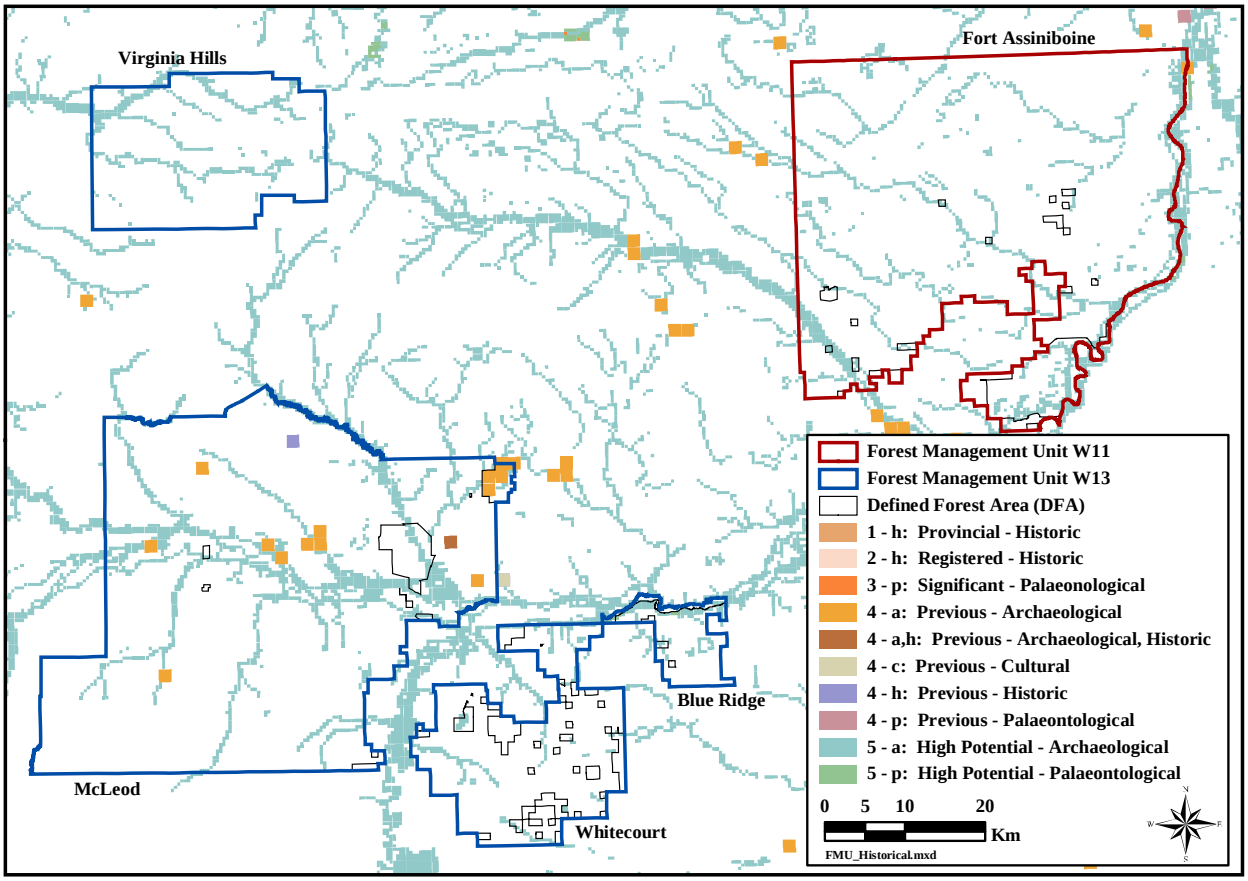

Figure 57. Cultural and historic resources within and around the DFA

Table 47. Area summary of cultural and historic designated areas within the DFA.

FMU	Operating Area	Historic Resource Value and Category				
		4 - a (ha)	4 - a,h (ha)	4 - h (ha)	5 - a (ha)	5 - p (ha)
W11	Ft. Assiniboine	114	-	-	16,639	74
W13	Blue Ridge	-	-	-	1,586	220
	McLeod	2,315	257	257	23,350	-
	Virginia Hills	-	-	-	6,038	-
	Whitecourt	-	-	-	2,692	-
Total		2,429	257	257	50,305	294

Table 48. Historical resource value codes and definitions.

Historic Resource Value Code	Definition
1	Provincial Historic Resource and/or lands that are owned by Alberta Community Development for the purposes of protecting and/or promoting historical resources.
2	Registered Historic Resource.
3	Significant Historic Resource.
4	Previously recorded historical resources that require avoidance and/or the conduct of additional historical resource studies.
5	High potential lands.

Table 49. Historical resource value categories and definitions.

Historic Resource Value Category	Definition
a	Archaeological resources.
c	Cultural resources (ie. cultural facilities, specific types of historic sites).
gl	Geological (ie. Hetherington Erratics Field).
h	Historic sites (ie. structures, structural remains, trails).
n	Natural resources (ie. environmentally significant and sensitive areas).
p	Palaeontological resources.

7.9 Visual Resources

Numerous high-value visual areas are known to exist within the DFA; however, no formal inventory has yet been compiled. Typically, high-value visual areas are associated with travel corridors and recreational areas. As described in *Appendix XXIII – Commitments*, Millar Western will be undertaking initiatives associated with visual resource assessment.

7.10 Fish and Wildlife Resources

The DFA has an abundance of fish and wildlife resources. The Alberta government has identified specific wildlife zones that require special considerations when completing strategic

and operational forest management plans, and implementation strategies. The specific wildlife zones identified within and around the DFA are illustrated in Figure 58.

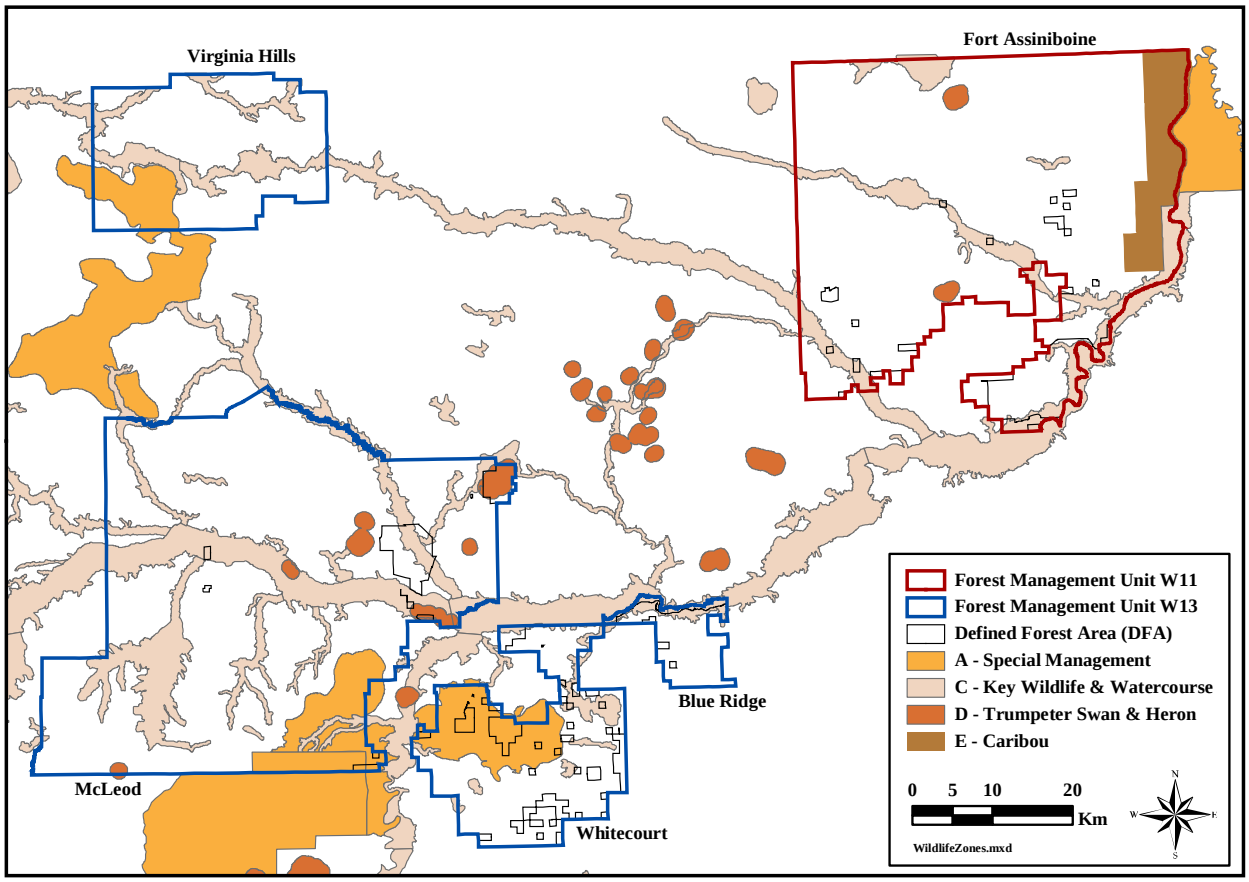

Figure 58. Wildlife referral areas in and around the DFA.

The majority of the DFA contained within these wildlife zones falls into the *Key Wildlife and Watercourse* category. In this zone, the intent is to protect significant wildlife movement corridors, rich and significant habitat, critical hiding cover, and the complex structure and processes of riparian areas.

In the portion of the DFA categorized as *Special Management*, the government's objective is to maintain or enhance the ungulate populations. The main mechanisms for achieving this goal are to restrict new linear disturbances (roads, seismic lines, pipelines, etc.), as well as the timing of associated operations and use of all-weather roads.

Several small lakes throughout the DFA are designated as *Trumpeter Swan and Heron Nesting Colonies* zones. The government's intent in designating these areas is to protect the long-term integrity and productivity of breeding habitat, avoid industrial disturbance during nesting and rearing of cygnets, and minimize access near swan lakes, to reduce the potential for secondary disturbance from recreational users. This entails restricting all activities during certain times of the year, and limiting industrial and grazing activities within specific distances of the water bodies.

The Specific Wildlife Zone *Caribou* exists along the eastern portion of W11. The activities and the restrictions placed on this area are discussed in "Strategic Plan and Industrial Guidelines for Boreal Caribou Ranges in Northern Alberta" (September 2001).

7.11 Government

The DFA is entirely located on Crown land belonging to the province of Alberta, which grants Millar Western the rights to manage the area for growing and harvesting of trees for use in the production of forest products.

Under the Public Lands Act, the provincial government has the authority to remove land from the FMA area for other uses, as it sees fit. Typically, the government withdraws land from the FMA area for allocation to other industrial stakeholders, but it also does so to support its own initiatives such as road development and research plot establishment and protection.

7.12 Protected Areas and Parks

Five designated parks and protected areas, totalling 10,921 ha, are adjacent to the DFA (Figure 59). The largest of these areas is the Fort Assiniboine Sandhills Provincial Park (8,392 ha), followed by Carson Pegasus Provincial Park (1,630 ha), Whitecourt Mountain Natural Area (573 ha), Centre of Alberta (313 ha), and Eagle River Campground (13 ha) (Table 50). Since Millar Western does not have the right to conduct operations within these areas, they are excluded from the DFA.

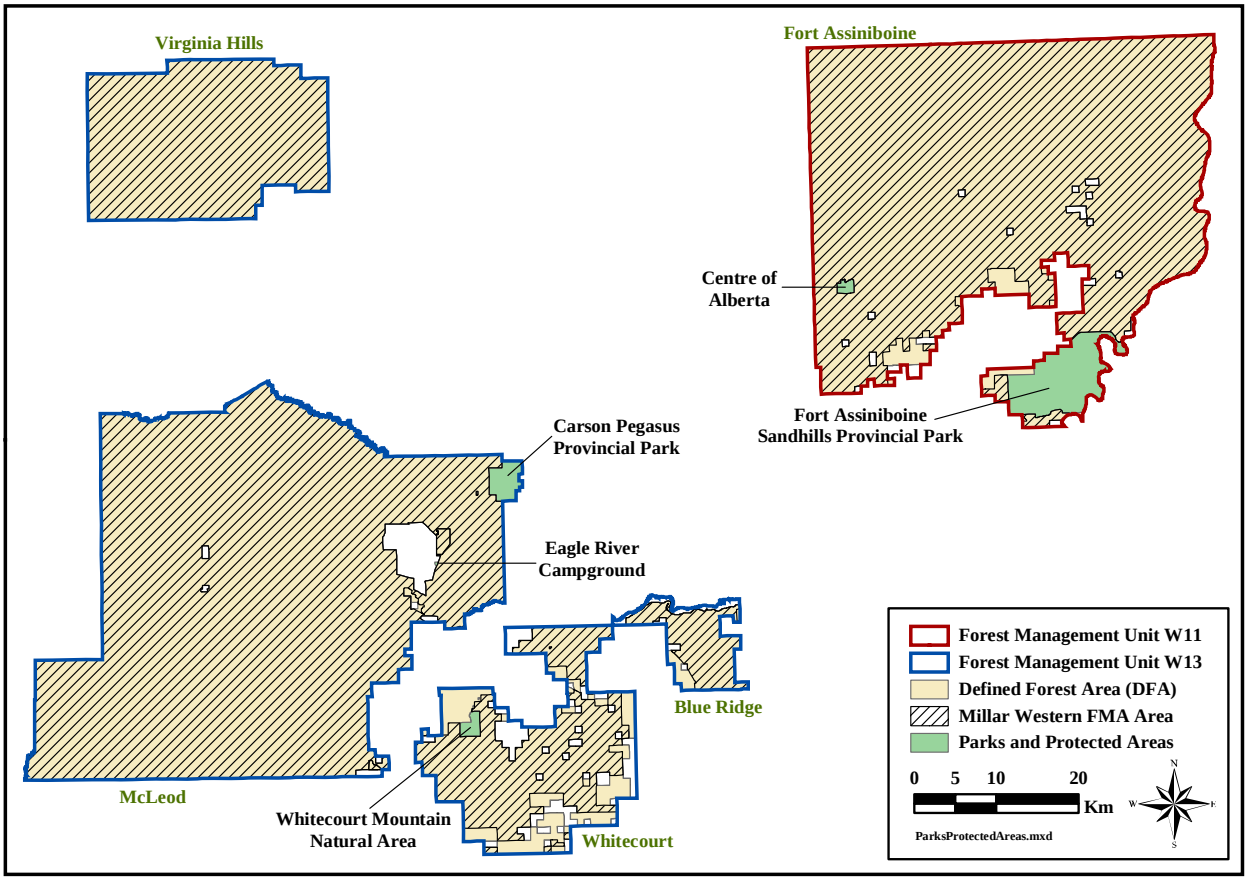

Figure 59. Parks and protected areas within W11 and W13.

Table 50. Area summary of parks and protected areas in W11 and W13.

FMU	Subunit	Park or Protected Area	Area (ha)
W11	Ft. Assiniboine	Centre of Alberta	313
		Fort Assiniboine Sandhills Provincial Park	8,392
	Total		8,705
W13	Blue Ridge	N/A	-
	McLeod	Carson Pegasus Provincial Park	1,630
		Eagle River Campground	13
	Virginia Hills	N/A	-
	Whitecourt	Whitecourt Mountain Natural Area	573
	Total		2,216
Grand Total			10,921

8. References

Alberta Sustainable Resource Development. 2005. Forest Health in Alberta – 2005 Annual Report. Edmonton, AB.

Alberta Sustainable Resources Development. 2006. Alberta Forest Management Planning Standard – Version 4.1 – April 2006. Edmonton, AB.

Cayford, J.H. and D.J. McRae. 1983. The ecological role of fire in jack pine forests. pp. 183-199 in Wein, R.W. and D.A. MacLean (eds.). The Role of Fire in Northern Circumpolar Ecosystems. John Wiley and Sons, New York.

Cerezke, H.F. and W.J.A. Volney. 1995. Forest insect pests in the Northwest region. Chapt. 5 In: J. A. Armstrong and W. G. H. Ives (eds.). Forest insect pests in Canada. Nat. Resour. Can., Can. For. Serv., Ottawa, Ontario.

Knapik, L.J. and J.D. Lindsay. 1983. Reconnaissance of Soil Survey of the Iosegun Lake Area, Alberta. Alberta Research Council Bulletin #43. Edmonton, AB.

Natural Resources Committee. 2006. Natural Regions and Subregions of Alberta. Compiled by D.J. Downing and W.W. Pettapiece. Government of Alberta. Pub. No. T852.

Olson, R. 1985. The climate of Edmonton. Canadian Climate Program, Climatological Studies No 37, The Climate of Canadian Cities No. 2.

Rowe and Scotter. 1973. Fire in the Boreal forest. Quat. Res. 31:444-464.

Twardy, A.G. and J.D. Lindsay. 1971. Reconnaissance Soil Survey of the Chip Lake Area. Alberta Soil Survey Reports S-71-28. Edmonton, AB.

Van Wagner, C.E. 1978. Age-class distribution and the forest fire cycle. Can. J. For. Res. 8: 220-227.

Viereck, L.A. 1983. The effect of fire in black spruce ecosystems of Alaska and northern Canada. P. 201-220 in Wein, R.W. and MacLean, D.A. (eds.). The Role of Fire in Northern Circumpolar Ecosystems. John Wiley and Sons, New York.

Volney, W.J.A., J.R. Spence, K.I. Mallet and J.P. Brandt. 1999. Forest Health Status Assessment Report. Prepared for Millar Western Forest Products Detailed Forest Management Plan. Whitecourt, Alberta.

G:\MWFP\Projects\P485_DFMP\Doc\Chapter2_DFA_Description\Document\Ch2_DFA_Desc_20071101.doc