

Appendix 11-F

*Murray River Project: Cumulative Alteration from Past, Present,
and Reasonably Foreseeable Future Projects within the CEA
Boundary for Forested and BC CDC Listed Ecosystems*

MURRAY RIVER COAL PROJECT

Application for an Environmental Assessment Certificate / Environmental Impact Statement

Appendix 11-F. Murray River Project: Cumulative Alteration from Past, Present and Reasonably Foreseeable Future Projects within the CEA Boundary for Forested and BC CDC Listed Ecosystems

Ecosystem Data						Past and Present Projects						Future Projects	
BEC	Site Series	Map Code	EcoUnit	Name	GenEcoType	Wolverine (ha)	Tumbler Ridge (ha)	Trend (ha)	Sukunka (Bullmoose) (ha)	Quintette (ha)	All other infrastructure (ha)	Babcock Creek Wind Project (ha)	EB Pit Coal Mine (ha)
BWBSmw	00	BA	BA	Barren	Barren	0	1	1	0	7	86	0	0
	101	XA	101	Sw - Trailing raspberry - Step moss	Mesic Forest	5	50	15	0	64	4227	0	0
	101\$	XG	101\$	At - Rose - Creamy peavine	Mesic Forest	0	31	1	0	21	752	0	0
	102	XB	102	Pl - Kinnikinnick - Lingonberry	Moderately Dry Forest	0	6	1	0	3	223	0	0
	102\$	XH	102\$	At - Soopolallie - Kinnikinnick	Moderately Dry Forest	0	4	0	0	1	113	0	0
	103	XC	103	SwPl - Soopolallie - Wildrye	Moderately Dry Forest	0	9	1	0	5	762	0	0
	103\$	XI	103\$	At - Rose - Fuzzy-spiked wildrye	Moderately Dry Forest	0	4	0	0	2	271	0	0
	103\$/102\$	XI/XH	103\$/102\$	At - Rose - Fuzzy-spiked wildrye/At - Soopolallie - Kinnikinnick	Moderately Dry Forest	0	5	0	0	0	78	0	0
	103/102	XC/XB	103/102	SwPl - Soopolallie - Wildrye/Pl - Kinnikinnick - Lingonberry	Moderately Dry Forest	0	5	0	0	2	273	0	0
	104	XD	104	Sb - Lingonberry - Step moss	Slightly Dry to Moist Forest	0	8	1	0	6	490	0	0
	104\$	XJ	104\$	At - Labrador tea - Lingonberry	Slightly Dry to Moist Forest	0	6	0	0	5	83	0	0
	110	XE	110	Sw - Oak fern - Sarsaparilla (blue listed)	Moist Forest	0	2	1	0	5	162	0	0
	110\$	XK	110\$	At - Highbush-cranberry - Oak fern	Moist Forest	0	2	0	0	3	38	0	0
	111	XF	111	Sw - Currant - Horsetail (blue listed)	Moist Forest	0	15	4	0	13	797	0	0
	111\$	XL	111\$	At - Cow-parsnip - Meadowrue	Moist Forest	0	3	0	0	3	59	0	0
	111\$/112	XL/XM	111\$/112	At - Cow-parsnip - Meadowrue/AcbSw - Mountain alder - Dogwood (blue listed-potentially)	Moist Forest/Mid Bench Floodplain	0	12	0	0	4	183	0	0
	F105	DB	F105	Drummond's willow-Bluejoint	Low Bench Floodplain	0	0	0	0	0	0	0	0
	Gb51	SB	Gb51	Saskatoon-Blue wildrye	Grassland Brushland	0	0	0	0	0	0	0	0
BWBSwk1	00	BA	BA	Barren	Barren	0	0	0	0	1	85	0	0
	101	YA	101	SwBl - Huckleberry - Feathermoss (blue listed)	Mesic Forest	0	0	0	0	24	5147	28	0
	101\$	YG	101\$	At - Birch-leaved spiraea - Huckleberry	Mesic Forest	0	0	0	0	4	1790	2	0
	102	YB	102	Pl - Lingonberry - Reindeer lichen	Moderately Dry Forest	0	0	0	0	1	599	7	0
	102\$	YH	102\$	At - Kinnikinnick - Fuzzy-spiked wildrye	Moderately Dry Forest	0	0	0	0	0	191	0	0
	103	YC	103	SwPl - Soopolallie - Showy aster (blue listed)	Moderately Dry Forest	0	0	0	0	0	50	0	0
	103\$	YI	103\$	At - Rose - Fuzzy-spiked wildrye	Moderately Dry Forest	0	0	0	0	0	16	0	0
	104	YD	104	Sb - Huckleberry - Lingonberry	Slightly Dry to Moist Forest	0	0	0	0	1	2781	51	0
	104\$	YJ	104\$	At - Labrador tea - Lingonberry	Slightly Dry to Moist Forest	0	0	0	0	0	870	1	0
	110\$	YK	110\$	AcbAt - Cow-parsnip/At - Highbush-cranberry - Oak fern	Moist Forest	0	0	0	0	0	314	0	0
	110/111	YE/YF	110/111	Sw - Currant - Horsetail/Sb - Lingonberry - Horsetail (blue listed potentially)	Moist Forest	0	0	0	0	4	1302	8	0
ESSFmv2	00	AH	AH	Alder-Hellebore avalanche track	Moist Shrub	0	0	0	0	0	0	0	0
	00	AW	AW	Entire-leaved white mountain avens-Netted willow	Dry Shrub	0	0	0	0	0	0	0	0
	00	CG	CG	Cryptogam-Altai fescue	Lichen- Gramminoid	0	0	0	0	0	0	0	0
	00	FB	FB	Subalpine fir-Mountain heather-Valerian	Slightly Dry to Mesic Forest	0	0	0	0	0	0	0	0
	00	FC	FC	Subalpine fir-Crowberry-Lichen	Dry Forest	0	0	0	0	0	0	0	0
	00	FK	FK	Subalpine fir krummholz	Krummholz	0	0	0	0	0	0	0	0
	00	FV	FV	Subalpine fir-Valerian	Moist to Wet Forest	0	0	0	0	0	0	0	0
	00	FW	FW	Altai fescue-Dwarf willow	Willow-Gramminoid	0	0	0	0	0	0	0	0
	00	HB	HB	Hellebore-Sedge-Bluejoint seepage meadow	Herb Meadow	0	0	0	0	0	0	0	0
	00	HW	HW	Netted willow-Four-angled mountain heather	Mesic Shrub	0	0	0	0	0	0	0	0
	00	JK	JK	Juniper-Kinnikinnick	Dry Shrub	0	0	0	0	0	0	0	0
	00	SS	SS	Scrub birch-Dwarf willow	Mesic to Dry Shrub	0	0	0	0	0	0	0	0
	00	BA	BA	Barren	Barren	5	0	1	1	28	0	0	0
	01	FR	01	Bl - Rhododendron - Feathermoss	Mesic Forest	25	0	26	12	210	0	0	14
	01/03/04	FR (BT/FO)	01/03/04	Bl - Rhododendron - Feathermoss (BlSb - Labrador tea/Bl - Oak fern - Knight's plume)	Slightly Dry to Moist Forest	1	0	12	5	39	0	0	9
	02	FL	02	Bl - Lingonberry	Moderately Dry Forest	2	0	0	1	20	0	0	2
	03	BT	03	BlSb - Labrador tea	Slightly Dry to Moist Forest	0	0	2	5	8	0	0	3
	04	FO	04	Bl - Oak fern - Knight's plume	Mesic Forest	0	0	1	2	5	0	0	1
	05	FD	05	Bl - Devil's club - Rhododendron	Moist Forest	17	0	20	0	55	0	0	18
	06	FH	06	Bl - Alder - Horsetail (Ws08 - Bl - Sitka valerian - Common horsetail)	Wet Forest	1	0	5	3	11	0	0	5
ESSFwc3	00	BA	BA	Barren	Barren	0	0	0	0	0	0	0	0
	01	WE	WE	TRIM Wetland	Wetland	0	0	0	0	0	0	0	0
	01	FR	01	Bl - Rhododendron - Oak fern	Mesic Forest	0	0	0	0	0	0	0	0
	02	FQ	02	Bl - Rhododendron - Queen's cup	Moderately Dry Forest	0	0	0	0	0	0	0	0
	03	FG	03	Bl - Globeflower - Horsetail (Ws08 - Bl - Sitka valerian - Common horsetail)	Moist Forest	0	0	0	0	0	0	0	0
ESSFwk2	00	BA	BA	Barren	Barren	0	0	0	0	0	0	0	0
	01/03	FO/FB	01/03	Bl - Oak fern - Knight's plume/Bl - Oak fern - Bluebells	Mesic Forest	0	0	0	0	0	0	0	0
	02	FS	02	Bl - Oak fern - Sarsaparilla	Moderately Dry Forest	0	0	0	0	0	0	0	0
	04	FD	04	Bl - Devil's club - Rhododendron	Moist Forest	0	0	0	0	0	0	0	0
	05	FR	05	Bl - Rhododendron - Lady fern	Moist Forest	0	0	0	0	0	0	0	0
	06	FH	06	Bl - Horsetail - Sphagnum	Wet Forest	0	0	0	0	0	0	0	0
SBSwk2	00	BA	BA	Barren	Barren	12	0	0	0	1	0	0	0
	01	SO	01	Sxw - Oak fern	Mesic Forest	34	0	0	0	5	0	0	0
	02	LH	02	Pl - Huckleberry - Cladina (blue listed)	Moderately Dry Forest	2	0	0	0	2	0	0	0
	03	SC	03	Sxw - Huckleberry - Highbush-cranberry	Moderately Dry Forest	36	0	0	0	13	0	0	0
	04	BF	04	SbPl - Feathermoss	Slightly Dry to Moist Forest	16	0	0	0	0	0	0	0
	05	SD	05	Sxw - Devil's club	Moist Forest	14	0	0	0	3	0	0	0
Grand Total						174	168	97	32	584	21745	102	57

Appendix 11-F. Murray River Project: Cumulative Alteration from Past, Present and Reasonably Foreseeable Future Projects within the CEA Boundary for Forested and BC CDC Listed Ecosystems

Ecosystem Data				Future Projects (cont'd)							
BEC	Site Series	Map Code	EcoUnit	Name	Hermann Mine (ha)	Horizon Mine (ha)	Northern Gateway Pipeline (ha)	Quality Wind Project (ha)	Quintette Coal Mine (ha)	Roman Coal Mine (ha)	Thunder Mountain Wind Project (ha)
BWBSmw	00	BA	BA	Barren	0	0	7	3	1	0	5
	101	XA	101	Sw - Trailing raspberry - Step moss	0	0	114	143	43	0	51
	101\$	XG	101\$	At - Rose - Creamy peavine	0	0	44	13	7	0	4
	102	XB	102	Pl - Kinnikinnick - Lingonberry	0	0	7	4	5	0	2
	102\$	XH	102\$	At - Soopolallie - Kinnikinnick	0	0	7	1	2	0	0
	103	XC	103	SwPl - Soopolallie - Wildrye	0	0	46	30	6	0	14
	103\$	XI	103\$	At - Rose - Fuzzy-spiked wildrye	0	0	26	4	0	0	1
	103\$/102\$	XI/XH	103\$/102\$	At - Rose - Fuzzy-spiked wildrye/At - Soopolallie - Kinnikinnick	0	0	12	0	1	0	0
	103/102	XC/XB	103/102	SwPl - Soopolallie - Wildrye/Pl - Kinnikinnick - Lingonberry	0	0	8	2	2	0	1
	104	XD	104	Sb - Lingonberry - Step moss	0	0	12	8	8	0	6
	104\$	XJ	104\$	At - Labrador tea - Lingonberry	0	0	5	1	1	0	1
	110	XE	110	Sw - Oak fern - Sarsaparilla (blue listed)	0	0	4	4	3	0	2
	110\$	XK	110\$	At - Highbush-cranberry - Oak fern	0	0	2	1	0	0	0
	111	XF	111	Sw - Currant - Horsetail (blue listed)	0	0	30	16	13	0	12
	111\$	XL	111\$	At - Cow-parsnip - Meadowrue	0	0	7	1	0	0	0
	111\$/112	XL/XM	111\$/112	At - Cow-parsnip - Meadowrue/AcbSw - Mountain alder - Dogwood (blue listed-potentially)	0	0	10	2	3	0	1
	F105	DB	F105	Drummond's willow-Bluejoint	0	0	0	0	0	0	0
	Gb51	SB	Gb51	Saskatoon-Blue wildrye	0	0	0	0	0	0	0
BWBSwk1	00	BA	BA	Barren	0	0	0	1	0	0	9
	101	YA	101	SwBl - Huckleberry - Feathermoss (blue listed)	0	0	8	138	8	0	330
	101\$	YG	101\$	At - Birch-leaved spiraea - Huckleberry	0	0	3	88	3	0	200
	102	YB	102	Pl - Lingonberry - Reindeer lichen	0	0	4	4	0	0	41
	102\$	YH	102\$	At - Kinnikinnick - Fuzzy-spiked wildrye	0	0	1	5	0	0	23
	103	YC	103	SwPl - Soopolallie - Showy aster (blue listed)	0	0	0	0	0	0	5
	103\$	YI	103\$	At - Rose - Fuzzy-spiked wildrye	0	0	0	0	0	0	4
	104	YD	104	Sb - Huckleberry - Lingonberry	0	0	15	53	3	0	183
	104\$	YJ	104\$	At - Labrador tea - Lingonberry	0	0	7	25	1	0	71
	110\$	YK	110\$	AcbAt - Cow-parsnip/At - Highbush-cranberry - Oak fern	0	0	2	11	0	0	29
	110/111	YE/YF	110/111	Sw - Currant - Horsetail/Sb - Lingonberry - Horsetail (blue listed potentially)	0	0	4	17	2	0	87
ESSFmv2	00	AH	AH	Alder-Hellebore avalanche track	0	0	0	0	0	0	0
	00	AW	AW	Entire-leaved white mountain avens-Netted willow	0	0	0	0	0	0	0
	00	CG	CG	Cryptogam-Altai fescue	0	0	0	0	0	0	0
	00	FB	FB	Subalpine fir-Mountain heather-Valerian	0	0	0	0	0	0	0
	00	FC	FC	Subalpine fir-Crowberry-Lichen	0	0	0	0	0	0	0
	00	FK	FK	Subalpine fir krummholz	0	0	0	0	0	0	0
	00	FV	FV	Subalpine fir-Valerian	0	0	0	0	0	0	0
	00	FW	FW	Altai fescue-Dwarf willow	0	0	0	0	0	0	0
	00	HB	HB	Hellebore-Sedge-Bluejoint seepage meadow	0	0	0	0	0	0	0
	00	HW	HW	Netted willow-Four-angled mountain heather	0	0	0	0	0	0	0
	00	JK	JK	Juniper-Kinnikinnick	0	0	0	0	0	0	0
	00	SS	SS	Scrub birch-Dwarf willow	0	0	0	0	0	0	0
	00	BA	BA	Barren	2	2	0	2	3	4	2
	01	FR	01	Bl - Rhododendron - Feathermoss	68	74	0	114	57	55	360
	01/03/04	FR (BT/FO)	01/03/04	Bl - Rhododendron - Feathermoss (BlSb - Labrador tea/Bl - Oak fern - Knight's plume)	16	8	0	93	25	22	378
	02	FL	02	Bl - Lingonberry	5	6	0	6	13	2	51
	03	BT	03	BlSb - Labrador tea	5	2	0	182	12	5	215
	04	FO	04	Bl - Oak fern - Knight's plume	1	2	0	61	5	2	86
	05	FD	05	Bl - Devil's club - Rhododendron	21	16	0	115	38	26	170
	06	FH	06	Bl - Alder - Horsetail (Ws08 - Bl - Sitka valerian - Common horsetail)	4	5	0	35	6	5	43
ESSFwc3	00	BA	BA	Barren	0	0	0	0	0	0	0
	01	WE	WE	TRIM Wetland	0	0	0	0	0	0	0
	01	FR	01	Bl - Rhododendron - Oak fern	0	0	0	0	0	0	0
	02	FQ	02	Bl - Rhododendron - Queen's cup	0	0	0	0	0	0	0
	03	FG	03	Bl - Globeflower - Horsetail (Ws08 - Bl - Sitka valerian - Common horsetail)	0	0	0	0	0	0	0
ESSFwk2	00	BA	BA	Barren	0	0	0	0	0	0	0
	01/03	FO/FB	01/03	Bl - Oak fern - Knight's plume/Bl - Oak fern - Bluebells	0	0	0	0	0	0	0
	02	FS	02	Bl - Oak fern - Sarsaparilla	0	0	0	0	0	0	0
	04	FD	04	Bl - Devil's club - Rhododendron	0	0	0	0	0	0	0
	05	FR	05	Bl - Rhododendron - Lady fern	0	0	0	0	0	0	0
	06	FH	06	Bl - Horsetail - Sphagnum	0	0	0	0	0	0	0
SBSwk2	00	BA	BA	Barren	0	0	3	0	0	0	0
	01	SO	01	Sxw - Oak fern	0	0	133	0	15	0	0
	02	LH	02	Pl - Huckleberry - Cladina (blue listed)	0	0	11	0	0	0	0
	03	SC	03	Sxw - Huckleberry - Highbush-cranberry	0	0	135	0	5	0	0
	04	BF	04	SbPl - Feathermoss	0	0	52	0	1	0	0
	05	SD	05	Sxw - Devil's club	0	0	91	0	6	0	0
Grand Total					127	119	814	1181	301	124	2393

Appendix 11-F. Murray River Project: Cumulative Alteration from Past, Present and Reasonably Foreseeable Future Projects within the CEA Boundary for Forested and BC CDC Listed Ecosystems

Ecosystem Data										
BEC	Site Series	Map Code	EcoUnit	Name	Tumbler Ridge Wind Energy Project (ha)	Murray River - MSAF (ha)	Total in RSA (ha)	Past / Present Alteration (ha)	Future Alteration (ha)	Total Alteration (ha)
BWBSmw	00	BA	BA	Barren	7	5	433	96	27	122
	101	XA	101	Sw - Trailing raspberry - Step moss	121	59	13003	4360	531	4891
	101\$	XG	101\$	At - Rose - Creamy peavine	28	16	2792	806	111	918
	102	XB	102	Pl - Kinnikinnick - Lingonberry	5	5	829	232	28	260
	102\$	XH	102\$	At - Soopolallie - Kinnikinnick	4	3	312	119	16	135
	103	XC	103	SwPl - Soopolallie - Wildrye	18	17	2772	778	132	909
	103\$	XI	103\$	At - Rose - Fuzzy-spiked wildrye	8	3	961	277	43	320
	103\$/102\$	XI/XH	103\$/102\$	At - Rose - Fuzzy-spiked wildrye/At - Soopolallie - Kinnikinnick	1	1	208	83	15	99
	103/102	XC/XB	103/102	SwPl - Soopolallie - Wildrye/Pl - Kinnikinnick - Lingonberry	14	5	873	280	32	312
	104	XD	104	Sb - Lingonberry - Step moss	4	8	1658	505	46	551
	104\$	XJ	104\$	At - Labrador tea - Lingonberry	1	2	266	95	11	105
	110	XE	110	Sw - Oak fern - Sarsaparilla (blue listed)	5	1	672	170	18	188
	110\$	XK	110\$	At - Highbush-cranberry - Oak fern	1	1	139	43	5	48
	111	XF	111	Sw - Currant - Horsetail (blue listed)	22	15	2835	829	108	937
	111\$	XL	111\$	At - Cow-parsnip - Meadowrue	1	1	200	65	11	76
	111\$/112	XL/XM	111\$/112	At - Cow-parsnip - Meadowrue/AcbSw - Mountain alder - Dogwood (blue listed-potentially)	6	7	612	199	28	228
	F105	DB	F105	Drummond's willow-Bluejoint	0	0	1			0
	Gb51	SB	Gb51	Saskatoon-Blue wildrye	0	0	2			0
BWBSwk1	00	BA	BA	Barren	1	0	454	86	11	97
	101	YA	101	SwBl - Huckleberry - Feathermoss (blue listed)	117	0	22448	5171	630	5801
	101\$	YG	101\$	At - Birch-leaved spiraea - Huckleberry	120	0	5929	1794	416	2210
	102	YB	102	Pl - Lingonberry - Reindeer lichen	6	0	2624	600	61	661
	102\$	YH	102\$	At - Kinnikinnick - Fuzzy-spiked wildrye	2	0	571	191	31	223
	103	YC	103	SwPl - Soopolallie - Showy aster (blue listed)	2	0	435	50	7	57
	103\$	YI	103\$	At - Rose - Fuzzy-spiked wildrye	5	0	131	16	10	26
	104	YD	104	Sb - Huckleberry - Lingonberry	25	0	12572	2783	330	3112
	104\$	YJ	104\$	At - Labrador tea - Lingonberry	25	0	2679	870	129	999
	110\$	YK	110\$	AcbAt - Cow-parsnip/At - Highbush-cranberry - Oak fern	11	0	1136	315	54	368
	110/111	YE/YF	110/111	Sw - Currant - Horsetail/Sb - Lingonberry - Horsetail (blue listed potentially)	11	0	5639	1306	128	1434
ESSFmv2	00	AH	AH	Alder-Hellebore avalanche track	0	0	5	0	0	0
	00	AW	AW	Entire-leaved white mountain avens-Netted willow	0	0	1	0	0	0
	00	CG	CG	Cryptogam-Altai fescue	0	0	0	0	0	0
	00	FB	FB	Subalpine fir-Mountain heather-Valerian	0	0	3	0	0	0
	00	FC	FC	Subalpine fir-Crowberry-Lichen	0	0	0	0	0	0
	00	FK	FK	Subalpine fir krummholz	0	0	7	0	0	0
	00	FV	FV	Subalpine fir-Valerian	0	0	22	0	0	0
	00	FW	FW	Altai fescue-Dwarf willow	0	0	0	0	0	0
	00	HB	HB	Hellebore-Sedge-Bluejoint seepage meadow	0	0	0	0	0	0
	00	HW	HW	Netted willow-Four-angled mountain heather	0	0	1	0	0	0
	00	JK	JK	Juniper-Kinnikinnick	0	0	4	0	0	0
	00	SS	SS	Scrub birch-Dwarf willow	0	0	1	0	0	0
	00	BA	BA	Barren	10	0	1693	231	25	256
	01	FR	01	Bl - Rhododendron - Feathermoss	234	4	39917	5069	980	6049
	01/03/04	FR (BT/FO)	01/03/04	Bl - Rhododendron - Feathermoss (BlSb - Labrador tea/Bl - Oak fern - Knight's plume)	208	1	11395	2351	760	3110
	02	FL	02	Bl - Lingonberry	39	0	4004	345	124	468
	03	BT	03	BlSb - Labrador tea	110	0	6781	1316	533	1849
	04	FO	04	Bl - Oak fern - Knight's plume	47	0	2483	498	206	703
	05	FD	05	Bl - Devil's club - Rhododendron	121	0	14179	2715	526	3241
	06	FH	06	Bl - Alder - Horsetail (Ws08 - Bl - Sitka valerian - Common horsetail)	15	0	3351	518	118	637
ESSFwc3	00	BA	BA	Barren	0	0	87	13	0	13
	01	WE	WE	TRIM Wetland	0	0	33	0	0	0
	01	FR	01	Bl - Rhododendron - Oak fern	0	0	2022	168	0	169
	02	FQ	02	Bl - Rhododendron - Queen's cup	0	0	472	9	0	9
	03	FG	03	Bl - Globeflower - Horsetail (Ws08 - Bl - Sitka valerian - Common horsetail)	0	0	841	110	0	110
ESSFwk2	00	BA	BA	Barren	0	0	35	8	0	8
	01/03	FO/FB	01/03	Bl - Oak fern - Knight's plume/Bl - Oak fern - Bluebells	0	0	2121	536	0	536
	02	FS	02	Bl - Oak fern - Sarsaparilla	0	0	79	18	0	19
	04	FD	04	Bl - Devil's club - Rhododendron	0	0	488	142	0	142
	05	FR	05	Bl - Rhododendron - Lady fern	0	0	587	248	0	248
	06	FH	06	Bl - Horsetail - Sphagnum	0	0	276	87	0	87
SBSwk2	00	BA	BA	Barren	4	1	345	59	8	67
	01	SO	01	Sxw - Oak fern	88	2	8106	2225	238	2463
	02	LH	02	Pl - Huckleberry - Cladina (blue listed)	4	0	487	117	15	132
	03	SC	03	Sxw - Huckleberry - Highbush-cranberry	67	2	5774	1451	209	1659
	04	BF	04	SbPl - Feathermoss	9	0	1305	435	62	497
	05	SD	05	Sxw - Devil's club	59	2	4266	1470	159	1629
Grand Total					1585	164	194,326	42257	6933	49190