FMF Report #3 1999 CWS Air Surveys

In response to a general lack of knowledge on the abundance and distribution of the Harlequin Duck within Alberta, the Canadian Wildlife Service in cooperation with Alberta Environment undertook helicopter surveys of the eastern slopes of Alberta in 1998 and 1999.

In 1999 the survey area encompassed streams along the eastern slopes of Alberta between the North Burnt Timber River in the Red Deer River watershed and the Narraway River in the Smoky River watershed. Ground truthing was provided by foot surveys on the McLeod River conducted by Bighorn Wildlife Technologies Ltd.

Local area biologists helped with selection of blocks of streams to be surveyed where harlequins were most likely to occur and assisted in the helicopter surveys. Helicopter survey methods are detailed in Gregoire et al. (1999). Global Positioning Coordinates (GPS) were recorded for all sightings as well as survey start and end points. Coordinates were reported as Latitude and Longitude in all the 1999 reports but one, where the Universal Transverse Mercator (UTM) coordinate system was used. Five digit numbers hand written in the field survey reports represent the BSOD (now WHIMIS) ID number for that observation.

This document contains summaries of the 1999 Harlequin Duck helicopter surveys conducted in the eastern slopes of Alberta between the North Burnt Timber River (southern boundary) and north of the Willmore Wilderness Area (northern boundary).

Results of the 1998 and 1999 Harlequin Duck helicopter surveys of Alberta's eastern slopes were presented at a conference in Blaine, WA by Gregoire (2000).

HARLEQUIN DUCK SURVEYS
NORTH OF WILLMORE WILDERNESS PARK AND SOUTH OF THE NORTH SASKATCHEWAN RIVER
MAY 21, 25, JUNE 1, 1999

Paul Gregoire
Wildlife Biologist
Canadian Wildlife Service
Environment Canada, Edmonton, AB

Introduction

This brief report is in partial fullfillment of Technical Report 3 for the Harlequin Duck Foothills Model Forest project. This report presents previously unpublished results from a second year of aerial surveys undertaken by the Canadian Wildlife Service and Alberta Environment. To aid in a continuing effort to determine a breeding population of Harlequin Ducks (Histrionicus histrionicus) an aerial survey was conducted in 1) the area immediately north of the Willmore Wilderness Park to the British Columbia border, and 2) in an area between the North Saskatchewan River sonth to the North Burnt Timber River and from the Banff Park boundary eastward on the rivers as long as reasonable habitat was observed. The survey covered all the major drainages and several of the smaller tributaries. The survey took 5.5 hours and 15.6 hours of flying time respectively, and 19 and 47 harlequin ducks were observed, respectively.

Methods

A Bell 206 helicopter was used in the snrvey. There was an observer navigator in the left front and an observer recorder in the right rear. The helicopter flew low and slow, following the rivercourse to a point where the stream was too small or was not observable due to steep canyons or overhanging trees. The rivers were flown both upstream and downstream to minimize deadheading time. A GPS position was taken at all observations and survey start and stop points. The GPS points were recorded in degrees – minutes and tenths of minutes.

Resnlts and Discussion

A total of 19 Harlequin ducks were observed in the northern (Kakwa and Narraway Rivers) survey and 47 Harlequin ducks were observed on the southern (Ram, Clearwater, North Saskatchewan and Red Deer Rivers) survey. The composition was 6 pair, 2 hens and 5 drakes for the northern survey, and 21 pair, 3 lone drakes and 2 drakes associated with separate pairs for the southern snrvey. There were no groups of ducks or groups of pairs. The location of the survey areas and the duck locations are listed in Table 1 and mapped on Fignres 1 and 2. Excellent visibility with partial to full cloud cover was experienced during the surveys and little reflection was observed off the water. The raw data is provided in Tables 2 and 3 (Figures 1 and 2 have been corrected for any discrepancies in the UTM's provided).

A large concentration of Harlequin ducks was only observed on the North Ram River with a smaller concentration on the Torrens River. Both of these concentrations are not on federally or provincially protected lands. Relatively few ducks were found, given the effort and large extent of area flown. Several of the streams were glacier fed with cooler waters and therefore deemed less productive while other streams lacked the gradient and turbulent water conditions favoured by Harlequin ducks. This snrvey supports previons survey conclusions that Harlequin ducks are uncommon in Alberta and have a patchy and clumped distribution, descriptors associated with describing the Harlequin duck as a sensitive species.

Received October 2000 from FMF
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TABLE 1: 1999 Harlequin Duck survey results

GRANDE PRAIRIE		
KAKWA RIVER		
	COPTON Creek	0 ducks
	SOUTH KAKWA River	0 ducks
	TRENCH Creek	0 ducks
	PUTZY Creek	1 duck (1 Male)
	FRANCIS PEAK Creek	0 ducks
	KAKWA RIVER	2 ducks (1 Pair)
NARRAWAY RIVER		
[Stinking Creek]	SOUTH TORRENS River	1 duck (1 Male)
[trib to Stinking Ck]	STINKING Creek	0 ducks
	TORRENS RIVER	15 ducks (5 Pair, 2 Females, 3 Males)
	NARRAWAY RIVER	0 ducks
	DINOSAUR Creek	0 ducks
NORDEGG SOUTH		
NORTH RAM RIVER		
	NORTH RAM River	28 ducks (12 Pair, 4 Male)
	PINTO Creek	2 ducks (1 Pair)
	EASY Creek	0 ducks
	CRIPPLE Creek	2 ducks (1 Pair)
	JOYCE River	0 ducks
	RAM River	2 ducks (1 Pair)
SOUTH RAM RIVER		
	HUMMINGBIRD Creek	0 ducks
[Ram R]	SOUTH RAM River	0 ducks
[Ram R]	SOUTH RAM River	2 ducks (1 Pair)
CLEARWATER RIVER		
	CLEARWATER River	4 ducks (2 pair)
	CLEARWATER River	2 ducks (1 Pair)
	CUTOFF Creek	0 ducks
	TIMBER Creek	0 ducks
	FORBIDDEN Creek	0 ducks
NORTH SASK		
	N. SASK. River	0 ducks
	SIFFLEUR River	0 ducks
	WHITERABBIT Creek	0 ducks
RED DEER RIVER		
	SCALP Creek	0 ducks

RED DEER River	0 ducks
RED DEER River	0 ducks
PANTHER River	2 ducks (1 Pair)
DORMER River	0 ducks
NORTH BURNT TIMBER River	3 ducks (1 Pair, 1 Male)
JAMES RIVER	0 ducks.

Table 2. Harlequin Duck Survey south of the North Saskatchewan River. May 21, 25 and June 1, 1999.

CWS ID	River	Pair	Male	Female	Lat. Long		Comments
	May 21						
83	North Ram River	1			52-15.173	115-38.558	Start junction with South Ram
84		1			52-15.168	115-39.970	
85		1	1		52-15.000	115-41.058	
86		1			52-15.080	115-41.940	
87			1		52-15.287	115-43.029	
88			1		52-15.622	115-44.950	
89		1			52-15.750	115-45.200	
90		1			52-15.939	115-45.968	
91		1			52-15.905	115-49.460	
92		1			52-15.663	115-51.140	
93		1			52-16.475	115-52.485	
94		1			52-16.706	115-59.180	
95		1			52-10.285	116-10.232	
96		1	1		52-08.893	116-12.834	End of N. Ram survey
97	Pinto Creek	1			52- 16.000	115-46.773	Junction with N. Ram
					52-15.074	115-46.435	End of Pinto Cr. survey
	Easy Creek				52-16.240	115-48.648	Junction with N. Ram
					52-17.806	115-49.103	End of Easy Cr. survey
98	Cripple Creek	1			52-15.421	115-52.825	Junction with N. Ram
					52-13.201	115-55.194	End of Cripple Cr. survey
	Joyce River				52-16.899	116-00.252	Junction with N. Ram
					52-18.270	116-02.718	End of Joyce R. survey
	Hummingbird Cr.				52-06.033	116-02.204	Start (headwaters)
					52-04.323	115-56.917	Junction with S. Ram
	South Ram River [Ram River]			end	52-04.993	115-50.465	End S. Ram due to snow storm
	Clearwater River				52-02.953	115-38.665	Start Elk Cr. Cmpgrnd (down)
99		1			52-00.000	115-26.900	
100		1			51-59.182	115-12.527	
					52-05.501	114-51.305	End of Clearwater R. survey
	May 25						
	N. Sask. R.				52-23.900	116-04.500	Start at trunk rd. bridge
					52-18.400	116-19.500	End N. Sask. At Bighorn Dam
	Siffleur River				52-03.450	116-24.230	Start at junction with N. Sask.
					51-49.302	116-24.706	End survey Banff Park
	White Rabbit Cr.				52-06.100	116-23.800	Start at junction with N. Sask.
					51-59.160	116-11.670	End White Rabbit Cr. survey
	South Ram River				51-56.400	116-07.700	Start S. Ram at Hdwtrs cabin
101	[Ram River]	1			51-59.890	116-01.424	
					52-04.323	115-56.917	End S. Ram at Hummingbird
					52-04.993	115-50.465	Start at S. Ram at Trunk Rd
	Ram River				52-15.173	115-38.558	Junction S. and N. Ram
102	[Ram River]	1			52-08.745	115-43.622	
					52-16.445	115-33.113	End Ram at Mainline Rd.
	Clearwater River				52-02.953	115-38.665	Start at Elk Cr. Cmgrnd (up)
103		1			51-53.465	115-43.609	
					51-49.811	11X-01.767	End survey Banff Park

116-01.767

River	Pair	Male	Female	Lat. Long.	Comments
June 1					
Cutoff Creek				52-00.183 115-29.640	Start at Clearwater junction
				52-57.800 115-40.257	End Cutoff Cr. survey
Timber Creek				51-55.258 115-41.771	Start at Clearwater junction
				51-54.170 115.41.597	End Timber Cr. survey
Forbidden Cr.					Not surveyed, lack of water
Scalp Creek				51-48.033 115-42.471	Start
				51-43.871 115-33.174	End junction with Red Deer R.
Red Deer River					Survey upstream from Scalp
				51-42.094 115-42.326	End survey Banff Park
Red Deer River					Survey dnstream from Scalp
				51-39.001 115-14.841	End R.D.R. survey
Panther River				51-39.199 115-18.889	Start at Red Deer R. junction
	1			51-38.094 115-32.217	
				51-37.576 115-35.267	End survey Banff Park
Dormer River				51-37.050 115-29.298	Start at Panther junction
				51-34.642 115-33.786	End survey Banff Park
N. Burnt Timber				51-29.311 115-25.688	Start
				51-31.154 115-24.262	River goes under ground
				51-31.418 115-23.607	River flowing again
		1		51-32.614 115-16.598	
	1			51-38.463 115-08.787	
				51-38.069 115-05.259	End at R.D.R. junction
James River				51-44.876 115-21.931	Start
				51-.53.027 115-04.112	
TOTAL	21 pair	5	0		
Total Harlequin	47				

Table 3: Harlequin Duck survey June 1, 1999 of the Torens and Narraway Rivers.

1999

CWS ID Point	Lat	Long	River	Description	Time
2	54.26824450	-119.27108133	Copton	start	932
3	54.01872400	-119.52973733	Copton	finish	1007
4	54.08690583	-119.68039700	South Kakwa	start	1015
5	53.97006867	-119.96738800	South Kakwa	finish	1034
6	53.97992317	-119.82086967	Trench	start	1038
7	53.90629117	-119.76137300	Trench	finish	1048
8	54.01321467	-119.78449367	Putzy	start	1055
9	53.99735217	-119.76028933	Putzy	male	
10	53.94098283	-119.65787717	Putzy	finish	1108
11	54.09235600	-119.81649233	Francis Peak	start	1119
14	54.04520817	-119.97753217	Francis Peak	finish	1133
15	54.09103633	-119.81659433	Kakwa	start	1138
16	54.09425500	-119.82170117	Kakwa	pair	
18	54.10193150	-120.00051333	Kakwa	finish	1154
19	54.25403417	-119.86302867	South Torens	start	1256
20	54.19382400	-119.91233300	South Torens	male	
21	54.18199550	-119.97317100	South Torens	finish	1310
22	54.19959067	-119.90450633	Stinking	start	1312
23	54.16740950	-119.84898467	Stinking	finish	1319
24	54.22605333	-120.00138783	Torens	start	1324
25	54.23104767	-119.99093783	Torens	1 male + 2 female	
26	54.23365483	-119.98239767	Torens	pair	
27	54.23773167	-119.97787017	Torens	pair	
28	54.24005983	-119.97415800	Torens	pair	
29	54.25020400	-119.95535567	Torens	male	
30	54.25138950	-119.94595183	Torens	pair	
31	54.25164167	-119.93501383	Torens	pair	
32	54.32608900	-119.84331450	Torens	male	
33	54.39653467	-119.86195050	Torens	finish	1354
34	54.39620200	-119.86223483	Narraway	start	1357
35	54.35710617	-120.02457817	Narraway	finish	1407
36	54.35857600	-119.93509967	Dinosaur	start	1411
37	54.29631117	-119.92774500	Dinosaur	finish	1416

NOTE: Figures 1 and 2 have been corrected for any discrepancies observed between UTM locations reported on Tables 2 and 3.

Nordegg 1999 Harlequin Survey

△ Pair

● Female

■ Male

★ Checkpoint

N

1:484821

Environment Canada / Environnement Canada

Produced by
Canadian Wildlife Service
Resource Conservation Division
Prairie and Northern Region, 1999

10 0 10 20 30 40 50 60 Kilometers

Grand Prairie 1999 Harlequin Survey

△ Pair

● Female

■ Male

★ Checkpoint

N

1:269770

Environment Canada / Environnement Canada

Produced by
Canadian Wildlife Service
Resource Conservation Division
Prairie and Northern Region, 1999

6 0 6 12 18 24 30 36 Kilometers

HARLEQUIN DUCK SURVEYS
NORTH SASKATCHEWAN RIVER TO THE NORTH BURNT TIMBER RIVER
MAY 21, 25, JUNE 1, 1999

Jim Allen, Alberta Natural Resources Service, Rocky Mountain House

prepared for CWS

Introduction

To determine a breeding population of Harlequin Ducks (Histrionicus histrionicus) an aerial survey was conducted in the area from the North Saskatchewan River south to the North Burnt Timber River and from the Banff Park boundary eastward on the rivers as long as reasonable habitat was observed. The survey covered all the major drainages and several of the smaller tributaries. The survey took 15.6 hours of flying time and 47 harlequin ducks were observed. There were 21 pair and 5 single drakes observed.

Methods

A Bell 206 helicopter was used in the survey. There was an observer navigator in the left front and an observer recorder in the right rear. The helicopter flew low and slow, following the rivercourse to a point where the stream was too small or was not observable due to steep canyons or overhanging trees. The rivers were flown both upstream and downstream to minimize deadheading time. A GPS position was taken at all observations and survey start and stop points. The GPS points were recorded in degrees – minutes and tenths of minutes.

Results and Discussion

A total of 47 harlequin ducks were observed on the survey. The composition was 21 pair, 3 lone drakes and 2 drakes associated with separate pairs. There were no groups of ducks or groups of pairs. The location of the survey areas and the duck locations are listed in Table 1.

Table 1. Harlequin Duck Survey. May 21, 25 and June 1, 1999.

River	Pair	Male	Female	Lat. Long		Comments
May 21						592659E 5789815N 83
North Ram River	1			52-15.173	115-38.558	Start junction with South Ram
	1			52-15.168	115-39.970	591053E 5789776N
	1	1		52-15.000	115-41.058	587821E 5789442N
	1			52-15.080	115-41.940	588814E 5789572N
		1		52-15.287	115-43.029	587569E 5789934N
		1		52-15.622	115-44.950	585373E 5790517N
	1			52-15.750	115-45.200	585084E 5790749N
	1			52-15.939	115-45.968	584205E 5791094N
	1			52-15.905	115-49.460	580234E 5790955N
	1			52-15.663	115-51.140	578330E 5790476N
	1			52-16.475	115-52.485	576777E 5790000N
	1			52-16.706	115-59.180	569158E 5792273N
	1			52-10.285	116-10.232	554727E 5790210N
	1	1		52-08.893	116-12.834	End of N. Ram survey = 553789E
Pinto Creek	1			52- 16.000	115-46.773	Junction with N. Ram = 583287E
				52-15.074	115-46.435	End of Pinto Cr. survey
Easy Creek				52-16.240	115-48.648	Junction with N. Ram
				52-17.806	115-49.103	End of Easy Cr. survey
Cripple Creek	1			52-15.421	115-52.825	Junction with N. Ram = 576420E
				52-13.201	115-55.194	End of Cripple Cr. survey
Joyce River				52-16.899	116-00.252	Junction with N. Ram
				52-18.270	116-02.718	End of Joyce R. survey
Hummingbird Cr.				52-06.033	116-02.204	Start (headwaters)
				52-04.323	115-56.917	Junction with S. Ram
South Ram River [Ram River]				52-04.993	115-50.465	End S. Ram due to snow storm
Clearwater River				52-02.953	115-38.665	Start Elk Cr. Cmpgrnd (down)
	1			52-00.000	115-26.900	606523E 5761200N 82
	1			51-59.182	115-12.527	623005E 5760819N
				52-05.501	114-51.305	End of Clearwater R. survey
May 25						
N. Sask. R.				52-23.900	116-04.500	Start at trunk rd. bridge
				52-18.400	116-19.500	End N. Sask. At Bighorn Dam
Siffleur River				52-03.450	116-24.230	Start at junction with N. Sask.
				51-49.302	116-24.706	End survey Banff Park
White Rabbit Cr.				52-06.100	116-23.800	Start at junction with N. Sask.
				51-59.160	116-11.670	End White Rabbit Cr. survey
South Ram River				51-56.400	116-07.700	Start S. Ram at Hdwtrs cabin
[RAM RIVER]	1			51-59.890	116-01.424	567025E 5761066N 82
				52-04.323	115-56.917	End S. Ram at Hummingbird
				52-04.993	115-50.465	Start at S. Ram at Trunk Rd
Ram River				52-15.173	115-38.558	Junction S. and N. Ram
	1			52-08.745	115-43.622	587107E 5777795N - 83
				52-16.445	115-33.113	End Ram at Mainline Rd.
Clearwater River				52-02.953	115-38.665	Start at Elk Cr. Cmgrnd (up)
	1			51-53.465	115-43.609	587618E 5749472N 82
				51-49.811	115-01.767	End survey Banff Park

River	Pair	Male	Female	Lat. Long.		Comments
June 1						
Cutoff Creek				52-00.183	115-29.640	Start at Clearwater junction
				52-57.800	115-40.257	End Cutoff Cr. survey
Timber Creek				51-55.258	115-41.771	Start at Clearwater junction
				51-54.170	115.41.597	End Timber Cr. survey
Forbidden Cr.						Not surveyed, lack of water
Scalp Creek				51-48.033	115-42.471	Start
				51-43.871	115-33.174	End junction with Red Deer R.
Red Deer River						Survey upstream from Scalp
				51-42.094	115-42.326	End survey Banff Park
Red Deer River						Survey dnstream from Scalp
				51-39.001	115-14.841	End R.D.R. survey
Panther River				51-39.199	115-18.889	Start at Red Deer R. junction
	1			51-38.094	115-32.217	= 601255E 5721227N 82013
				51-37.576	115-35.267	End survey Banff Park
Dormer River				51-37.050	115-29.298	Start at Panther junction
				51-34.642	115-33.786	End survey Banff Park
N. Burnt Timber				51-29.311	115-25.688	Start
				51-31.154	115-24.262	River goes under ground
				51-31.418	115-23.607	River flowing again
		1		51-32.614	115-16.598	= 619509E 5711464N 82011
	1			51-38.463	115-08.787	= 628262E 5702525N 82011
				51-38.069	115-05.259	End at R.D.R. junction
James River				51-44.876	115-21.931	Start
				51-.53.027	115-04.112	
TOTAL	21 pair	5	0			
Total Harlequin	47					

= Red Deer River watershed

1999 Harlequin Duck Survey Report

	Point	Lat	Long	River	Description	Time
	2	54.26824450	-119.27108133	Copton	start	932
	3	54.01872400	-119.52973733	Copton	finish	1007
	4	54.08690583	-119.68039700	South Kakwa	start	1015
	5	53.97006867	-119.96738800	South Kakwa	finish	1034
	6	53.97992317	-119.82086967	Trench	start	1038
	7	53.90629117	-119.76137300	Trench	finish	1048
	8	54.01321467	-119.78449367	Putzy	start	1055
3846	9	53.99735217	-119.76028933	Putzy	male	
	10	53.94098283	-119.65787717	Putzy	finish	1108
	11	54.09235600	-119.81649233	Francis Peak	start	1119
	14	54.04520817	-119.97753217	Francis Peak	finish	1133
	15	54.09103633	-119.81659433	Kakwa	start	1138
3847	16	54.09425500	-119.82170117	Kakwa	pair	
	18	54.10193150	-120.00051333	Kakwa	finish	1154
	19	54.25403417	-119.86302867	South Torens	start	1256
3846	20	54.19382400	-119.91233300	South Torens	male	
	21	54.18199550	-119.97317100	South Torens	finish	1310
	22	54.19959067	-119.90450633	Stinking	start	1312
	23	54.16740950	-119.84898467	Stinking	finish	1319
	24	54.22605333	-120.00138783	Torens	start	1324
3849 —	25	54.23104767	-119.99093783	Torens	male + 2 female	—
3850 —	26	54.23365483	-119.98239767	Torens	pair	
3851 -	27	54.23773167	-119.97787017	Torens	pair	
3852 -	28	54.24005983	-119.97415800	Torens	pair	
3853 -	29	54.25020400	-119.95535567	Torens	male	—
3854 -	30	54.25138950	-119.94595183	Torens	pair	
3855 -	31	54.25164167	-119.93501383	Torens	pair	
3856	32	54.32608900	-119.84331450	Torens	male	—
	33	54.39653467	-119.86195050	Torens	finish	1354
	34	54.39620200	-119.86223483	Narraway	start	1357
	35	54.35710617	-120.02457817	Narraway	finish	1407
	36	54.35857600	-119.93509967	Dinosaur	start	1411
	37	54.29631117	-119.92774500	Dinosaur	finish	1416

ajames:

Harlequin Duck Survey
Completed June 1, 1999
Pilot - K. Harley
Observers - A. James and T. Ripley

Rivers were surveyed from a Bell 206 flown at 40 miles per hour air speed approximately 50 feet above treetop. GPS waypoints and time were recorded at the start and end of each stretch of river surveyed. GPS waypoints were also taken at the location of each harlequin duck observed. Ducks were recorded as pairs or by sex.

All rivers were surveyed by flying upstream except the Torrens River. We flew quickly upstream on the Torrens from the confluence of the South Torrens until it was covered with snow then flew the survey downstream. This may in part explain the greater number of ducks observed in this stretch because we may have flushed them onto the river on the first pass, making them easier to see on the actual survey.

Many of the ducks observed on the other rivers were seen behind the helicopter after it had passed. Many stretches on these rivers appeared to be very similar habitat to the upper Torrens. Based on our experiences through the day, I suspect we missed many ducks on some rivers - particularly Copton, South Kakwa, Francis Peak and possibly the upper Kakwa. The lower Kakwa and Narraway were larger and much more silty than the other rivers surveyed. Other creeks that may be suitable include Bank, Falls, east branch of Trench and Mouse Cache.

5.5 hrs helicopter time - paid for by CWS

1999 HARD Survey - CWS

Coordinate Conversions

Pc				
(9)	From:	53.9974° N	119.7603° W	3846
	To:	Zone 11 319068 m E	5986537 m N	
(16)	From:	54.0943° N	119.8217° W	3847
	To:	Zone 11 315474 m E	5997473 m N	
(20)	From:	54.1938° N	119.9123° W	3848
	To:	Zone 11 310005 m E	6008786 m N	
(2)	From:	54.2310° N	119.9909° W	3849
	To:	Zone 11 305054 m E	6013142 m N	
(2)	From:	54.2337° N	119.9824° W	3850
	To:	Zone 11 305622 m E	6013408 m N	
(2)	From:	54.2377° N	119.9779° W	3851
	To:	Zone 11 305936 m E	6013846 m N	
(2)	From:	54.2401° N	119.9742° W	3852
	To:	Zone 11 306189 m E	6014103 m N	
(2)	From:	54.2502° N	119.9554° W	3853
	To:	Zone 11 307461 m E	6015175 m N	
(3)	From:	54.2514° N	119.9460° W	3854
	To:	Zone 11 308080 m E	6015282 m N	
(31)	From:	54.2516° N	119.9350° W	3855
	To:	Zone 11 308794 m E	6015280 m N	
(32)	From:	54.3261° N	119.8433° W	3856
	To:	Zone 11 315100 m E	6023315 m N	

Here is the info you requested for use in the Alberta Harlequin Status Report. Only the UTM's were corrected, therefore that is what I am passing along. The blank lines are simply checkpoints. Unfortunately workload has gotten the best of me and I will try to get back to writing up the data in march.

Cheers!

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May 25 1999

CWS ID → HARD3DD

WILDHAY observations

		Easting	Northing	
38	3801	414757	5926159	PR
39	3802	406319	5928451	M
40	3803	405471	5928539	PR
41	3804	404349	5928521	F
42	3805	403492	5928522	PR
43	3806	403237	5929162	F
44	3807	402861	5929822	M
45	3808	400713	5929763	PR

SMOKY observations

May 25, 1999

		Easting	Northing	
46	3809	343667	5959645	PR
47	3810	351121	5926404	M

JACKPINE observations

May 25, 1999

May 26, 1999 lower end

		Easting	Northing	
48	3811	332073	5942972	M
49	3812	325872	5936980	PR
50	3813	325007	5936516	F
51	3814	324370	5935736	PR
52	3815	322143	5934334	F
53	3816	321686	5933950	PR
54	3817	320124	5930698	PR
55	3818	323275	5924880	PR
56	3819	324176	5923879	PR
57	3820	323378	5924450	PR
58	3821	324282	5924554	F

SHEEP observations

May 26, 1999

Easting	Northing

Sharp River at Horn Creek are 2 pair - Map shows only one circle.

59	3822	345658	5980458	PR
60	3823	345743	5980302	M
61	3824	344868	5980300	PR
62	3825	326281	5970778	PR
63	3826	314482	5971202	PR
64	3827	316589	5970243	PR
65	3828	317241	5969732	PR

FETHERSTONEHAUGH

May 26, 1999

		Easting	Northing	
66	3829	316848	5961579	M

MUDDYWATER

May 26, 1999

		Easting	Northing	
67	3830	339319	5962763	PR
68	3831	337963	5962717	PR
69	3832	335815	5963132	PR
70	3833	334778	5963849	PR
71	3834	334129	5964120	PR
72	3835	333172	5964000	PR
73	3836	332864	5964103	F
74	3837	326214	5966512	F
75	3838	325609	5966008	PR
76	3839	320115	5959286	F

COTE Cr.

May 26, 1999

		Easting	Northing	
77	3840	317194	5970068	M
78	3841	314939	5972111	PR
79	3842	313527	5973870	PR
80	3843	306362	5977829	PR
81	3844	306480	5978711	PR
82	3845	307401	5978002	M

Paul Gregoire

harle McL99.xls

Sheet1

GPS #	deg lat	min lat	sec lat	deg lon	min lon	sec lon	sex	
878	53	8	7	117	6	6	O	START MCLEOD
879	53	6	47	117	7	41	PR	Mcleod
880	53	6	4	117	7	53	PR	
880	53	6	4	117	7	52	M	
881	53	4	55	117	10	37	PR	
882	53	4	43	117	11	47	PR	
883	53	3	54	117	17	8	F	
884	53	3	53	117	17	15	PR	
885	53	3	43	117	18	7	M	
886	53	2	41	117	19	10	M	
887	53	2	36	117	19	11	PR	
888	53	2	25	117	19	18	M	
889	53	0	38	117	19	53	PR	
890	52	59	14	117	19	54	PR	END. START UP WHITEHORSE
891	52	59	4	117	20	49	F	Whitehorse
892	52	59	11	117	22	27	O	END WHITEHORSE
893	53	8	31	117	35	1	O	START GREGG GOING DOWN
894	53	13	1	117	28	55	O	END GREGG
895	53	12	4	117	29	58	O	START DRINNAN
896	53	12	55	117	35	40	O	END DRINNAN

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DM

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Sheet1

GPS #	deg lat	min lat	sec lat	deg lon	min lon	sec lon	sex	
897	53	28	15	117	13	1	O	START WILDHAY
898	53	27	59	118	14	44	O	STOPPED AT MOUTH OF ROCK LAKE, START WILDHAY
899	53	28	35	118	16	6	PR	
900	53	28	39	118	17	4	M	
901	53	29	48	118	24	44	PR	
902	53	29	55	118	25	10	F	
903	53	29	49	118	26	31	PR	
904	53	30	2	118	27	3	F	
905	53	30	9	118	27	32	M	
906	53	30	13	118	27	44	PR	
907	53	30	20	118	29	28	O	907 OR 908 STOP WILDHAY → 1081 is STOP Wildhay
908	53	31	21	118	33	2	O	?
909	53	27	27	119	14	0	O	START SMOKY GOING DOWN
910	53	27	56	119	14	34	M	
911	53	41	12	119	25	4	O	END SMOKY START UP JACKPINE
912	53	36	31	119	32	18	M	
913	53	36	8	119	32	49	O	CABIN
914	53	34	33	119	35	6	O	STOP JACKPINE
915	53	41	19	119	25	1	O	START SMOKY GOING DOWN FROM JACKPINE
916	53	51	29	119	10	26	O	END SMOKY
916	54	4	0	119	0	50	O	START SHEEP MOUTH UPSTR
917	53	56	58	119	21	7	PR	
917	53	56	53	119	21	2	M	
918	53	56	52	119	21	50	M	
919	53	51	59	119	33	0	O	STOP REFUEL
920	53	51	23	119	38	29	DUP	
921	53	50	46	119	46	32	DUP	
922	53	53	22	119	51	58	DUP	
923	53	54	59	119	56	39	DUP	
924	53	54	54	119	57	8	O	
925	53	50	29	119	52	56	O	START SHEEP DOWN TO COTE MOUTH
926	53	51	22	119	49	15	PR	
927	53	50	43	119	46	46	PR	
927	53	50	38	119	46	41	PR	
928	53	50	36	119	46	25	O	START COTE GOING UP
929	53	51	52	119	48	52	PR	
930	53	52	47	119	50	13	PR	
931	53	55	1	119	56	40	PR	
931	53	55	6	119	56	35	PR	
931	53	55	11	119	56	45	M	
932	53	46	36	119	20	48	O	MUDDYWATER GOING UP
933	53	46	34	119	21	10	PR	
934	53	47	19	119	26	21	PR	
935	53	47	16	119	27	35	PR	
936	53	47	27	119	29	33	PR	
937	53	47	49	119	30	31	PR	
938	53	47	57	119	31	7	PR	
939	53	47	52	119	31	59	PR	
940	53	47	55	119	32	16	F	
941	53	49	5	119	38	24	F	
942	53	48	48	119	38	56	PR	
943	53	45	4	119	43	42	F	
944	53	42	21	119	42	9	O	END
945	53	43	25	119	44	11	O	START UP RIGHT ARM
946	53	41	33	119	44	56	O	STOP
947	53	48	1	119	41	29	O	?START MOUTH FEATHERSTONE UP
948	53	46	14	119	46	45	M	?
949	53	43	50	119	50	56	O	?END
950	53	34	34	119	35	23	O	?START UPPER JACKPINE UPSTR
951	53	33	10	119	37	43	PR	?
952	53	32	54	119	38	29	F	
953	53	32	28	119	39	2	PR	
954	53	31	40	119	41	0	F	
955	53	31	27	119	41	24	PR	
956	53	29	40	119	42	42	PR	
957	53	26	32	119	39	22	PR	
957	53	26	27	119	39	27	PR	
957	53	26	22	32	39	33	PR	
957	53	26	37	119	39	17	F	
958	53	23	26	119	32	23	O	END JACKPINE

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BLM