

DENDROCHRONOLOGICAL INVESTIGATIONS OF HISTORIC CABINS IN JASPER AND BANFF NATIONAL PARKS

A REPORT BASED ON FIELD SURVEYS IN
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INTRODUCTION

The mountain valleys of Jasper and Banff National Parks in the Canadian Rocky Mountains have many stories to tell. Some of these tales are preserved as oral histories, archival records or have gained acclaim thanks to the efforts of contemporary writers. Unfortunately, little is known about many of the other men and women who have explored and exploited this landscape, and all that remains of their passing are long neglected cabins that are quickly fading from sight (Figure 1).

This report is intended to summarize the findings of an exploratory dendrochronological survey of historical structures within Jasper and northern Banff National Parks (Figure 2). At the invitation of Parks Canada, researchers from the University of Victoria Tree-Ring Laboratory visited a variety of historical cabins within both parks in August, 1999. The aim of the sampling program was to collect tree-ring evidence at the sites and to identify the year in which the cabins were constructed.



Figure 1. Photograph showing the condition of small cabin (UVTRL 99Q) located above the west shore of Jasper Lake, Jasper National Park.

Research Methodology

Tree-ring chronology building and cross-dating provides a simple and effective tool for dating historic structures (Pilcher 1983; Baillie 1995). The science of dendrochronology is based on the recognition coniferous trees produce an annual radial growth increment (Stokes and Smiley, 1968. Cook and Kairiukstis 1990). Because the annual radial growth characteristics of trees of a similar species are similar, a master chronology can be developed to describe these growth characteristics over the length of the stand's life span (Baillie 1995). Undated samples can be crossdated into this master chronology to identify when they were alive.

Cabin Tree-Ring Samples

The cabins varied in soundness from sites where the logs were solid from perimeter to pith, to other sites where surface/subsurface rotting was widespread (Figure 2) These variable conditions necessitated the collection of samples using either a two-thread increment corer to extract a 5 mm wide *core* or, in cases where rotting was widespread, by sawing off the butt end of a corner log to create a *disc*.



Figure 2. Condition of Deer Creek Mine Cabin (UVTRL 990).

After air drying, the cores were glued into slotted mounting boards and polished to a high finish. The annual ringwidths of the cores were then measured to the nearest hundredth of a millimetre using a computerized WinDENDRO™ image processing tree-ring measurement system (Guay *et al* 1992; Sheppard and Graumlich 1996). Where ring boundaries were difficult to distinguish, a 40X microscope and Velmex-type stage measurement system was employed for ring boundary verification. The discs were similarly polished and measured using the WinDENDRO™ system.

Following this process, the ringwidth data for each cabin was compiled into a *floating tree-ring chronology* and their signal homogeneity was established using the COFECHA program (Holmes, 1983).

Living Master Chronologies

Increment cores from living trees were used to developing two *living tree-ring chronologies*:

- ❑ a white spruce (*Picea glauca*) chronology collected in August, 1999 adjacent to UVTRL 99P (Celestine Lake Road area).
- ❑ an Engelmann spruce (*Picea engelmannii*) chronology collected in September, 1998 adjacent to Hilda Glacier (Columbia Icefield area)(Smith 1999).

The annual ring-widths of the two living chronologies were measured using the WinDENDRO™ system and the data checked for signal homogeneity using COFECHA. A standardized tree-ring series was then constructed using a double detrending procedure within the ARSTAN computer program to remove any inherent age/growth trends (Holmes *et al.*, 1986).

The Celestine Lake Road living white spruce chronology spans the interval between 1800 and 1999. Table 1 presents the principle tree-ring statistics associated with the chronology. The mean series correlation value of 0.629 illustrates the relative strength of the chronology and the mean sensitivity value of 0.243 provides a measure of between-ring variability (Fritts, 1976). Autocorrelation is a measure of the correspondence between successive increments and the value of 0.765 assigned to the chronology suggests that radial growth at the Celestine Road site is conditioned by factors in preceding growth years (Fritts, 1976). Notable pointer years within the Celestine Road series include small rings produced in 1800, 1837, 1869, 1889, 1941, 1964 and 1988 (Figure 3).

The Englemann spruce chronology spans the interval between 1800-1998. Table 1 presents the principle tree-ring statistics associated with the chronology. The mean series correlation value of 0.614, the mean sensitivity value of 0.183 and the autocorrelation value of 0.771 assigned to the chronology suggests that radial growth at the Hilda Glacier site is also

Table 1. Living tree-ring chronology statistics.

	Elevation (m asl)	Duration (years)	Number of Series	Correlation with master	Auto- correlation	Mean sensitivity
White spruce (<i>Picea glauca</i>)	975	1800- 1999	78	0.629	0.765	0.243
Engelmann spruce (<i>Picea engelmannii</i>)	2100	1800- 1998	15	0.614	0.771	0.183

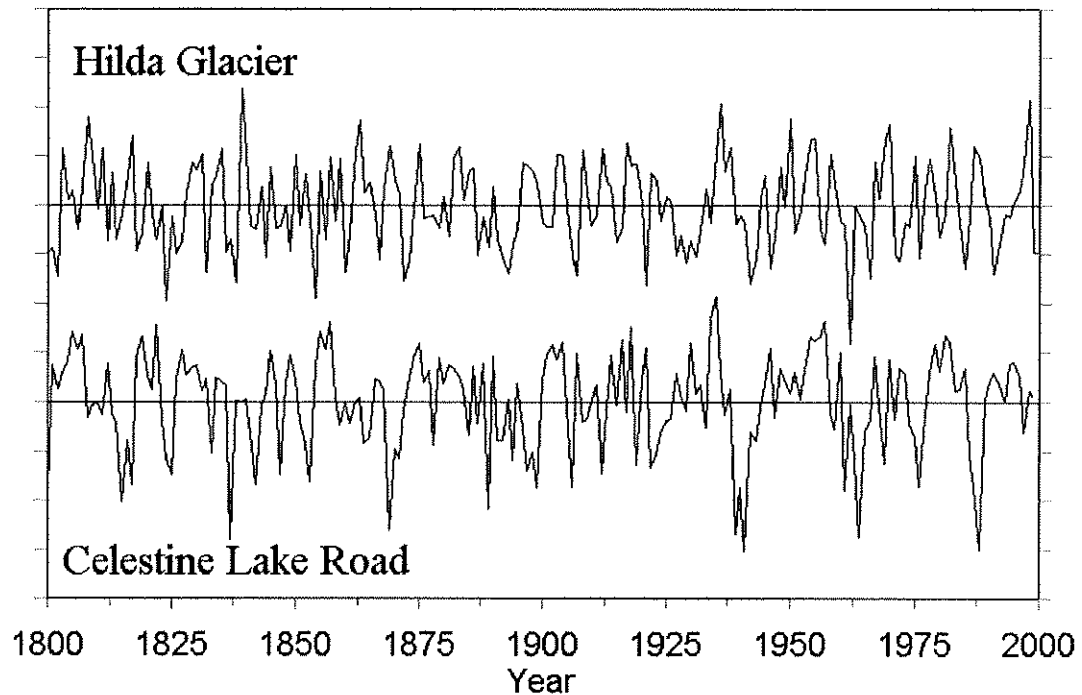


Figure 3. Radial growth trends established for living Englemann spruce at Hilda Glacier and white spruce at Celestine Lake Road. Deviation from the average line drawn through each denotes above average radial growth (+) and lower than average radial growth (-).

conditioned by factors in preceding growth years. These values are characteristic of climatically responsive, upper elevation tree species in the area (Luckman *et al.* 1997). Notable pointer years are recorded in 1824, 1854, 1872, 1893, 1921, 1962 and 1991 (Figure 3).

There is little correspondence in growth trends between the Celestine Lake Road and the Hilda Glacier spruce chronologies (Figure 2). The distinct growth trends exhibited by each reflects a species-specific response to different limiting conditions - temperature in the case of the Hilda Glacier chronology (Luckman *et al.* 1997) and, presumably, precipitation in the case of the Celestine Lake Road chronology (Figure 3)

Determining the Date of Construction

The floating cabin chronologies were initially visually crossdated with reference to the prominent narrow marker rings within either the *P. glauca* or *P. engelmannii* master chronologies (Figure 3). These crossdates were subsequently verified against the living chronology using COFECHA (99% confidence interval set at 0.328).

Based on a strong relationship being established and the presence of bark on the sample, it could be stated with some surety that a log was felled in a certain year. Unfortunately, surface rotting, abrasion or dressing of the log during construction often results in the loss of perimeter cells/wood. In these cases, it is only possible to indicate that the tree was felled sometime after the date assigned to the outermost tree ring.

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BANFF NATIONAL PARK

Collection activities in Banff National Park were coordinated with Don Mickle (Warden Service, BNP) and Rod Wallace (Warden Service, JNP)(Figure 4). Three sites were visited in the northern portion of the park (Figure 5) and samples collected from three cabins (Table 2).

Table 2. Site designation and sampling date in Banff National Park

Site No.	Description	Collection Date
UVTRL 99K	Glacier Trail Cabin	August 7, 1999
UVTRL 99L	Hector 9 Mile Warden Cabin	August 9, 1999
UVTRL 99M	Owen Creek Warden Cabin	August 9, 1999



Figure 4. Undated road construction cabin, Banff NP.

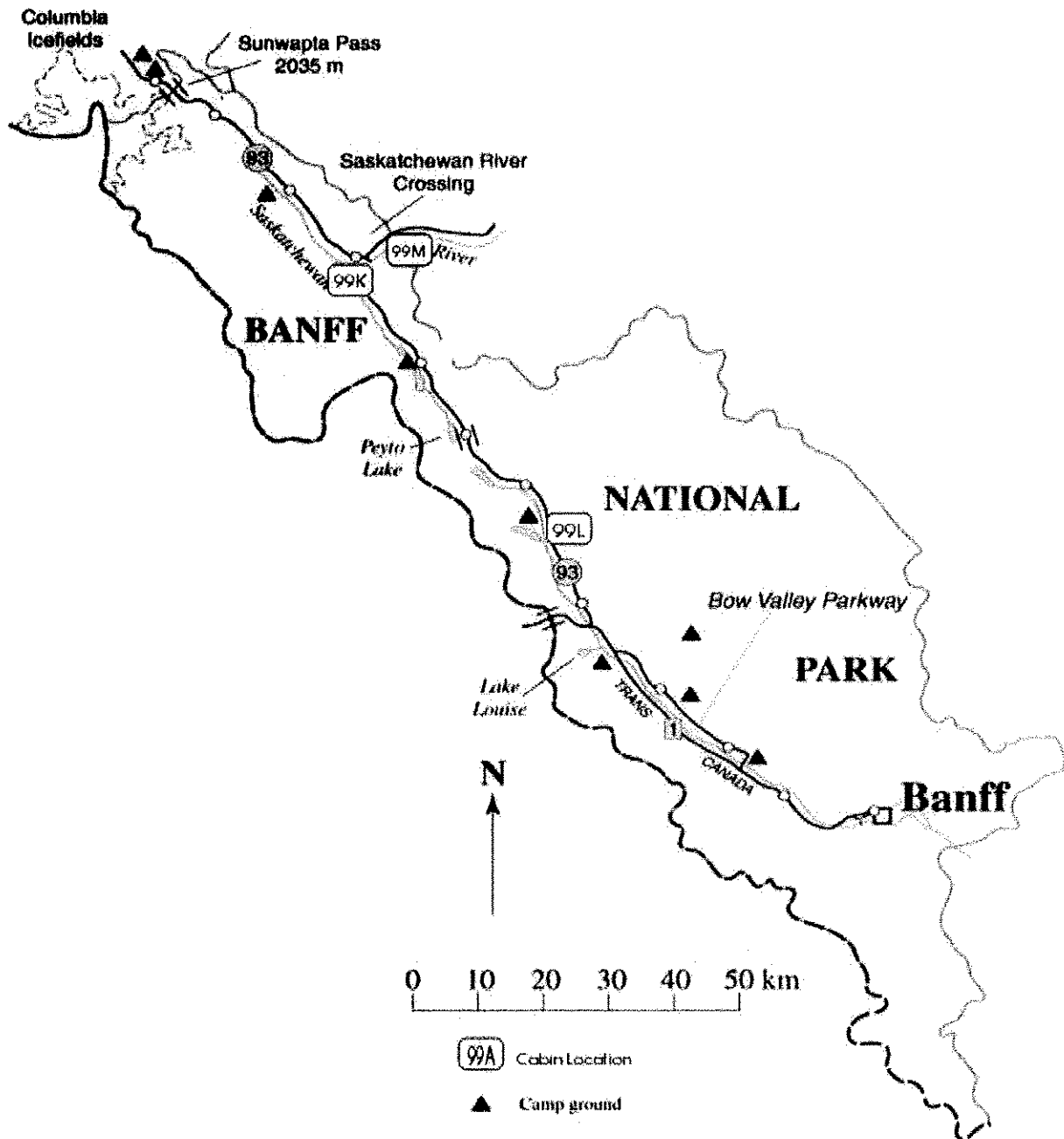


Figure 5. Map of Banff National Park showing the location of the sites sampled.

Glacier Trail Cabin (UVTRL 99K)



Figure 6. West-facing wall of the Glacier Trail Cabin. Increment core samples were collected from the three lowest logs shown.

Location - Terrace surface on the north bank of the North Saskatchewan River *ca.* 200 m downstream of confluence with Howse River..

<i>Descriptor</i>	<i>Elevation (m)</i>	<i>UTM</i>	<i>GPS</i>
NH 169 566	1420	5175555	

Description - This solidly constructed rectangular cabin has two windows and a single door. One window is set into the centre of the west-facing wall which contains 10 courses of logs (Figure 6). The second window is located adjacent to the door on the south-facing wall made up of 6 log courses. A single log stretching the length of the cabin holds the ribbed roof up, on which a number of seedlings have established (Figure 7).

Samples - At this site two sample collections were made: a) increment cores were extracted from a representative sampling of logs (two per log) on all four exterior walls (11 of 34 logs); and b) increment cores were collected from a set of 20 living spruce trees (two per tree) for crossdating purposes.

Structure Age - The outermost tree-ring retained on four logs (five series) at UVTRL 99K was produced in 1907 (Table 3). In at least one case, the presence of bark suggests 1907 represents the year of falling. Close examination of the rings indicates the presence of earlywood and only a few latewood growth cells. Wood tissue developed late in the growth season (*latewood*) is of higher density and, therefore, appears darker than wood developed early in the growth season (*earlywood*). These observations suggest the cabin walls were constructed from trees felled in late-July to early-August 1907.



Figure 7. East wall of the Glacier Trail cabin showing seedlings on roof.

Table 3. Age of logs at Glacier Trail Cabin (99K).

Sample No.	UVTRL No.	Duration	Age
1	99KC00a	1748-1907	160
2	99KC00b	1680-1904	225
3	99KC001a	1690-1905	216
4	99KC001b	1729-1907	179
5	99kc002a	1622-1901	280
6	99kc002b	1617-1873	257
7	99kc003a	1668-1860	193
8	99kc003b	1633-1894	262
9	99KC004a	1687-1907	221
10	99KC004b	1644-1907	264
11	99KC005a	1691-1905	215
12	99KC005b	1734-1901	168
13	99KC006a	1685-1905	221
14	99KC006b	1680-1907	228
15	99KC007a	1632-1853	222
16	99kc008a	1804-1904	101
17	99kc008b	1670-1908	239
18	99kc009a	1617-1887	271
19	99kc009b	1601-1886	286
20	99kc010b	1669-1904	236

Hector 9 Mile Warden Cabin (UVTRL 99L)

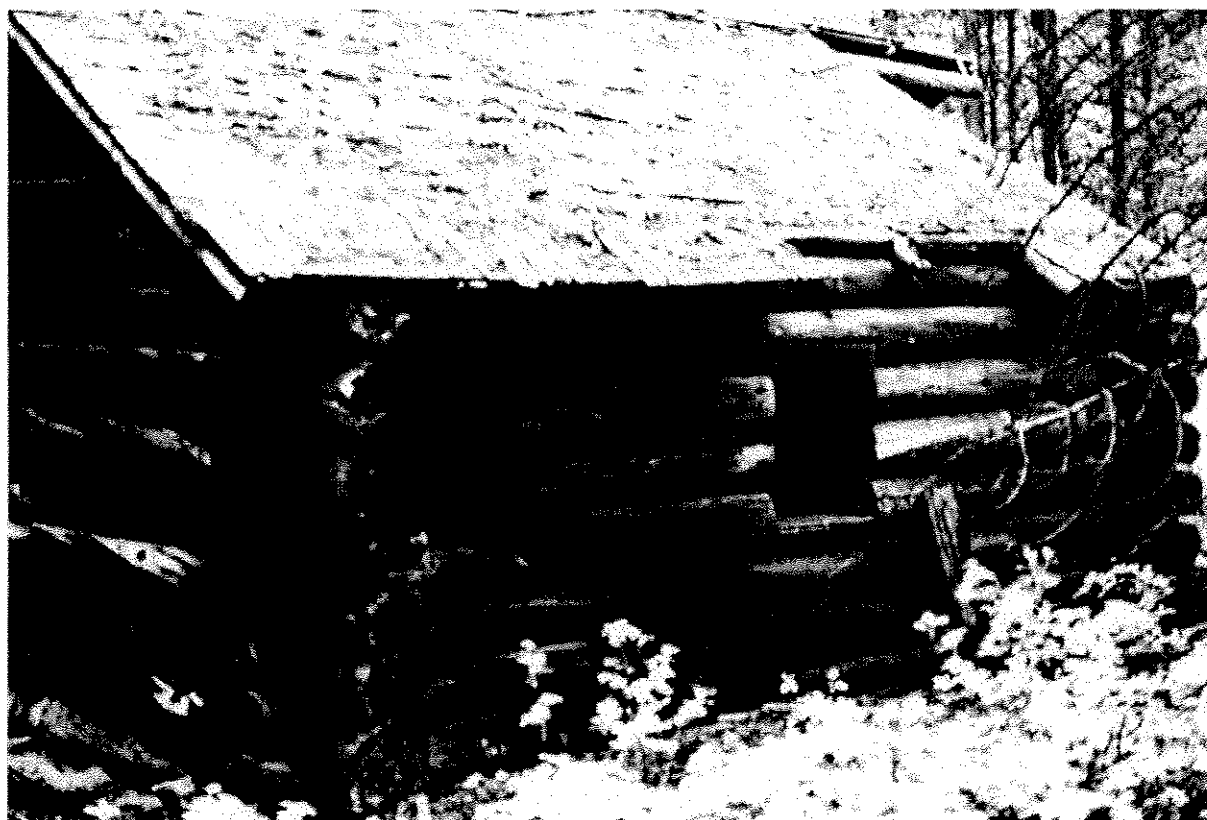


Figure 8. South-facing wall of the Hector 9 Mile Warden Cabin. Increment core samples were collected from the three logs to the left of the window opening.

Location - West-facing subalpine slope below Mount Hector. The cabin is located *ca.* 100 m above (east of) the Banff-Jasper Parkway and looks out over Hector Lake.

<i>Descriptor</i>	<i>Elevation (m)</i>	<i>UTM</i>	<i>GPS</i>
NH 104 499	1850	5671922	11U0600573

Description - This solidly constructed rectangular cabin has three windows and a single door. One window is set into the centre of the west-facing wall which contains 14 courses of logs (Figure 9). This wall and the north wall show evidence of having been burned after construction. The second window is located in the centre of the south-facing wall made up of 9 log courses (Figure 8). The third window is located on the front wall (east-facing)

adjacent to the full-sized door. A roof over the front porch is reported to have collapsed within the last decade.

Samples - At this site two sample collections were made: a) increment cores were extracted from a representative sampling of logs on all four exterior walls ; and b) increment cores were collected from a set of 20 living spruce trees (two per tree) for crossdating purposes.

Structure Age - The Hector 9 Mile Warden Cabin is built from mature spruce logs that range in age from *ca.* 233 to 377 years (Table 4). Scorching by fire, surface rotting and surface dressing have all removed several decades of perimeter tree-rings at various points on the exterior walls of the cabin. Nevertheless, two increment core samples (one of which retains bark - 99LCOO8b) with complete ring sequences indicate the cabin walls were constructed from trees felled in the late summer of 1915 (Figure 9).



Figure 9. West-facing wall of the Hector 9 Mile Warden Cabin that overlooks Hector Lake. Exterior logs show evidence having been burned.

Table 4. Age of logs used in Hector 9 Mile Warden Cabin (99L).

Sample No.	UVTRL No.	Duration	Age
1	99LC00b	1523-1849	327
2	99LC001a	1513-1838	326
3	99LC001b	1476-1852	377
4	99LC002a	1526-1850	325
5	99LC003a	1508-1865	358
6	99LC003b	1600-1864	265
7	99LC004a	1554-1835	282
8	99LC004b	1516-1843	328
9	99LC007a	1673-1905	233
10	99LC007b	1665- 1915	251
11	99LC008a	1686-1913	228
12	99LC008b	1692- 1915	224
13	99LC009a	1547-1846	300
14	99LC009b	1564-1855	292
15	99LC005a	1461-1806	346
16	99LC006a	1531-1779	249
17	99LC006b	1567-1796	230

Owen Creek Warden Cabin (UVTRL 99M)



Figure 10. South face of Owen Creek Cabin, BNP. On left the view on March 13, 1948 and on the right the view on August 9, 1999.

Location - North side of Owen Creek in the North Saskatchewan River valley. The cabin is located *ca.* 150 m south (downstream) of where Owen Creek passes underneath the David Thompson Highway.

Descriptor	Elevation (m)	UTM	GPS
MH 104 499	1400	52255670	

Description - This solidly constructed rectangular cabin has two windows and a single door. The corners of the cabin are carefully fitted and show considerable care went into its construction (Figure 10). One window is set into the centre of the west-facing wall which contains 10 courses of logs. The second window is on the opposite east-facing cabin wall overlooking Owen Creek (Figure 10). The door is located on the south-facing wall (Figure 10) made up of 9 log courses. The sides of the logs underneath the front porch of the cabin contain many hand written notations, the earliest of which record visits as early as 1932.

Samples - At this site increment cores were extracted from a representative sampling (*ca.* three logs per wall, two cores from each log) of logs on all four interior walls.

Structure Age - The walls of the Owen Creek Cabin are constructed of spruce trees ranging in age from *ca.* 200 to 264 years (Table 5). While surface dressing and abrasion has removed the outermost 10 to 20 tree-rings on several logs, 3 logs (5 series) show that the walls are constructed from trees felled in late-summer or early-fall of 1911.

Table 5. Age of logs used in Owen Creek Cabin (99O).

Sample No.	UVTRL No.	Duration	Age
1	99MC00a	1658-1840	183
2	99MC00b	1662-1911	250
3	99MC001a	1643-1899	257
4	99MC002a	1657-1910	254
5	99MC002b	1663-1908	246
6	99MC003a	1682-1911	230
7	99MC003b	1673-1911	239
8	99MC004a	1636-1889	254
9	99MC005a	1661-1910	250
10	99MC005b	1656-1908	253
11	99MC006a	1679-1886	208
12	99MC007a	1702-1911	210
13	99MC007b	1708-1911	204
14	99MC008a	1644-1888	245
15	99MC008b	1655-1889	235
16	99MC009a	1647-1910	264
17	99MC009b	1555-1814	260
18	99MC010a	1675-1891	217
19	99MC010b	1660-1878	219
20	99MC011a	1669-1890	222
21	99MC011b	1675-1897	223

JASPER NATIONAL PARK

Collection activities in Jasper National Park were coordinated with Rod Wallace (Warden Service, JNP). Ten sites were visited in the northern portion of the park (Figure 11) and increment core samples collected from fourteen cabins/structures (Table 5).

Table 5. Site designation and sampling date in Jasper National Park

Site No.	Description	Collection Date
UVTRL 99NA	Railway Construction Camp	August 10, 1999
UVTRL 99NB	Railway Construction Camp	August 10, 1999
UVTRL 990	Deer Creek Mine Cabin	August 10, 1999
UVTRL 99P1	Celestine Lake Road Railroad Construction Camp	August 11, 1999
UVTRL 99P2	Celestine Lake Road Railroad Construction Camp	August 11, 1999
UVTRL 99P3	Celestine Lake Road Railroad Construction Camp	August 11, 1999
UVTRL 99P5	Celestine Lake Road Railroad Construction Camp	August 11, 1999
UVTRL 99Q	Railside Cabin	August 11, 1999
UVTRL 99R	Keith Lake Cabin	August 12, 1999
UVTRL 99S	Maligne Lake Outlet Cabin	August 12, 1999
UVTRL 99T	Fiddle River Railroad Camp	August 13, 1999
UVTRL 99U	Disaster Point Railroad Camp	August 13, 1999
UVTRL 99V	Rocky River Cabin	August 13, 1999
UVTRL 99W	Talbot Lake Log Foundation	August 13, 1999

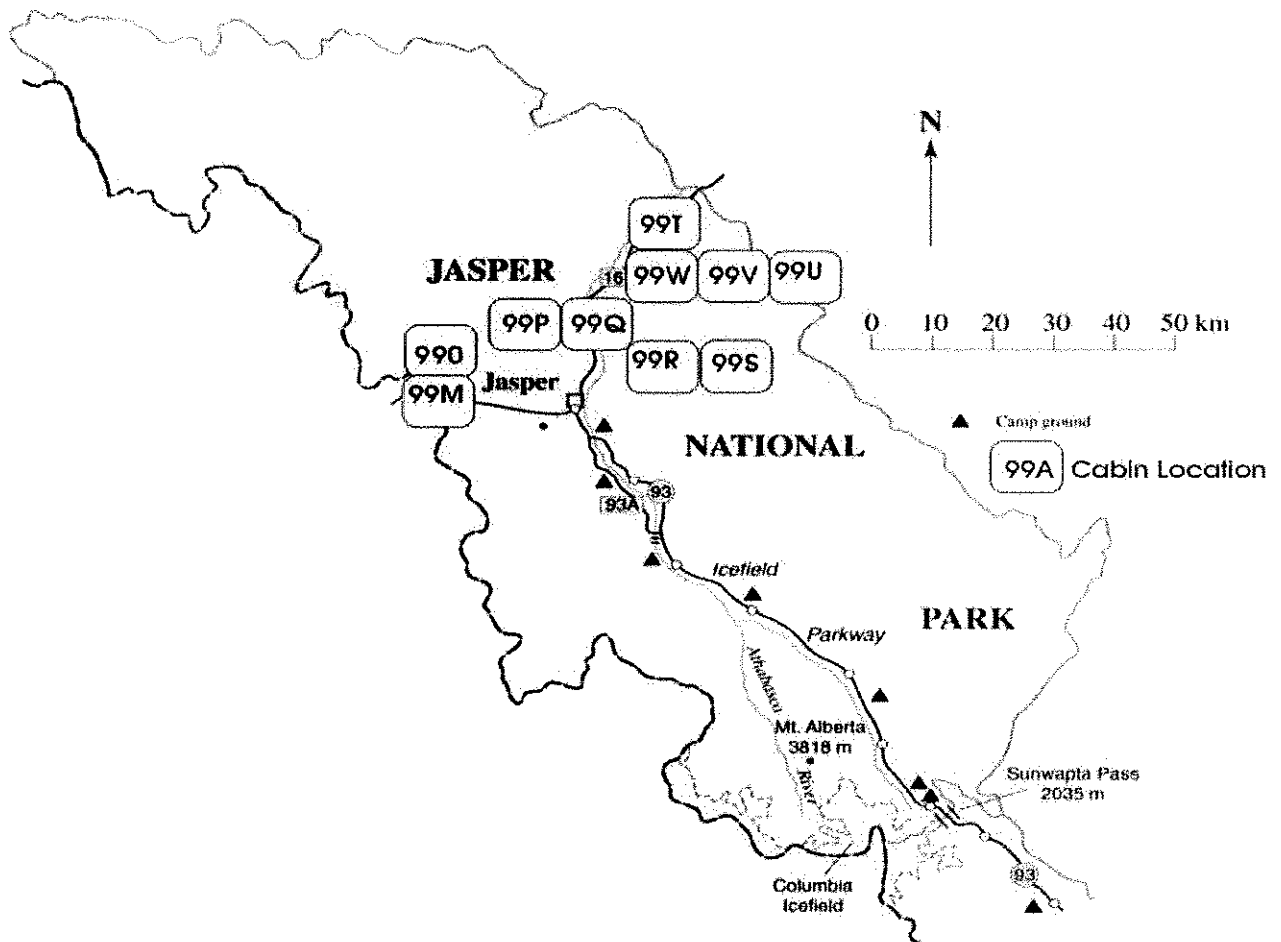


Figure 11. Map of Jasper National Park showing the location of the sites sampled.

Railway Construction Camp (UVTRL 99N)

Location - Terrace surface west of Jasper townsite along Miette Creek in the Dominion Prairie/Yellowhead Pass area. The site is located north of Miette Creek and is *ca.* 50 m above the river within a stand of mature aspen and fire-scarred Douglas-fir trees.

Descriptor	Elevation (m)	UTM	GPS
M J 035 603	1160	5860646	11U0404265

General Description - Two structures are present at the site:

- a) **UVTRL 99NA** - a large two room cabin that appears to have served as a storage building. This structure is in disrepair, the roof has collapsed and all that remains are 6 to 8 courses of logs along the cabin walls (Figure 12).
- b) **UVTRL 99NB** - a small one room cabin that has largely fallen down. All that remains are the lowest courses of logs (two to three high)(Figure 13).



Figure 12. Northwest interior corner of storage structure at 99N. The printed box label found inside the cabin reads *High Explosives, Dangerous*.



Figure 13. Cutting of butt ends of logs at Railway Construction Camp (99NB).

Samples - Increment core samples were from 8 logs at UVTRL 99NA and 3 logs at UVTRL 99NB. Discs were cut from butt ends of 3 logs at UVTRL 99NA and 2 logs at UVTRL 99NB. Both cabins appear to be constructed of a mix of lodgepole pine and spruce logs. No bark was present on the logs at either site and there is considerable surface decay.

Structure Age - While there is considerable variation in the age of the outermost tree-ring at both structures, all point to a turn-of-the-century cutting date (Tables 6 and 7) The oldest tree-ring present at both sites (99NAck27 - 1903; 99NBC03a - 1903) were derived from discs and suggest the walls at both cabins were built from timbers felled sometime after the 1903 growing season.

Table 7. Age of logs used at 99NB.

Sample No.	UVTRL No.	Duration	Age
1	99NBC01a	1790-1872	83
2	99NBC01b	1799-1874	76
3	99NBC03a	1795- 1903	109
4	99NBC03b	1797-1902	106
5	99NBcka	1768-1868	101
6	99NBckb	1768-1864	97

Table 6. Age of logs used at 99NA.

Sample No.	UVTRL No.	Duration	Age
1	99NAC00a	1763-1856	94
2	99NAC00b	1800-1902	103
3	99NAC01a	1800-1884	85
4	99NAC01b	1808-1892	85
5	99NAC03a	1837-1897	61
6	99NAC02b	1803-1902	100
7	99NAC02a	1804-1892	89
8	99NAC05a	1854-1879	26
9	99NAC05b	1818-1846	29
10	99NAC06a	1811-1902	92
11	99NAC06b	1818-1902	85
12	99NAC07a	1802-1896	95
13	99NAC07b	1802-1895	94
14	99NAC08a	1787-1897	111
15	99NAC08b	1794-1901	108
16	99NAck26a	1774-1896	123
17	99NAck26b	1774-1896	123
18	99NAck27a	1804- 1903	100
19	99NAck27b	1803- 1903	101
20	99Nck27a	1813-1902	90
21	99Nck27b	1810-1897	88

Derr Creek Mine Cabin (UVTRL 990)



Figure 14. Frontal view of the Derr Creek Mine Cabin.

Location - Terrace surface west of Jasper townsite, close to where Derr Creek enters Miette Creek. The structure is located *ca.* 5 m above the north bank of Miette Creek.

Descriptor	Elevation (m)	UTM	GPS
MJ 065 604	1150	5860690	11U0406587

Description - The roof on this rectangular-shaped cabin has collapsed, resulting in the destruction of large sections of the exterior walls (Figures 2 and 14). The cabin consists of three components: a central room, a root cellar structure and a small room at the front that may have served as a kitchen. The cabin is constructed of a mix of Douglas-fir and spruce/pine logs, with the relatively slender Douglas-fir logs providing structural support at several places.

Samples - Increment core samples were collected from 8 representative logs (two cores per bole) and disc samples were cut from two protruding butt ends. Examination of the surfaces exposed by the latter activity confirmed the presence of Douglas-fir logs and revealed fire scars within the boles.

Structure Age - The cabin is constructed from logs felled in 1906 (Table 7). The age of this activity was confirmed by strong crossdates within 6 different logs. While the oldest boles proved to be from Douglas-fir trees (range 121-124 years old), most of the cabin is constructed from relatively youthful (31-82 year old) spruce or pine trees.

Table 7. Age of logs used in Derr Creek Mine Cabin

Sample No.	UVTRL No.	Duration	Age
1	99OC00a	1796-1903	108
2	99OC00b	1783-1903	121
3	99OC01a	1866-1904	39
4	99OC01b	1867-1903	37
5	99OC02a	1867-1905	39
6	99OC02b	1852-1906	55
7	99OC03a	1871-1904	34
8	99OC03b	1874-1906	33
9	99OC04a	1793-1874	82
10	99OC04b	1850-1905	56
11	99OC06a	1878-1906	29
12	99OC06b	1876-1906	31
13	99OC07a	1860-1906	47
14	99OC07b	1803-1849	47
15	99OC08b	1875-1903	29
16	99Ock26a	1783-1906	124
17	99Ock26b	1783-1906	124
18	990ck27b	1859-1906	48

Celestine Lake Road Railroad Construction Camp (UVTRL 99P)

The Celestine Lake Road Railroad Construction Camp has been designated as *Historic Site 1871R*. It consists of five standing log structures, numerous depressions and scattered debris extending over more than 200 metres within a clearing located on a moderately sloping hill overlooking Jasper Lake. Surface artifacts identified and collected at the site by previous researchers indicate the site had been a camp for workmen who were blasting for the Canadian Northern railway line.

By 1913, the Canadian Northern had established a station west of the Grand Trunk Pacific's station in Jasper, and steel had reached Lucene, their divisional point in the Rockies just 8 kilometres over the British Columbia border. This historical information and patent dates on artifacts collected at the site (Figure 15) suggest the site was occupied in the early 1900s.



Figure 15. Print on wooden box side found within 99P1.

Location - The site is accessed by taking the Celestine Lake Road for approximately 22 kilometres, then continuing on foot at a marked pipeline crossing and following a path eastward for approximately 10 minutes to a clearing. The general area around the site is largely free of tree cover with only a few small isolated stands of a few spruce trees.

Descriptor	Elevation (m)	UTM	GPS
MJ 316 856	975	5885677	11U0431421

General Description - The camp consists of five substantial log buildings. Tree-ring samples were collected at four of these structures:

- I. UVTRL 99P1 - large bunk house
- II. UVTRL 99P2 - large bunkhouse adjacent to 99P1.
- III. UVTRL 99P3 - small cabin with annex immediately upslope from 99P2
- IV. UVTRL 99P5 - small cabin upslope from 99P3.

I. UVTRL 99P1



Figure 16. Doorway in 99P1 located in walkway between 99P1 and 99P2.

Description - 99P1 is a large rectangular log structure (bunkhouse?) located immediately adjacent to 99P2. While the walls of the structure are still standing, the roof of the building has collapsed. The cabin has a single door framed by two wooden planks on either side of the opening (Figure 16) and windows at several points. The walls are constructed of 5 to 6 courses of large-calibre boles.

Samples - Increment core samples were collected from 13 individual logs at both interior and exterior sites.

Structure Age - The walls of 99P1 are constructed of spruce logs ranging in age from *ca.* 56 to 203 years (Table 8). The logs lack a covering of bark and appear well-weathered. Perimeter dates on the logs have a considerable range (1846-1907) and reflect the loss of perimeter wood. The most recent tree-ring recorded was produced in 1907 (99P1C03b, Table 99P1) and contains a complete earlywood/latewood sequence. Based on this observation, the minimum falling age for the trees used to construct the walls of 99P1 is sometime after the summer of 1907.

Table 8. Age of logs used in construction of UVTRL 99P1.

Sample No.	UVTRL No.	Duration	Age
1	99P1C00a	1702-1846	145
2	99P1C00b	1751-1872	122
3	99P1C01a	1685-1874	190
4	99P1C01b	1689-1891	203
5	99P1C02b	1820-1900	81
6	99P1C03a	1737-1901	165
7	99P1C03b	1760- 1907	148
8	99P1C04a	1775-1889	115
9	99P1C04b	1774-1888	115
10	99P1C05a	1820-1886	67
11	99P1C06b	1745-1895	151
12	99P1C07a	1792-1863	72
13	99P1C07b	1825-1889	65
14	99P1C08a	1902-1840	63
15	99P1C09a	1713-1860	148
16	99P1C09b	1714-1845	132
17	99P1C10a	1797-1878	82
18	99P1C10b	1824-1890	67
19	99P1C11a	1799-1884	86
20	99P1C11b	1792-1890	99
21	99P1C12a	1806-1861	56

II. UVTRL 99P2



Figure 17. Inside of 99P2 showing increment core sampling sites.

Description - 99P2 is a large rectangular log structure located immediately adjacent to 99P1. While the walls of the structure are still standing, the roof of the building has collapsed (Figure 17). The cabin has two door openings framed by wooden planks and windows at several points. The walls are constructed of 5 to 6 courses of large-calibre boles.

Samples - Increment core samples were collected from 11 individual logs at both interior and exterior sites (Figure 17).

Structure Age - The walls of 99P2 are constructed of spruce logs ranging in age from *ca.* 46 to 166 years (Table 9). The logs lack a covering of bark and appear well-weathered. Perimeter dates on the logs have a considerable range (1856-1911) and reflect the loss of perimeter wood. The most recent tree-ring recorded was produced in 1911 (99P1C03b, Table 99P1) and contains a complete earlywood/latewood sequence. Based on this observation, the minimum falling age for the trees used to construct the walls of 99P2 is sometime after the summer of 1911.

Table 9. Age of logs used in construction of 99P2.

Sample No.	UVTRL No.	Duration	Age
1	99P2C00a	1768-1867	100
2	99P2C00b	1771-1861	91
3	99P2C01a	1768-1900	133
4	99P2C01b	1770-1907	138
5	99P2C02a	1779-1887	109
6	99P2C02b	1770-1888	119
7	99P2C03a	1765-1881	117
8	99P2C03b	1760-1879	120
9	99P2C04a	1771-1910	140
11	99P2C05a	1738-1856	119
12	99P2C05b	1740-1815	76
13	99P2C06a	1760-1885	126
14	99P2C06b	1756-1888	133
15	99P2C07a	1782-1827	46
16	99P2C07b	1816-1899	84
17	99P2C08a	1763-1899	137
18	99P2C08b	1749-1906	158
19	99P2C09a	1769-1911	145
20	99P2C09b	1743-1908	166
21	99P2C10a	1816-1896	81
22	99P2C10b	1740-1871	132

III. UVTRL 99P3



Figure 18. Photograph showing the annex attached to 99P3.

Description - 99P3 is a small rectangular two-roomed log structure located immediately upslope from 99P2. While the walls of the structure are still standing, the roof of the building has collapsed. The larger room of the structure comprises the northern two-thirds of the building and has a door along its north wall and window along its east wall. The smaller annex is accessed through a door located along the southern end of the east wall (Figure 18).

Samples - Increment core samples were collected from 19 individual logs at both interior and exterior sites at both the main building and the annex.

Structure Age - The walls of 99P3 are constructed of spruce logs ranging in age from *ca.* 78 to 160 years (Table 10). The logs lack a covering of bark and appear well-weathered. Perimeter dates on the logs have a considerable range (1837-1909) and reflect the loss of perimeter wood. The most recent tree-ring identified was produced in 1909 (99P3C18a, Table 10) and contains a complete earlywood/latewood sequence capped by bark. The latter observation suggests that the logs used to construct 99P3 were felled between the late-summer of 1909 and the beginning of the growing season in 1910.

Table 10. Age of logs used in construction of 99P3.

Sample No.	UVTRL No.	Duration	Age
1	99P3C00a	1748-1855	108
2	99P3C00b	1742-1871	130
3	99P3C01a	1754-1896	141
4	99P3C02a	1737-1896	160
5	99P3C02b	1734-1867	134
6	99P3C03a	1759-1865	107
7	99P3C03b	1764-1878	115
8	99P3C04a	1762-1885	124
9	99P3C04b	1758-1874	117
10	99P3C05a	1763-1880	118
11	99P3C06a	1764-1885	122
12	99P3C06b	1861-1895	35
13	99P3C07b	1768-1889	122
14	99P3C08a	1746-1875	130
15	99P3C08b	1752-1889	138
16	99P3C09a	1748-1871	124
17	99P3C10a	1752-1866	115
18	99P3C10b	1768-1865	98
19	99P3C11a	1744-1868	125
20	99P3C11b	1740-1873	134
21	99P3C12a	1744-1847	104
22	99P3C12b	1735-1837	103
23	99P3C13a	1748-1891	144

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24	99P3C13b	183-1873	71
25	99P3C14b	1730-1867	138
26	99P3C15a	1768-1884	117
27	99P3C15b	1764-1860	97
28	99P3C16a	1764-1883	120
29	99P3C16b	1773-1885	113
30	99P3C17a	1758-1835	78
31	99P3C17b	1765-1835	71
32	99P3C18a	1761-1909	149
33	99P3C18b	1762-1905	144

IV. UVTRL 99P5



Figure 19. Photograph showing the collapsed character of 99P5.

Description - 99P5 is a large square-shaped cabin located near the upper end of the site. The cabin is in an advanced state of collapse, with failure of the roof structure apparently having pulled the walls down. The downslope face of the cabin contains a window opening (Figure 19). A single door provided access to the cabin interior.

Samples - The logs composing the walls and the remaining roof timbers of 99P5 are weathered and rotten. Solid increment cores were difficult to extract and only six logs were successfully sampled.

Structure Age - The walls of 99P5 are constructed of spruce logs ranging in age from *ca.* 78 to 134 years (Table 99P5). Perimeter dates on the logs have a considerable range (1822-1902). While the most recent tree-ring recorded was produced in 1902 (99P503b, Table 11), the surface of this core is weathered and suggests the loss of perimeter wood. This observation indicates that the logs used to construct 99P5 were felled sometime after 1902.

Table 11. Age of logs used in construction of 99P5.

Sample No.	UVTRL No.	Duration	Age
1	99P5C00a	1762-1895	134
2	99P5C00b	1764-1897	134
3	99P5C01a	1749-1826	78
4	99P5C02a	1778-1894	117
5	99P5C02b	1790-1897	108
6	99P5C03a	1782-1901	120
7	99P5C03b	1793- 1902	110
8	99P5C04a	1701-1822	122
9	99P5C04b	1774-1878	105
10	99P5C05a	1738-1870	133
11	99P5C05b	1757-1883	127

Summary

Historical artifact evidence and various railway records suggest the Celestine Lake Road Railroad Construction Camp was occupied between *ca.* 1900 and 1915. The tree-ring evidence collected at the site shows that the two bunkhouses were constructed from trees felled sometime after 1907 in the case of 99P1 and after the 1911 growing season in the case of 99P2. The logs used in the construction of the two-room cabin (99P1) were felled sometime after the 1909 growing season but before the 1910 growing season. The tree-ring evidence from 99P5 is less conclusive, but does indicate a construction date after the 1902 growing season.

The tree-ring evidence collected at Celestine Lake Road Railroad Construction Camp indicates cabin construction at the site likely occurred over a three-year period, extending from *ca.* 1909 to 1911.

Railside Cabin (UVTRL 99Q)



Figure 20. Railside Cabin overlooking Jasper Lake.

Location - The site is located off Celestine Lake Road, overlooking Jasper Lake (ie. Athabasca River) and the Canadian National Railway mainline (*ca.* 50 m downslope). Access to the site is by means of a west-trending trail to the 99P sites and then continuing downslope (*ca.* 120 m) and then east (*ca.* 750 m).

Descriptor	Elevation (m)	UTM	GPS
M J 318 858	945	5885677	11U0431760

Description - While the roof of this cabin has fallen into the interior of the structure, the walls remain largely intact and consist of 8 to 9 courses of logs (Figure 20). The cabin is square and faces downslope towards Jasper Lake. The front of the cabin contains openings for two symmetrically-placed windows. The single door to the cabin is located on one side of the cabin (Figure 1).

Samples - Increment cores were extracted from the exterior surfaces on all four cabin faces.

Structure Age - The cabin is constructed of spruce logs ranging in age from *ca.* 136 to 171 years in age (Table 12). As the majority of logs have perimeter dates in the late-1880s, the logs used to construct the cabin were most likely felled either in 1894 or shortly thereafter.

Table 12. Age of logs used in Railside structure.

Sample No.	UVTRL No.	Duration	Age
1	99QC00a	1703-1865	163
2	99QC00b	1699-1849	151
3	99QC001a	1739-1873	135
4	99QC001b	1728-1866	139
5	99QC002a	1740-1889	150
6	99QC002b	1737-1868	132
7	99QC003a	1762-1879	118
8	99QC003b	1753-1888	136
9	99QC004a	1724-1800	77
10	99QC004b	1727-1886	160
11	99QC005a	1748-1886	139
12	99QC005b	1746-1877	132
13	99QC006a	1751-1891	141
14	99QC006b	1753-1890	138
15	99QC007a	1748-1886	139
16	99QC007b	1721-1839	119
17	99QC008a	1773-1893	121
18	99QC008b	1749-1890	142
19	99QC009a	1758-1889	132
20	99QC010a	1705-1875	171
21	99QC010b	1711-1876	166
22	99QC011a	1748-1884	137
23	99QC011b	1752-1894	143

Keith Lake Cabin (UVTRL 99R)



Figure 21. Keith Lake Cabin

Location - The Keith Lake structure (UVTRL 99R) is located on a terrace surface to the east of " Keith Lake" in the Lake Edith area.

Descriptor	Elevation (m)	UTM	GPS
M J 320 618	975	5961850	11U0431930

Description - The cabin measures *ca.* 3 x 2 m and contains an internal crib-like structure (west wall) of indeterminate use. The walls are composed of between 3 to 5 logs and the structure was accessed through an offset opening along the east wall. There are no openings for windows, nor any indications of roof beams (Figures 21 and 22).

Samples - Increment cores were removed from eight logs on the east, west and south walls of the Keith Lake Cabin. Discs were cut from the butt ends of three logs.

Structure Age - The Keith Lake structure is composed of logs which range in age from *ca.* 53 to 122 years (Table 13). While the surfaces of almost all of the logs have lost some

perimeter wood, the majority have dates in the late 1880s. The youngest tree ring identified dates to 1890 (99RC005b). Bark is present on this sample and there is earlywood but no latewood development associated with the 1890 ring. This observation indicates that the Keith Lake structure was built from logs that were felled sometime in early July 1890.



Figure 22. Keith Lake cabin

Table 13. Age of logs used in Keith Lake structure.

Sample No.	UVTRL No.	Duration	Age
1	99RC00a	1791-1886	96
2	99RC00b	1790-1879	90
3	99RC001a	1789-1886	98
4	99RC001b	1791-1883	93
5	99RC002a	1796-1886	91
6	99RC002b	1808-1887	80
7	99RC003a	1765-1886	122
8	99RC003b	1774-1885	112
9	99RC004a	1791-1884	94
10	99RC004b	1779-1885	107
11	99RC005a	1785-1888	104
12	99RC005b	1803-1890	88
13	99RC006a	1812-1884	73
14	99RC006b	1813-1887	75
15	99RC007b	1797-1888	92
16	99RC008a	1857-1883	27
17	99RC008b	1835-1887	53
18	99RckW2a	1799-1885	87
19	99RckW2b	1799-1884	86
20	99RckE3a	1789-1885	97
21	99RckE3b	1789-1882	94
22	99RckS3a	1792-1883	92
23	99RckS3b	1792-1884	93

Maligne Lake Outlet Cabin (UVTRL 99S)



Figure 23. Maligne Lake Outlet Cabin showing location of disc samples

Location - The Maligne Lake Outlet cabin (UVTRL 99S) is found *ca.* 500 m north of Maligne Lake. It is located adjacent to the sewage lagoon and west of the Maligne River.

Descriptor	Elevation (m)	UTM	GPS
M J 565 421	1665	456358425	

Description - The cabin measures *ca.* 4 x 3 m in size and contains an internal crib-like structure (south wall) that was most likely a bunk (Figure 23). The walls are composed of between 5 to 6 courses of pine/spruce logs. The cabin was accessed through an offset framed doorway along the west wall.

Samples - Increment cores were collected from eight logs and discs were cut from the butt ends of three logs (Figure 23).

Structure Age - The walls of the Maligne Lake Outlet Cabin are constructed of relatively youthful pine and spruce logs that range in age from *ca.* 121 to 147 years (Table 14). While the cabin appears to have been constructed from undressed logs, surface rot and decay have removed the outermost tree-rings at many points. Based on the discovery of several tree-rings dating to the early 1910s, the Maligne Lake Outlet Cabin appears to have been constructed of trees felled in 1913.

Table 14. Age of logs used in Maligne Lake outlet cabin.

Sample No.	UVTRL No.	Duration	Age
1	99SC00a	1764-1898	135
2	99SC00b	1766-1897	132
3	99SC001a	1770-1907	138
4	99SC001b	1767-1902	136
5	99SC003a	1785-1913	129
6	99SC004b	1777-1910	134
7	99SC005a	1763-1909	147
8	99SC006a	1788-1910	123
9	99SC006b	1794-1910	117
10	99SC007a	1779-1899	121
11	99SC007b	1800-1886	87
12	99SC008b	1798-1907	110
13	99Sck14a	1788-1907	120
14	99Sck14b	1788-1909	122
15	99Sck15a	1791-1911	121
16	99S16Na	1766-1912	147
17	99S16Nb	1766-1911	146

Samples - The logs composing the cabin are rotted and there appears to be considerable surface decay. No increment cores were collected at the site. Four discs were collected from three different corners of the cabin (Figure 24).

Age of Structure - The Fiddle River cabin is constructed from logs that range in age from *ca.* 49 to 135 years (Table 15). A lack of bark and the prevalence of surface rot at the site precludes assigning an exact date of construction. Nevertheless, a general correspondence of perimeter dates in the late 1910s suggests the structure was constructed either in 1917 or sometime shortly thereafter.

Table 15. Age of logs used in Fiddle River cabin.

Sample No.	UVTRL No.	Duration	Age
1	99TckE2a	1867-1915	49
2	99TckE2b	1866-1916	51
3	99TckW3a	1783-1917	135
4	99TckW3b	1783-1907	125
5	99TckS3a	1828-1915	88
6	99TckS3b	1826-1914	89
7	99TckN4a	1800-1902	103
8	99TckN4b	1797-1899	103

Structure Age - As indicated by Table 17, only a single log from this cabin crossdated into the living chronologies. The remainder of the logs expressed growth trends that were unmatched within the living tree-ring series. The inability to crossdate these logs suggests they were collected at another location and transported to the site or that local growth conditions are unlike those elsewhere in this part of JNP. Additional sampling at the site focused on developing a site-specific living tree-ring chronology might resolve this dilemma. The single log dated at the site does indicate that the cabin postdates the 1906 growth year.

Table 99V1 - Age of logs used in Rocky River cabin.

Sample No.	UVTRE No.	Duration	Age
1	99V1C00a	1774-1906	133
2	99V1C00b	1765-1899	134
3	99V1C01a		82
4	99V1C01b		59
5	99V1C02a		126
6	99V1C02b		113
7	99V1C03a		114
8	99V1C03b		129
9	99V1C04a		129
10	99V1C04b		130
11	99V1C05a		149
12	99V1C05b		132
13	99V1C06a		131
14	99V1C06b		123
15	99V1C07b		52
16	99V1C08a		100
17	99V1C08b		100
18	99V1S3a		96
19	99V1S3b		96

Talbot Lake Log Foundation (UVTRL 99W)



Figure 27. Location of Talbot Lake foundation. Dated log was found at feet of person.

Location - The Talbot Lake site is located west of the Highway 16 within an area of vegetated sand dunes.

Descriptor	Elevation (m)	UTM	GPS
M J 332 837	945	5884170	11U0433460

Description - Little remains at the site but a single, partially-rotted, log partially buried within the turf (Figure 27). Limited surface excavations around the remaining perimeter of the site did not reveal additional samples.

Samples - The single foundation log at the site was excavated and two cross-sectional cookies were retained for analysis. While no bark remained on the sample and there was some evidence of perimeter wood loss, the morphological characteristics of the ringwidth

patterns suggest that the derived age of the outermost tree ring should be close to the falling date.

Structure Age - The single log (*ca.* 109 years old) recovered from the Talbot Lake site crossdated strongly into the living spruce chronology. Based on the assumption of limited loss of perimeter wood and the age of the oldest tree ring (Table 18), it is suggested that the tree was felled either in 1908 or sometime very shortly after.

Table 18. Age of log at Talbot Lake structure.

Sample No.	UVTRL No.	Duration	Age
1	99VTL1a	1800-1908	109
2	99VTL1b	1804-1908	105