Culturally Modified Trees of British Columbia

A Handbook for the Identification and Recording of Culturally Modified Trees

Prepared by
Archaeology Branch
B.C. Ministry of Small Business, Tourism and Culture
for the
Resources Inventory Committee

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This book is dedicated to the memory of Arne C. Carlson and Leslie Mitchell.

The CMT Recording Procedures outlined in this handbook have been endorsed by the B.C. Association of Professional Consulting Archaeologists

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For further information about the Resources Inventory Committee and its various Task Forces, please access the Resources Inventory Committee Website at: http://www.for.gov.bc.ca/ric.

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INTRODUCTION

About this Handbook

This handbook is an operational guide to the identification and recording of culturally modified trees (CMTs) in British Columbia. It is designed for resource managers and others interested in documenting these trees.

<table>
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<th>Definition of CMT</th>
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<td>A CMT is a tree that has been altered by aboriginal people as part of their traditional use of the forest. Non-aboriginal people also have altered trees, and it is sometimes difficult to determine if an alteration (modification) is of aboriginal or non-aboriginal origin. There are no reasons why the term “CMT” could not be applied to a tree altered by non-aboriginal people. However, the term is commonly used to refer to trees modified by aboriginal people in the course of traditional tree utilization, and is used as such in this handbook.</td>
</tr>
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</table>

There are many kinds of CMTs in British Columbia. Examples include trees with bark removed, stumps and felled logs, trees tested for soundness, trees chopped for pitch, trees with scars from plank removal, and trees delimbed for wood. Some kinds are common; others infrequent. This handbook is concerned with the most common kinds of CMTs — those most likely to be encountered in BC’s forests. The handbook focuses on both coastal and interior CMTs. There is considerable overlap of tree species and modifications between the coast and interior regions of the province. Investigators should be familiar with CMTs discussed for both regions, as the majority of CMT types are not exclusive to either geographic area. The handbook also provides background information on CMT dating, intrasite sampling of CMT sites and, CMT protection and significance as currently practised in British Columbia. Appendix I contains criteria for identifying cultural tapering bark–strip scars. Appendix II addresses natural bark scarring agents commonly found on lodgepole pine.
Cultural resource managers must be aware that any archaeological site containing physical evidence of human use or habitation prior to 1846 is potentially subject to provisions of the prevailing legislation, the *Heritage Conservation Act*. These sites may not be altered without a permit issued under this Act. Modified trees associated with the early non-aboriginal history of the province are excluded from the handbook by the above definition of CMTs, but are protected by the Act if they predate 1846.

**How the Handbook is Organized**

The handbook consists of three main sections:
- identification of CMTs on the Coast
- identification of CMTs in the Interior
- the recording of CMTs both on the Coast and in the Interior.

The handbook also contains:
- a brief section on CMT dating
- intrasite sampling strategies
- an introduction to CMT protection, evaluation of significance, aboriginal rights and permits
- identifying cultural tapered bark-stripped scars
- a glossary
- suggested readings
- identifying cultural cambium scars on lodgepole pine

**CMT Classification**

There are many different kinds of CMTs in British Columbia, reflecting the traditional uses of tree products. In order to describe this diversity, archaeologists classify CMTs based on the kinds of modifications present on the trees. CMTs are first divided into three main groups or classes. Each class is then divided into a number of types. The chart on the next page shows the CMT classification used in this handbook. This classification can be used in all regions of British Columbia, though not all types are present everywhere. Each class and type...
of CMT is discussed later. There is a separate discussion for the Coast and Interior of the Province. Terms are defined at that time, as well as in the glossary.
Toolmarks

Cuts, striations, grooves and other marks produced by tool use are found on many types of CMTs. The presence of marks made by tools used traditionally by aboriginal people is usually convincing evidence that a tree is a CMT. These tools include steel axes, hatchets, knives; iron chisels and adzes; chisels of stone, bone and shell; wooden, bone and antler wedges; bone and antler bark peelers; bone sap scrapers; and others. Cutting tools made of steel were used in traditional activities throughout British Columbia in the 19th and 20th centuries; other kinds of tools were more restricted in the geographic extent of their use (for example, chisels with shell bits were used in some areas on the Coast only, and antler bark peelers were used in the Interior only). Toolmarks are discussed in the sections on Coast and Interior CMTs.

How to Identify a CMT

There is no simple method for identifying a CMT. Most identifications involve matching the observable characteristics of an altered tree suspected of being a CMT with those listed for the different types of CMTs. To help identify CMTs on the Coast, where many complex types of CMTs occur, a key is provided. The key provides a fast preliminary identification. The key indicates where in the handbook information about each type can be found. A final identification then can be made by consulting the detailed characteristics and illustrations for that type.

When a tree is confirmed as a CMT, the location (CMT site) is recorded. Two forms are used for recording CMT sites:

- Level I CMT Site Recording Form or;
- BC Archaeological Site Inventory Form.

The BC Archaeological Site Inventory Form was also formerly referred to as a Level II Site Recording Form.
The Level I CMT Site Recording Form is included in the handbook. The BC Archaeological Site Inventory Forms are available through the Archaeology Branch website (www.archaeology.gov.bc.ca) or by directly contacting the Branch.

A third form, the CMT Feature Recording Form, assists in recording CMT features that form the site. This form is used with either the Level I or BC Archaeological Site Inventory Forms and is included in the handbook.

This handbook is organized so that it can be used in the field. Individual pages or sections can be removed from the binder and inserted into Duksbak-style field notebooks. The recording forms can be photocopied onto waterproof paper and inserted into a field notebook.

### Protecting CMTs

People encountering CMTs are encouraged to make a record of their findings. However, care should be taken not to damage, move, or in any other way impact a CMT or CMT site which may be protected under provisions of the *Heritage Conservation Act* without the appropriate permit (see the section on CMT protection). This includes the coring of trees for dating purposes. Impacts may affect the physical, cultural and historical integrity of a CMT or CMT site.
COASTAL BRITISH COLUMBIA

Introduction

Coastal British Columbia consists of the Coast Mountains and the land and islands to the west. Tree use was a part of virtually every aspect of traditional aboriginal life on the Coast. More than a dozen species of trees were used, the most important of these being the western redcedar. The importance of trees and tree products in the traditional cultures of the Coast is well known and documented in a number of widely available sources.

CMT Classification

As discussed in the Introduction, CMT classification is based on the kinds of modification present on the trees. CMTs are first divided into three main groups (classes): bark-stripped trees, aboriginally-logged trees, and other modified trees. Each class is then divided into a number of types. The chart in the Introduction shows the most common types for each CMT class. The most common CMT types found on the Coast are discussed and defined below. Terms are also found in the glossary.

Toolmarks

Prior to European contact, people on the Coast used a variety of technologies and tools for felling trees, working wood, and collecting bark. The main tools used were chisels, wedges, hammers, and adzes. Chisels and adzes had bits made of stone, bone or shell. Cobbles and handmauls were used as hammers. Wedges were made of wood, bone and antler. Iron was available in some areas of the Coast by the 15th century (and perhaps earlier), and became the preferred material for chisel bits. Basic technologies did not change until the mid to late 19th century, when first the steel axe and knife were introduced, and later the crosscut saw and backcut-undercut felling method.
The careful documentation of these toolmarks can help us understand the techniques and diversity of aboriginal logging. Replication studies on the Northwest coast are limited (see bibliography) but toolmarks and wood chips have been studied in detail at Ozette and other wet sites.

Often, similar toolmarks can be distinguished by examining evidence for tool width, blade curvature and nature of the cut surface. These measures reflect that chisel blades are generally much narrower and more deeply curved than axe blades and that stone tools leave a much rougher surface than iron ones. Therefore, the blade width and curvature should be recorded whenever possible. (However width can only be recorded if both corners of the bit are visible.)

The context of the cutmarks may also be important. What initially appear to be axe marks might be found in a location inaccessible to a blade hafted as an axe or adze. In this case, an axe blade must have been hafted as a large chisel.

The surface nature of the cut can also help identify the tool. For instance, crosscut saw marks often are perfectly flat, soft and punky; seldom getting covered with a black substance termed lignin. In contrast, lignin is often found on iron chisel and axe marks, where the wood fibres have been cleanly sliced. This blackening may be confused with burning marks. The formation of lignin appears to require moisture and is seldom found on very protected dry surfaces. In contrast, non-iron tool bits, particularly stone chisels, always leave a rough surface and can leave a mass of jutting splinters. Intentional burning will leave clearly charred wood and charcoal on the worked surface.

Cuts, striations, and other marks produced by these tools are found on many types of CMTs. Examples of some of the toolmark found on CMTs on the Coast are illustrated below, along with additional description.
Axe marks

Axe marks are distinguished by a step in between bit marks where a large chip or chunk has been removed by twisting the axe handle. Axe marks, with age, may obtain thick lignin layers, which can leave rather roughened surfaces when decomposing.

Iron chisel marks

Iron chisels leave narrow cutmarks with clean surfaces often blackened with lignin. Chisels widths of 2 to 5 cm are common. Occasionally, and especially on the North Coast, large bits 10–12 cm wide were hafted as chisels. These large chisels were probably re-hafted axe heads. Chisels sometimes have deeply curved bits, leaving markedly curved toolmarks. A chisel is held in one position and driven with a maul in a series of blows. This action sometimes leaves semi-continuous lines of marks that can be traced for 30 cm or more into the tree. Chisels are the only tool that can reach into a deep, narrow cavity. Iron chisels are used at a variety of angles, sometimes at an oblique angle to the wood being removed, and sometimes puncturing the grain at a 90-degree angle. At some locations, particularly on the west side of Vancouver Island, the gouge chisel was held at a reversed angle (and upside down), leaving a series of unusual sharp-edged ridged toolmarks. A double line of chisel or adze marks is

Cut marks made by steel axe.
often found at the top of rectangular bark-strips on redcedar trees. This is a result of removing a narrow strip of bark before prying off the large bark sheet, perhaps as an aid to inserting pry bars and wedges.

![Image of chisel marks](image)

*A series of cuts from a 2.5 cm wide iron chisel at the top end of a plank-strip. Even though there are many cut marks, only a few are complete enough to determine chisel width. The chisel has a deeply rounded curved bit. Note the formation of black lignin on the bottom portion of the scar.*

**Stone chisel marks**

Stone chisel marks are particularly common in the North Coast and adjacent interior areas of the province. Stone toolmarks are relatively easy to identify where the preservation is good.

Large features made with stone tools often show a number of different toolmarks on one feature, suggesting the use of different types of tools as the hole was enlarged. At the outside edge of the features, in and near the sapwood, the tool is often clearly outlined by the toolmark, and the angle of attack is low (relatively parallel to the wood grain). Unlike iron toolmarks, however, the
smooth surface is not ‘shiny smooth’, and the end-grains of wood show coarse shearing. These marks could be made either with a stone celt hafted as a chisel, elbow adze or splitting adze.

A testhole on a standing tree made using stone tools. Note wedge marks on split face.

A 2 cm side stone chisel has been used to hack into the sapwood, leaving an extremely rough surface.
Further in the feature, the angle of attack becomes much steeper and individual toolmarks are often impossible to discern. The fibres are very coarsely shredded and hang in dense ridges. This is due to the inability of most stone tools to cut directly into cedar fibres.

*Puncture and associated splinter on the split face of a testhole. Note splintered fibres from stone tool use at top of photo.*

**Stone splitting-adze marks**

The large, heavy stone adzes used in the northern part of the province removed big splintered slabs. Their use and remnant stumps were described by an archaeologist in the late 1940s (Leechman, 1950). The individual ‘woodchip’ slabs removed were described as about 4 cm wide, 6 mm thick, and 20–23 cm long (see drawing and photo on next page).
Stone splitting adze toolmarks on small-diameter spruce stump. Splintered wood slabs are about 20–25 cm long (reprinted from Leechman, 1950).

Angled heavy scoring on the split face of a testhole from a splitting adze.
On large cedar trees, it appears that the splitting-adze was used to remove chunks of wood isolated with chisels. The resulting marks show as gaping punctures, about 4 cm wide and several millimetres across, at apparently random orientations. Sometimes splintered wood is torn up at the puncture, and the use of heavy force is apparent. The punctures can be distinguished from iron chisels on the basis of the thickness of the tool: iron tools usually leave very narrow or closed punctures, stone tools are very much blunter and leave a gaping puncture.

**Bone chisel marks**

Bone chisel marks may be indistinguishable from stone if the chisels share the same form. However, bone chisels or antler cutting wedges have been identified when the tool had a round cross-section. This results from using an entire animal legbone or antler. These toolmarks show rough surfaces or heavy splintering similar to stone tools, but the tools left distinctive deep half-circular grooves.

**Fire**

Fire was used to assist in making large notches in wood prior to the common availability of iron tools. Fire used as a tool can be difficult to identify because natural wildfires (including lightning strikes) can also cause inner surfaces to become charred. Pitch, lignin, and water staining can also mimic burning marks. Therefore, many CMTs with naturally burnt or otherwise blackened areas have been misidentified as intentional burning. Controlled burning should be associated with hearth features on the forest floor. Fire-altered rocks may be found on the ground or even within the feature.

Fire was very controlled, and it is unlikely that aboriginal logging with the aid of fire would lead to a hollow tree centre being extensively burnt. The burnt areas should be relatively small and clearly demarcated from light-coloured wood. Chisel marks will often be found in the charred wood, and will sometimes cut through the charcoal to expose light coloured
unburnt wood behind the cut. In other cases, burnt notches will be connected with wedged out unburnt wood. In each of these cases, it is clear that the burning pre-dated the final woodworking.

![Photo of a burnt testhole, partly obscured by fallen tree on upper left. There is a large healing lobe on right. The charred surfaces are confined to the chopped area, and the wood is clearly charcoal, not just blackened.](image)

**Wedge marks**

Precontact aboriginal loggers carried bundles of specialized wooden wedges. The marks left by hammering in these wedges in order to split away chunks, slabs, and planks are common where the split face is well preserved. The width of the tool can often be measured, and sometimes the shape of the wedge tip is left in profile. These working ends are often markedly asymmetrical.
Striation marks made by wedge.

Cross-cut saw marks
Cross-cut saws leave perfectly flat cut surfaces, that seldom preserve well. They cannot reach into tight places and are often accompanied by axe cuts (from the undercut) on stumps.

Chainsaw marks
Chainsaw marks can form lignin and are seldom as flat as the marks left by cross-cut saw. Cut surfaces have characteristic non-parallel linear ridges and cutlines.

Major toolmark classes have been summarised in the table that follows (see next page).

The presence of marks made by tools used traditionally by aboriginal people is usually convincing evidence that a tree is a CMT (as defined by this handbook). For resource management purposes, trees with axe, knife, or crosscut sawmarks (which could have been made by non-aboriginal persons) may require other kinds of supporting evidence, such as the kind, context, or date of modification on the tree, to determine if the CMT is protected by provisions of the Heritage Conservation Act.
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<td>1. Steel axe</td>
<td>Very clean cut, wide, deep, tangential orientation(s), cutting edge gentle arc, almost flat profile, horizontal angle of attack on stumps, quite oblique on log segments</td>
</tr>
<tr>
<td>2. Steel chisel</td>
<td>Very clean cut, narrower, deep, radial or perpendicular orientation, cutting edge rounded arc, almost flat profile, steep angle of attack, (near horizontal at bottom)</td>
</tr>
<tr>
<td>3. Iron axe</td>
<td>Clean cut, not so deep, rougher than steel, tangential orientation(s), cutting edge gentle arc, very rounded profile, horizontal angle of attack on stumps, quite oblique on log segments</td>
</tr>
<tr>
<td>4. Iron chisel</td>
<td>Clean cut, narrow (approx. 3–5 cm), not so deep, rougher than steel, radial or perpendicular orientation, cutting edge rounded arc, very rounded profile, steep angle of attack, (near horizontal at bottom)</td>
</tr>
<tr>
<td>5. Stone chisel</td>
<td>Shearing, some relatively clean cuts with well defined edges and pronounced ridges left by chipped edges, not so deep, irregular surfaces, cutting edge flat to rounded, flat to concave profile, steep angle of attack, no lignin</td>
</tr>
<tr>
<td>6. Bone chisel</td>
<td>Shearing, very narrow, not so deep, irregular surfaces, straight to semicircular cutting edge, deeply concave profile, steep angle of attack, no lignin</td>
</tr>
<tr>
<td>7. Shell chisel</td>
<td>Shearing, not deep at all, irregular surfaces, less pronounced ridges left by chipped edges, steep angle of attack, no lignin (experimental results)</td>
</tr>
<tr>
<td>8. Wedge (wood/antler)</td>
<td>Irregular depressions or grooves often in parallel series with sheared and splintered wood along the edges. Antler may leave a curved mark</td>
</tr>
<tr>
<td>9. Eroded/unclassifiable</td>
<td>All variables uncertain due to erosion. May be older examples.</td>
</tr>
<tr>
<td>10. Other (knives etc.)</td>
<td></td>
</tr>
</tbody>
</table>