Alberta
SUSTAINABLE RESOURCE DEVELOPMENT

PSP MANUALS
MASTER
CONDITION CODE LIST

MARCH 2005

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CONDITION CODES

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05	Browsing (Other animal)	53	Burls and Galls
06	Fire	54	Fork
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19	Western Gall Rust (only on Pine)	67	Closed Scars
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22	Multiple Leader	70	Elytroderma needle cast of pine
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27	Dead Top Dieback with NEW Leader	75	Spruce Spanworm
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29	Cut down	77	Spruce Cone worm
30	Terminal Weevil	78	Eastern Spruce Budworm
31	SW Gall Adelgid	79	Mountain Pine Beetle
32	Tent Caterpillar	80	Spruce Beetle
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45	Other mammalian/avian evidence	98	Data changed by office
46	Sweep/Bow/Bend	99	Do not look for tree

Note: No CC means no crown class.

CONDITION CODES DESCRIPTION

Condition Codes	Description
00 Healthy	No Defect.
01 Insects	Damage or mortality due to destruction of plant parts or tissue by insects. Look for evidence of eggs, egg cases, nests, chewed plant parts, etc. Similar signs on plants located off site may aid in identification of insect mortality.
02 Disease	Damage or mortality caused by disease or fungi. Cankers, discoloration, rust spotting, fungal coverings, etc. help to identify mortality under this code.
03 Rabbit Browsing	Trees killed or damaged by rabbits can be identified by clean, sharp cut marks along the branches and stems (approximately 45^{o} angles). Chewed bark and needles also indicate rabbit damage.
04 Shepherd's Crook	Damage results in blackening and wilting of young shoots and leaves. Tips of the blackened shoots often bend back. On older leaves brownish black, irregularly shaped spots appear.
05 Browsing (other animals)	Mortality or damage due to browsing by ungulates or other animals (e.g. moose, cattle, beavers). Look for chewed tops with rough cuts or breaks.
06 Fire	Mortality or damage due to actual burning of the seedling or scorching by nearby flames. **Not to be used when seedlings are killed by sun scald**.
07 Mechanical	Trees killed or damaged by mechanical or physical means such as scarification machinery, trampling or crushing by animals, etc. Stem scars and rough breakage help to identify mortality under this code.
08 WindThrow	Damage or mortality due to crushing by fallen or displaced logs, snags, branches, uprooted trees, etc.
09 Climate	Trees damaged or killed solely by climatic factors. These include death by freezing, sun scald, severe desiccation, ice accumulation, red belt, etc.
10 Flooding	Trees damaged or killed by drowning alone. Look for evidence of high water marks on the seedling, or in the immediate area. Pull tree out of ground and check roots to see if the root outer coverings is falling off and is blackened.
11 Poor Planting	Damage or mortality due to improper placement of nursery stock (hand or mechanical planting). Trees may have been planted too deep, too shallow, too loosely, or at an acute angle.
12 Suppression	Trees which have been suppressed by the surrounding vegetation for a period of time long enough to damage or kill them. Mortality may be due to severe lack of light, water, nutrients (removed by the competition) or by physical smothering (i.e. heavy grasses). Reference to the previous year's damage tally may help in determining this mortality call. A tree that is over topped by grass or shrubs is not necessarily suppressed. Look for a spindly main stem with very few long needles spaced wide apart or evaluate the last five increments. If the tree has only grown 1cm a year, it is probably suppressed.
13 Frost Heaving	This code is used only when mechanical frost action can be clearly identified as the direct cause of damage or mortality. Usually upheaval and separation of the seedling's root system from the soil occurs as a result of ice lens formation. This is most commonly associated with containerized seedlings planted in silty soil.
14 Erosion	Damage or mortality due to the removal of the seedling's seedbed, by the forces of water, wind or soil slumping. Trees killed by partial or total burial (deposited soil or organic matter) would also be tallied using this code.

15	Missing	This code is to be used when a seedling from the previous year's measurement cannot be located. It can also be used where the seedling was removed from the site and probably died (i.e. tag found, no morphological signs of live seedling remaining). Using in conjunction with code 25 **ONLY**.
16	Dead top/Dieback	Top is dead (die back) without any indication of insect or climate (frost) damage. See Figure 4.31
17	Poor Seedbed	This code is to be used only when the cause of death or damage for a seedling can be traced to the type of seedbed on which it is growing. In most cases the seedling will show signs of desiccation due to the poor moisture holding capacity of the seedbed material (e.g. rotten logs, dry clay).
18	Herbicide	Should only be used when the cutblock (or parts of the cutblock) has received a recent herbicide treatment; either before or after the stock was in place. Spruce seedlings exhibit needle loss and/or reddish brown coloration of stems and foliage. Deciduous species exhibit yellowish/brown leaf mottling and dieback of terminal growth. Hexazinone causes reddish brown coloration of conifer foliage and needle loss. Deciduous foliage turns red to black. Glyphosate causes chlorosis especially in new growing shoots. 2,4-D causes rapid growth and spiralling and twisting. If applied during conifer flush bad dieback similar to frost damage may occur. Often chemical damage will also be indicated by phytotoxicity spotting on exposed foliage.
19	Western Gall Rust (only in Pine)	This code is used when Lodgepole pine damage or death can be attributed to Western Gall Rust. This is usually clearly identifiable due to swelling of succulent tissue (and subsequent formation of a gall) and the bright orange spores produced in that affected area. This gall can be on the main stem or a lateral branch.
20	Armillaria Root Rot	This code is utilized when a seedling is damaged or killed by Armillaria Root Rot. Identification of the disease is in recognizing mycelial fans of the cambium of damaged and dead trees. Pull tree out of ground and examine root collar.
21	Moldy Planting Stock	This code is usually used on Bareroot Planting Stock. Grey mold will usually be found around the root collar and lower branches.
22	Multiple Leader	When a tree has two or more leaders, but is otherwise healthy this code should be entered. The tree is considered multiple leader if all leaders are within 5cm (height) of each other. This code also applies to saplings and regeneration that appear forked. Be aware of normal branching of deciduous trees.
23	Poor Form	This code is used on trees, which exhibit a general poor form, due to previous damage. DBH < 9.1 See code 66 for >9.1 DBH
24	Broken Top (DBH <9.1) (see "56" for DBH > 9.1)	It should be used as long as the broken top is noticeable and has some effect on the growth of the tree.
25	Dead Tree Standing (No CC)	Tree has no signs of being alive. A standing dead tree is one that is dead but still standing. No green foliage or buds present. The tree must be able to withstand a firm push. Record a diameter and species but do not record height. Pound nail into tree. **No crown class**.
26	Snow Press (No CC)	This code is normally used for trees that show signs of being pressed down to the ground for a few years after germinating. May Happen to bigger trees. See Figure 4.8
27	Dead Top Dieback with New Leader	This refers to stems that have had previous leader damage and a new leader has formed.
28	Sucker(s) (From Old stump)	Refers to stems that have been cut-down through thinning and have started to sucker. Do not re-use the previous stem number, but assign a new number to each sucker.
29	Cutdown	Self explanatory.
30	Terminal Weevil	Terminal leaders of Pine or Spruce bend over and die. Two or more years growth are affected. **Bore Holes** which are exit holes for the larvae **MUST** be present to

		use this code.
31	SW Gall Adelgid	Adelgid galls on spruce located at the end of new growth and may persist for many years.
32	Tent Caterpillar	A tent of silk forms on the tree and the caterpillars defoliate the tree.
33	Root Collar Weevil	This weevil feeds mainly on Sw, Pj and Pl. They feed in the bark and cambial area of the host tree at or below the duff surface, causing copious flows of resin. The tunnels often girdle small trees. This insect allows root rots to enter the tree.
34	J-Root	This code is used after the tree has had a poor planting code in the previous measurement.
35	Leaning (No CC) see code 58	Tree leaning more than 20% off of vertical axis.
36	Same Stump	Used when 2 or more trees can be distinguished above ground level but below DBH. Used a lot on Deciduous that have been cutdown and resprouted at stump.
37	Unknown	This condition code is to be used only when there appears to be something affecting the tree but the other condition codes do not describe the situation. This would include burnt trees etc. A description of what is affecting the tree should be included as well in the comments column. In the event that this code is used for more than 5% of the tallies, it is up to the crew leader or a forester to decide on the cause of the condition.
38	Pitch Moth	Primary host is Lodgepole Pine. May weaken or kill the terminal leader, resulting in stem deformities and height growth reduction. Blisters are mainly on main stem and are characteristic resin coated up to 20mm in diameter.
39	DBH Taken on New Leader	
40	Nutrient Deficiency	This may occur on blocks that have had the humus layer removed by scarification (i.e.; Blade). Trees are chlorotic and usually in bare mineral soil. Usually noted on spruce. May be confused with flooding damage.
41	Mouse Feeding	Mice and voles can girdle seedlings and consume seeds. See Rangen and Roy (1997) for more detail.
42	Ungulate feeding/rubbing	Ungulate feeding on twigs is generally recognized by the ragged appearance of twig terminals. Rubbing of trees as antler rubs and feeding on bark also occurs; these conditions are further described in Rangen and Roy (1997). Antler rubs can also be associated with “scrapes” (smaller patches of scraped ground) and small tufts of hair on twigs. If the bark on aspen trees has been consumed ensure that ungulates (as opposed to other mammals) are responsible. The extent of the bitten area, track identity and grooves that indicate tooth size and pattern should all be inspected in order to differentiate ungulate bark feeding from similar feeding by small mammals (i.e. see code number 86 and applicable photograph).
43	Domestic livestock (rubbing)	Rangen and Roy (1997) describe rubbing of trees by livestock; rubbed trees are occasionally seen in areas where cattle grazing occurs. If this code is used, ensure that other signs in general area (i.e. presence of cattle droppings, cow trails and grazed vegetation) also supports this.
44	Nest	This code indicates the presence of a nest on a given tree in the PSP. It refers only to an “open” nest; cavity nests are excluded from this category, as it is difficult to ascertain if a given cavity is indeed used as a nest site. Field guides that assist with the identification of “open” nests are available (see Harrison 1979). Of particular importance are colonial complexes of large nests on islands in lakes. Mammalian nests also exist and should be indicated as such if this is known. To do this, use the comments section which applies to a given tree and indicate as required. If the occupants of the nest can be identified, the identity can also be entered in the comments section.

45 Other mammalian/avian evidence	Other agents (i.e. bears, grouse, shrew, pocket gophers) which leave evidence on trees or leave evidence closely associated with trees are described in Rangen and Roy (1997). Pocket gophers leave soil mounds (Rangen and Roy - (1997). Bears can leave a characteristic series of claw marks on aspen trees, indicating that the tree was scaled, and rotted stumps/logs are also occasionally ripped apart. In addition, it has been suggested that bark on live trees is occasionally consumed (see Hiratsuka 1987 for a depiction). Ensure that ripped up stumps/logs, etc. are accompanied by other evidence of bear.
46 Sweep/Bow/Bend	Is a gradual bowing or curving of the main tree system. It has no decay significance but may cause a loss of volume in a sawlog.
47 Witches Broom	Yellow witches broom is the most conspicuous disease of spruce in the province. Can be recognized from a distance. See Figure 4.10
48 Frost Crack	A frost crack is a deep radial splitting of a trunk caused by an uneven shrinkage of the wood after a sudden drop in temperature. The cracks usually start at the base and extend up the trunk. They may re-opened repeatedly by wind stresses or a low temperature.
49 Dying	Tree is in distress and will die before next measurement.
51 Conk/Blind Conks	Conks appear most frequently on the underside of dead branch stubs or on the underside of live branches in the crown. Conks, by definition, are woody, shelflike basidiocarps (fruiting bodies) of wood-rotting fungi. See Figure 4.3
52 Open Scars	Open scars are wounds which have been penetrated through to the cambium. These wounds must not be healed over and may be caused by a variety of reasons such as fire, lightning, old blazing, machinery, animals, etc. Scars are considered to be entry points for decay fungi. Open scars are illustrated in Figure 4.4. Animal damage usually penetrates the cambium therefore code as an open scar. A common mistake is to call stem disease such as atropellis canker an open scar. See Figure 4.4
53 Burls and Galls	Burls are abnormal swelling of the main stem or branches resulting from abnormal wood cell development following disturbance to the cambial layer. A burl is illustrated in Figure 4.5. Galls are localized trunk and branch swelling of mainly tissue. There is little or no damage to the underlying wood.
54 Fork	Forks usually develop when there is malformation, injury or death of the terminal leader. Forks tend to be V-shaped and will only be recorded when above 1.3 m (DBH level). Forks below this point are recorded as same stump (condition code 36). Natural branching on deciduous trees is not to be recorded. Figure 4.6 demonstrates the difference between forks and natural branching.
55 Pronounced Crook	This condition develops from the death of the terminal leader or the breaking off of a forked leader. When this occurs, a lateral branch takes over apical dominance as shown in Figure 4.7.
56 Broken Top (No CC) (see "24" for DBH <9.1)	Broken tops occurs usually in the top third of the tree. **No Crown Class**.
57 Limby	A tree is recorded as limby if more than 75% of the tree has live, low sweeping branches. Usually branches on coniferous >2.0m on any part of tree could be considered limby.
58 Severe Lean (No CC) see code 35	A tree is considered leaning if it is standing greater than 20^{o} off of vertical (see Figure 4.8). If the angle is greater than 45^{o} to the ground, the tree has a severe lean. **No crown class if severe**.

59	Broken Stem (No CC)	A broken stem is recorded if the tree bole broken. Usually found in bottom 2/3 of the tree. **No crown class**.
60	Generic woodpecker feeding (often smaller species)	Figure 4.13 indicates feeding by woodpeckers. Species such as the Black-backed woodpecker and Three-toed woodpeckers will often leave signs like this on old coniferous trees, and Hairy and Downy woodpeckers typically peel off scales ("scale") and "peck" the bark as do Pileated woodpeckers in summer months (Conner 1979). Note the evidence of very small holes (arthropods) and holes made by the woodpeckers themselves. The appearance of tree trunks fed on in this manner is often reddish from a distance.
61	Dead and Down (No CC)	A dead and down tree is one that was previously tagged and measured in a PSP plot but at the present time is now dead and no longer standing. The cause of death must be by natural causes (i.e. windfall, beavers, insect or disease, etc.). **No crown class**.
62	Stem Insects (Bark + Sawyer Beetles)	This code is recorded when there is evidence of an insect infestation attacking the bole of the tree. Bark beetles are the most prevalent stem insects but sawyer beetles and others are included. Bark beetles, Dendroctonus spp., are a very serious problem in Alberta. The adult female enters the bark in early summer and lays eggs in the tree's cambium. The eggs overwinter and hatch as larvae in the early spring. Damage to the tree is done by the larvae eating the cambium and usually results in death. The tree will not turn red until the next summer. Other symptoms of attack are piles of "sawdust" (frass) at the base of the tree, entry holes in the bark, and pitch tubes (the tree tries to push the beetles out with resin). The beetles also carry a blue stain that causes further deterioration of wood quality. Beetles attack all species of pines, spruce, and Douglas fir. Sawyer beetle infestations are common in burned timber.
63	Stem Disease (Cankers)	All diseases that infect the main stem are documented with this code. Included in this code are cankers, rusts, rotten branches and root rot. Stem cankers are caused by fungi that invade stems and branches resulting in localized areas of infection in the bark and underlying wood tissue. Cankers may be annual or perennial. In perennial cankers the infected area may be eventually exposed to the underlying wood when the deadbark sloughs off. A common stem canker on lodgepole pine is Atropellis piniphila (Figure 4.9). Exudation of resin from the bark surface is the first external symptom. They are sunken elongated on one side of the trunk and indicate resin flow. This can cause a distortion in growth and a blue-black stain on the wood. Stem rusts are also included in this condition code. Rusts are host specific parasitic fungi usually requiring two alternating living hosts. Stems and branches may be girdled resulting in large malformations or even death. In particular, Endrocronartium harknessii on young pines is a serious problem in Alberta. Spruce broom rust, Chrysomyxa arctostaphi (see Figure 4.10), can also be noted but only if the broom is no longer green (i.e. red or missing needles). Large rotten branches typically appear on overmature, decadent trees and can be indicative of decay. Large rotten branches are those well below the base of the live Crown and are > 5 cm in diameter, are unweathered, appear punky, and are weeping. Often a black ring appears on the stem surrounding the branch. Some of the typical symptoms of Armillaria root rot are reddish brown or yellowish foliage; mycelial fans form between the bark and wood around the base; fungal (shoestring) strands in the soil surrounding the diseased roots and honey mushrooms growing around the base of the diseased tree.

64	Foliar Insects	This condition code pertains to all insects that infest parts of the tree off the main stem. Included in this category are the tent caterpillar, spruce budworm, jack pine budworm, spruce gall aphid, etc. The forest tent caterpillar, Malacasoma disstria, causes severe defoliation in hardwood stands in Alberta resulting in a significant reduction in annual growth. The spruce budworm, Choristoneura fumiferana, infests mature white and black spruce, and balsam fir stands. This insect attacks the buds and new needles. Their feeding spreads to old needles and eventually kills the tree. The jack pine budworm, Choristoneura pinus, attacks stands of jack and lodgepole pine and is a relatively new forest pest in Alberta. This insect feeds and spreads in the same manner as the spruce budworm.
65	Foliar Disease (Needle blights + rusts)	This code is used for all diseases that infect parts of the tree off the main stem. Needle casts and blights, and needle rusts are included in this condition code.
66	Stem Form Defects	This condition code is used when there is damage or a distortion resulting in a loss of volume. Used for trees >9.1 DBH. See code 23 for <9.1cm DBH. A sweep or bend is the gradual bowing or curving of the main tree stem. If has no decay significance, but may cause a loss of volume in a sawlog. Spiral grain is the twisting of the grain seen in exposed wood or in the direction of the bark fissures. Spiralling frost cracks and scars also indicate the presence of spiral grain. Windshake is a splitting in the wood along the grain or less frequently within an annual growth layer. It is caused by wind or snow stresses and is also known as ringshake.
67	Closed Scars	Wounds that had penetrated the cambium but have now healed over are considered closed scars. A closed scar is characterized by an irregular indentation in the bole of the tree that would result in loss of volume due to poor wood quality. Before healing over, the scar provided an entry point for disease. Frost crack is not included in this code.
68	Atropellis Canker	Widespread on pine, from small to large trees. Symptoms are elongated, sunken, cankers on the stem with copious yellowish resin flow. Wood is discoloured blue/black. Figure 4.9
69	Comandra Blister Rust	Pl and Pj are hosts. Local occurrence only. Infected stems are spindle-shaped with conspicuous swelling of the bark. Fungus is orange-yellow in early summer. Cankers are circular and grow laterally as quickly as longitudinally. They thus girdle the stem faster than stalactiform. It should not be confused with western gall rust, which is mainly a swelling of the wood. Alternate host is Indian Paint Brush.
70	Elytroderma Needle of Pine	Mostly on Pl. Current years needles turn red in fall. In severe cases only current needles remain, giving branches a “lion’s tail” appearance.
71	Hypoxylon Canker	Hosts are aspen and balsam poplar. Canker starts as a slightly sunken orange-yellowish area on stem. Eventually girdles the stem and has an orange/black appearance. A mycelial fan on the cambium is a reliable field symptom.
72	Spruce Cone Rust	Rust is only on spruce cones. Cones become prematurely brown then orange-yellow. When spores are abundant, the forest floor has an orange colour.
73	Stalactiform Blister Rust	Pl and Pj are hosts. Local occurrence. Causes slight swelling of bark. Orange-yellow in summer. Cankers are elongated and grow faster longitudinally compared

		to Comandra. Alternate host is Bastard Toad Flax.
74	Tomentosus Root Rot	Most important on Sw and Sb. Symptoms are excessive branch mortality, thinning of crown and openings in the stand. Disease develops slowly (over 15-20 years) so is not so obvious in regenerating stands.
75	Spruce Spanworm	Chiefly affects aspen. Damage shows mostly as holes in the leaves. Resembles forest ten caterpillar but no pupal cases or egg masses on the foliage. Caterpillars are typically light green and have one prominent and two indistinct yellowish lines along each side of the body. The head is dark-brown.
76	Spruce Cone Maggot	No external symptoms. Dissected cone shows frass-filled spiral tunnel around the central axis.
77	Spruce Cone Worm	Feeding larvae expel frass, which adheres to silken webbing on cone surface.
78	Eastern Spruce Budworm	First symptoms are webbing and frass in buds or on previous year's needles. Later, webbing is spun on branch tips. By late June tree crowns appears rust brown.
79	Mountain Pine Beetle	Main host is Pl. Symptoms are standing dead trees with beetle exit boles about eye-level. Accumulations of pitch or sawdust are conspicuous around entrance holes bored into the bark of trees by adult beetles from mid-July to mid-August.
80	Spruce Beetle	Host are Sw and Se. Symptoms are standing dead trees with beetle exit holes about eye-level. Conspicuous boring dust accumulates on bark below holes until the wind blows it away.
81	Spruce Needle Rust	Feed on needles in the upper crown of the tree. Partly chewed needles and needle stubs impart a brownish color and ragged appearance to the foliage. No webbing present. Found on all spruce.
82	Yellow-Headed Spruce Sawfly	Discoloration of needles. May find dotlike sexual fruiting structures on needles. Infected needles drop prematurely.
83	Large Aspen Tortrix	Affected foliage has a clumped, irregular appearance and leaves do not move as freely in the wind as uninfested leaves. Larval instars feed within rolled leaves or within 2 or more leaves pulled together and secured with silken webbing.
84	Excavations by woodpeckers (likely Pileated woodpecker)	Feeding by Pileated woodpecker can occur on dead or scenescent deciduous and coniferous trees, and feeding holes (as indicated in the figures below) are thought to occur towards the base of the tree (Rangen and Roy 1997). Excavated holes indicate subcambial penetration (holes penetrate beneath the bark and into the sapwood) and large wood chips can be associated with excavations. Excavated feeding holes can be large (Figure 4.16). In such excavations, evidence of carpenter ants (burrows, sawdust) or other boring arthropods might also be found in the sapwood. In living trees with a sound bole, initial feeding holes might be more restricted such as that indicated in Figure 4.12. Elsewhere in North America, the Pileated woodpecker has been found to excavate holes extensively in winter and to a grater extent that other woodpeckers (Conner 1979). The Hairy woodpecker might also create deeper holes in trees, however, it is considered an opportunistic feeder (Sousa 1987) and spends a smaller portion of its time "excavating" during winter months (Conner 1979). In Iowa, it has also been found to generally feed at higher locations in trees (5-7m) (Sousa 1987). If this feeding evidence exists on a given tree, indicate in comments its extent (i.e. restricted, such as in Figure 4.16).
85	Yellow-bellied sapsucker feeding	Figure 4.14 illustrates the characteristic pattern of regularly spaced small holes left by Yellow-bellied sapsucker (also see Hiratsuka 1987 for another depiction of sapsucker feeding). These are often found on birch, however they also have been observed on willows, and have been reported on aspen and pine (Rangen and Roy 1997, Hiratsuka 1987).
86	Small mammal feeding on tree bole (hare,porcupine, squirrel, bushy-tailed	Figure 4.15 is an example of feeding by hare on small saplings. In this case the bark was bitten off. When hares feed on twigs, it is generally thought that twigs are clipped off in a characteristic razored fashion (Figure 106, Rangen and Roy, 1997). Small mammals such as porcupine, woodrat and squirrel might also feed on bark

	woodrat)	however, if such feeding evidence occurs high in trees, one could probably rule out hare because hare do not climb trees (also see Hiratsuka 1987 for a depiction of porcupine feeding on pine). Ensure other evidence (i.e. tracks, pellets, etc.) Supports a specific determination of the agent involved. Also refer to Rangen and Roy (1997) for more information on how to identify the specific causes of girdling and refer to Murie (1975) for assistance on identifying tracks if this is required. Evidence of squirrel feeding is common and could also be indicated, however, the value of this information is probably less valuable.
87	Small Cavity	Small woodpeckers create small cavities (approximately 5 cm in diameter) in snags and stubs (Figure 4.17), however, height of the cavity above ground probably varies. Among the species which might use such cavities are smaller woodpeckers, kestrel, chickadee, nuthatch, swallow, wren, flycatchers, and small mammals (etc). One could explore whether such cavities are occupied by rubbing the bark with a stick. Should a cavity be occupied the occupant (if known) should be identified in the comments section.
88	Large Cavity	A large cavity is a round/excavated opening greater than or equal to 10 cm in diameter (see Figure 4.18). The cavity in the figure was approximately 15 m high. Pileated woodpeckers have been known to excavate such cavities, however, a variety of species (birds as well as mammals) may use them as nest sites, roosting sites or dens. As in the case of smaller cavities, one could investigate the identity of the occupant by rubbing/tapping the bark of such trees with a stick. If might be possible to ascertain the identity of the tracks which are associated with the cavity, during winter, by checking surrounding snow cover and identifying tracks that appear to lead towards the cavity in the tree (see Murie 1975).
89	Hollow tree or hollow bole section	Hollow trees can be used as denning sites by bats and other birds and mammals. This condition code should be used to identify these sites.
90	Beaver (feeding-/harvesting)	Beaver girdle large trees in a characteristic fashion and evidence of their harvesting activities (i.e. cone shaped stumps) are well known to many. Refer to Rangen and Roy (1997) and Hiratsuka (1987) for more details.
91-96	Hawksworth Mistletoe Rating System	Dwarf mistletoes are parasitic flowering plants requiring living hosts. Mistletoe is usually recognized by swellings on branches and stems or by witches brooms. Heavy infestation makes trees susceptible to secondary attack (such as bark beetles), lower wood quality and growth losses (can be from 30-60%). The major tree hosts in Alberta are: lodgepole pine, Douglas fir and larch. Figure 4.11 illustrates the effect resulting from mistletoe infestations and the individual flowering plant. The Hawksworth Rating System for mistletoe is used to determine the severity of mistletoe infestation on individual trees. Figure 4.12 outlines instructions and gives an example of the use of the 6-class mistletoe rating systems (Hawksworth 1961, 1977). If a tree has mistletoe, record only the 90 series code, do not record 33 unless there is a second distinct foliar disease.
97	Available for future consideration	
98	Data changed by office	
99	Do not look for Tree	