A GUIDEBOOK FOR GRIZZLY BEAR WILDLIFE HABITAT FEATURES IN COASTAL BRITISH COLUMBIA

Photo ©Stefan Himmer

Prepared for:

The Ministry of Water, Land, and Air Protection
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&
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1. INTRODUCTION

Under the British Columbia Forest Practices Code (FPC) the designation of Wildlife Habitat Features (WHF) is the responsibility of the Ministry of Water, Land and Air Protection (WLAP) and the Ministry of Forests jointly. Under section 51 (1) of the Operational Practices Regulation under the Forest Practices Code of British Columbia Act a "resource feature" includes - wildlife habitat features, as agreed to by the District Manager and a Designated Environment Official. The Ministry of Water, Land and Air Protection (WLAP) Designated Environmental Official, and the Mid-Coast Forest District Manager have agreed that the following five localized features are to be considered as Wildlife Habitat Features under the Forest Practices Code of British Columbia Act, within the Mid Coast Forest District, i.e.: well-established bear trails and well-defined bear marked/rub trees; well-established bear trails; bear wallows and bear beds and dens. This guidebook has been written to guide foresters and others in the identification of these features.

The ability to read wildlife tracks and sign assists with determining the presence, distribution, abundance and habitat use of species that are inconspicuous or secretive and are therefore difficult to detect using other methods. Tracking an animal teaches you much about its biology, including its foraging habits, preferred foods, denning or resting sites, extent of its home range, periods of activity, and relations with other species. Tracks and sign can also alert you to the presence of potentially dangerous species in the area, such as bears, thus allowing you to take steps to avoid a negative encounter.

For optimum safety in bear country it is necessary to use all of one's senses. Sight, hearing, smell, and touch all come into play, sometimes individually and sometimes in combination. It is necessary to be able to recognize all of the signs associated with bear activities (tracks, scat, mark trees, mark trails, wallows, dens, digs, scrapes, feeding etc.) to differentiate between signs of grizzlies and black bears; and the signs of other species (e.g. moose, deer, wolverines, wolves, cougars) which may, at times be confused with those of bears. While some bear signs are conspicuous to even the casual observer, many other signs are subtle and easily overlooked.

Much of the discussion of wildlife habitat features for grizzly bears is also applicable to black bears. In fact, it is sometimes very difficult, even for seasoned bear researchers, to distinguish between the sign of black and grizzly bears. Therefore, we use the term bear where it applies to both species and whenever possible discuss the differences between grizzly and black bear sign.

1.1. Tracking Techniques and Sign Interpretation

If following tracks or a trail, walk slowly, with all senses alert, pausing frequently. Whenever possible, try not to walk directly on the tracks but instead, walk slightly off to one side. Do not concentrate so much on the ground at your feet that you walk into a bear on the trail! Avoid travelling alone in bear country. It is best to work in teams. That way, one person can interpret and record sign while the other person remains vigilant and alerts his or her partner to the presence of bears. The best times for tracking

are early morning and late afternoon when the sun is at a low angle to the horizon. At these times, the low-angled light emphasizes any unevenness' in the surface of the ground, and throws details of tracks into sharp relief. However, this also the time when bears appear to be most active so extra precautions should be taken if travelling around dawn and dusk (MacHutchon et al. 1998). Tracks show up best when tracking towards the light. When this is not possible, make a point of looking frequently at tracks from a position where they are backlit by the sun. Tracks also show up clearer if they have been made after frost or dew has fallen. After dew, grass holds down when trodden. If following a trail across a dew-laden meadow, tracks will show up light if the animal is being followed, but if you are moving in the opposite direction to the animal the tracks show up darker (Taylor Page 1966).

Carefully examine the ground surface from all angles; crouch low or on hands and knees, peer carefully at tracks from a distance of a few centimetres; alter your viewing angle and eye-distance by looking directly down upon the tracks from an elevated position (e.g. while standing on a log or a rock). Droplets from trees or windblown debris can leave a variety of marks on the ground, which can be mistaken for animal tracks.

Do not concentrate only on tracks/sign at your feet but remember to look in all directions or further along the trail. Try to visualize an animal such as a bear moving through the terrain. Be constantly aware of the lay of the land, the slope, aspect, and obstacles to travel like logs, rocks, trees and shrubs. Note where a bear may have passed close to these obstacles and left some loose hairs.

Look for trampled vegetation, bent grass blades, broken twigs, disturbed leaves or dislodged stones. In the absence of tracks, the impression of the stone's former, relative to its present, position may give a clue as to the direction the animal which disturbed it, was travelling, likewise, for disturbed herbage, twigs, or other debris. If the trail passes under a log, look for snagged hairs on the underside, especially on twigs or broken stubs, or on the ground beneath. If you lose the trail, use your observations of the animal's length of stride and track patterns to locate where the next set of tracks should be. Alternatively, mark the last track seen (e.g. with an upright stick) and then walk slowly in widening circles around the fixed point until more tracks are encountered. In ground vegetated with low-growing grass, moss etc. bear tracks may only be discernible as flattened depressions. By gentling patting the ground with your palms and fingertips, you may be able to discern details of the tracks, including individual toe and claw marks, providing possible clues as to the species involved.

While approaching individual trees look for signs of worn, smooth bark, claw marks on trunks, running sap on conifer tree species, trampled or worn vegetation about the base, soil scuffs on exposed roots or rocks, hairs snagged on pitch, twigs, limb stubs, or shrubs. Conifers, which have been marked by bears, are easier to notice than are marked hardwood tree species. Damaged conifers exude free-flowing sap, which runs down the trunk. When a bear then rubs against the tree the loose hairs tend to stick to the sap. When examining trees or shrubs for snagged hairs, it is helpful to use a light-coloured surface, such as the palm of your hand, or a piece of paper, as a "back-ground" to silhouette any hairs which might be present.

Be alert for auditory signs of possible bear activity: snapping twigs, rustling vegetation, or bear vocalizations. The sight and/or sounds of angry bees or hornets may mean that a bear has recently disturbed their nest. This happens most commonly in late summer and fall. Signs of crows, ravens, or other avian scavengers may indicate the presence of carrion, possibly an animal carcass either predated or scavenged by a bear. Grizzly bears, in particular, can be very aggressive in defence of such a rich source of protein.

BEWARE! ***If you think there may be a carcass or carrion in the area, don't linger to investigate! Leave as quickly, and as unobtrusively as possible to avoid a possible bear attack!***

For more detailed descriptions of animal tracks and sign interpretation in general see: ***A field guide to animal tracks*** by Olaus J. Murie and ***Tracking and the art of seeing: how to read animal tracks and sign*** by P. Rezendes.

2. KINDS OF BEAR SIGN

Two important types of bear sign, tracks and hair, are introduced first to aid the reader in the proper identification of bear wildlife habitat features and to assist in distinguishing whether the use of these features is by grizzly or black bears or both.

2.1. Bear Hair

Bear hairs may be found stuck to the pitch of conifers, snagged on bark, twigs, logs, fence posts or barbed wire, and in beds and wallows. The fine, wavy hair of bears is readily distinguishable from the coarse, hollow, often crinkled hair of ungulates. Ungulate hairs kink sharply when bent and are easily broken by pulling at either end.

Distinguishing between the hairs of grizzlies and black bears is not as simple as one might think. Although glossy black hairs from a bear can usually be assumed to be from "black" bears, hair colour alone is not sufficient for differentiation: Some grizzlies have black hair, and hair colour may vary greatly for both species. In addition, old shed hairs may become bleached over time. However, grizzlies tend to have banded, light-tipped hairs and this can be used to differentiate them from light-coloured "black" bears. Light-coloured black bears are less common on the coast compared with the interior of the province.

The guard hairs, or long coarse outer hairs, of coastal black bears are very straight, glossy and much thicker when compared to grizzly bear guard hairs. Grizzly bear guard hairs also always have a lighter tip that is usually never found in black bears. Black bear underfur is dark brown or black and much more kinky than the white, blonde, or light brown, straighter underfur of grizzly bears.

2.2. Bear Tracks

Bear tracks are easily distinguished from those of most other wildlife species because they walk on the palms of their front feet and the soles of their hind feet and are referred to as plantigrade walkers. The only other plantigrades, whose range overlaps with bears, in coastal BC, are wolverines and racoons. The tracks of racoons can usually be distinguished from bear tracks by size alone.

While the paw print of a wolverine is about 10 cm wide, or less, an adult grizzly leaves tracks of at least 13 cm wide, and often larger. However, in forested habitat, size alone is not sufficient to differentiate between the tracks of a wolverine and those of a black bear; the tracks of both species may measure 10 cm across the pad. But, when the tracks are clear, there need be no confusion between the two: There are many differences between their track characteristics such as gait, trail width, length of stride, and shape of the pads (see track guides such as Murie 1954; Rezendes 1999; and Herrero 1985). The significant weight difference between the two species can also be useful in differentiating their tracks. As the small inner toe in wolverine tracks sometimes does not register, they are more likely to be confused with those of a wolf than with a black bear. If in doubt, look for additional evidence (e.g. scat and hair) to differentiate tracks.

Track size alone is not a good criterion to distinguish between bear species. The track size of large male black bears may overlap or even exceed those of adult female grizzlies. The size and shape of the track impression left by the same bear may be different in mud, snow or dry sand and may also be different depending on whether the bear was walking or running.

Lloyd (1979) conducted detailed investigations of the differences in grizzly and black bear track characteristics. Herrero (1985) also discussed differences between grizzly and black bear tracks. They both suggested that the best way to distinguish between black bear and grizzly tracks was by comparing the arc of the toes and whether or not the toe imprints are joined. These characteristics are present in both young and adult bears and on front and hind feet. The toes of black bears are more arced and further apart than the straighter and more joined grizzly bear toes (Figure 1 and Figure 2). The claws of adult grizzly bears usually appear further from the toes than in black bear. Aging Tracks

The quality of definition and detail of a particular track, and the track's duration, depends largely on the nature of the substrate in which it is made. Mud, clay, wet sand, and snow provide the best mediums for registering detailed tracks, while dry sand, dust, and vegetation register tracks poorly. Tracks in clay or mud can persist for a long time while tracks in snow, dust, or sand are short-lived. Knowledge of this may aid in aging tracks.

To gauge the age of a track in any medium, make an impression beside it with your foot or hand and then compare your mark with that of the animal. Over time, tracks lose their definition due to erosion by weather (rain, snow, wind), and through gravity. The edges of the tracks gradually crumble and fall into the print. Tracks under cover of trees or shrubs age more slowly than those in open, exposed areas. Be aware of recent weather events. Raindrops may pockmark the surface of the tracks and wind may have blown dust, leaves and other debris into them. Dew, frost, or cobwebs in the prints or across the

trails, can also provide clues as to when the animal passed. Tracks made early in the morning may have damp soil thrown up next to them. In sand wetted by early morning dew, tracks show up clearer than later in the day when the moisture has evaporated, likewise, if the animal has passed by soon after rainfall. Trampled vegetation which has not yet regained its former upright position may, depending on weather conditions, indicate that it has been trodden on fairly recently.

A bear moving from wet soil or vegetation onto bedrock or asphalt may leave moist imprints or scuff marks on the hard surface. The moisture soon evaporates, but will often leave a residue of sand or soil particles, visible to the discerning eye. If on a road surface, knowledge of local road traffic patterns may help to more accurately estimate the time the bear passed. The upper surface of a stone becomes bleached over time, so if the darker surface is exposed, it indicates that it has recently been moved. Likewise, if a stone is disturbed after precipitation has fallen, the drier underside may give a clue as to when it occurred.

Bear tracks may sometimes be found in snow, especially in early or late winter. Moist snow, a few centimetres deep is best for registering detailed tracks. In these conditions, a fresh bear track is crisp, and the species easy to identify. Tracks in snow are also easier to age than are tracks in most other mediums. A bear's warm pads may cause slight melting underfoot. This warmed snow gradually (depending on temperature) refreezes, leaving an icy glaze. Thus, if the snow at the bottom of the track feels soft to your touch, it may indicate that the track is quite fresh whereas if it is frozen it may indicate that it was made some time ago (Stokes 1986).

The presence of loose debris, rain or fresh snow in the tracks, combined with the effects of wind and sun on the tracks, can be very useful in determining their age. Occasionally, the tracks of other species crossing that of the bear (e.g. diurnal birds such as ravens or crows) may narrow down the time-line as well. Wind and sun can cause snow to slough off tree branches onto tracks beneath. The sun causes melting and enlarging of tracks in snow. In open areas, wind-driven snow can cause tracks to fill in, and cornices to form on their edges. Sometimes, the wind may move loose snow from around the tracks and this, combined with differential melting of compressed versus uncompressed snow, can leave the tracks as a staggered series of large prints raised above the surrounding surface.

Figure 1. Left front paw of a young adult male grizzly. Note how the toes are close together and that the claw tips are almost 3 cm from the ends of the toes. The small round dew pad does not always show in track impressions.

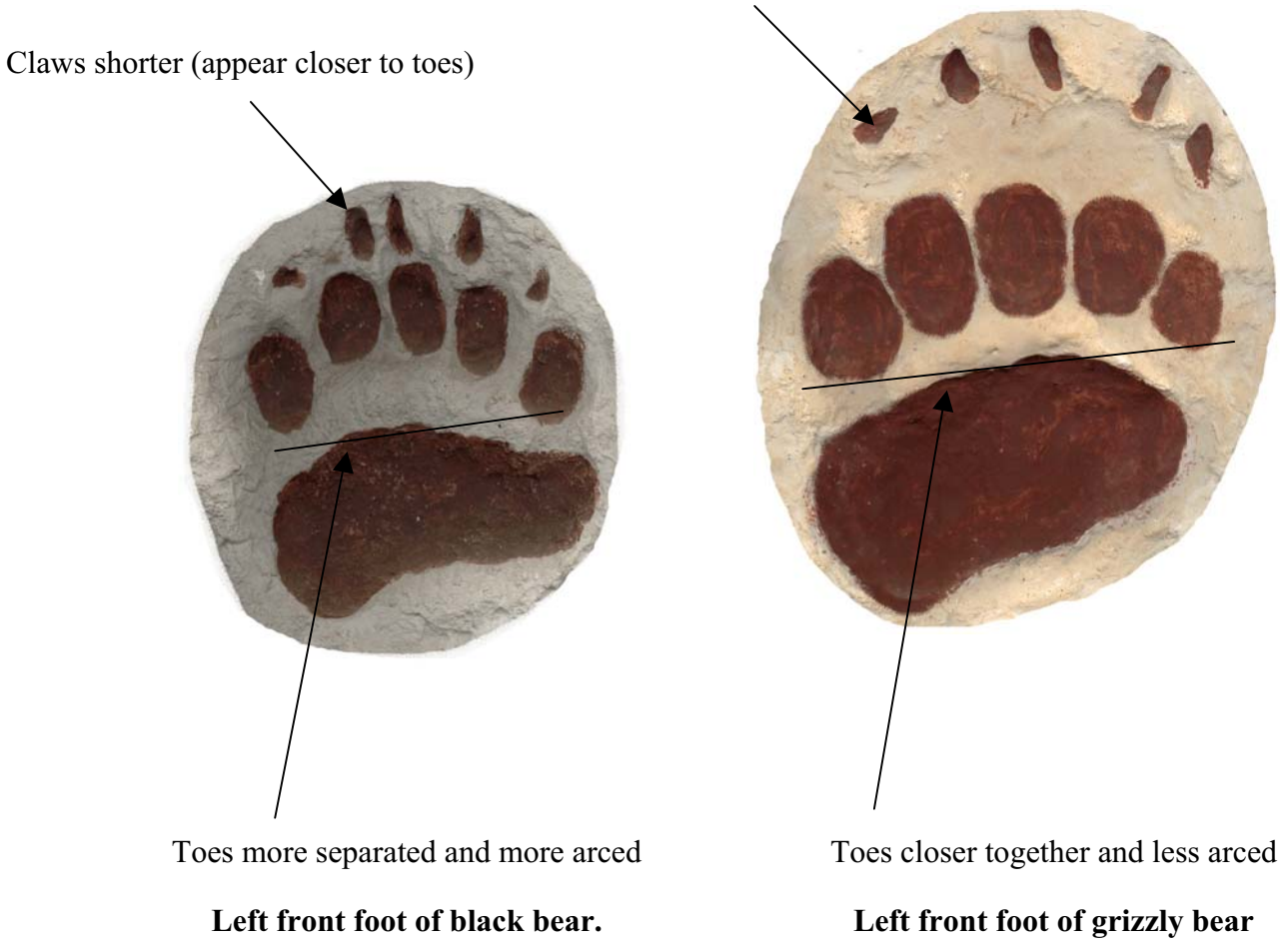

Figure 2. Plaster casts of black and grizzly front paw tracks showing the differences in claw length and foot structure. (Plaster casts courtesy of Ron Mayo, Stuie, BC)

2.3. Bear Trails

Some bear trails may be so well used that they can be mistaken for human hiking trails. For example, trails along salmon streams or across mountain passes. Bears, like humans and other animals, take the easiest route from point A to point B. Many hiking trails, and even logging roads, were probably bear or other wildlife trails before humans developed them. We have often observed this, when on logging development plan field reviews the road layout ribbons have followed an existing bear trail for several hundred meters. On the other hand, bears may readily use abandoned industrial roads or abandoned rural routes even if they were not trails before. In areas of low bear density bears may use the trails of other wildlife rather than producing their own and bear presence may be difficult to detect. In some substrates such as talus slopes it may also be difficult to discern trails; look for even patterns in the distribution of rocks. In open habitats such as alpine areas easy travel may preclude trail establishment, although grizzlies may make well-defined trails even on open tundra (Murie 1954).

Well-established bear trails are about 30-60 cm wide, often undulating and worn down to bare soil (Murie 1954; Smith 1982; Whitaker 1996). Other carnivores, ungulates and many other wildlife species also use these trails. Bears often go under or over obstacles (e.g. logs) that ungulates would have to go around (Murie 1954). Where the bear trails enter thickets of dense shrubs, they sometimes form tunnels through them, 1-1.2 m high. On temporary bear trails, where only recent movement can be detected, grass and other low-growing vegetation is often trampled flat by the bear's plantigrade feet. The movement sign appears wider than that of most other wildlife and may take the form of two parallel ruts in soft substrates because of the wide gait of bears.

Bear trails may be found in many different types of habitat and often link several habitat types; they allow movement between important feeding and bedding areas, allow seasonal movements between spring, summer and fall ranges or lead to denning areas. Bear trails may pass through specific habitat types, skirt the edges of habitats or go round around them and because they are linear features they are difficult to link to specific habitat types or site series. Therefore it is important to look at how the trail links the potential feeding and security habitats for bears rather than what habitat the trail is in. To judge the importance of a bear trail it is important to assess the amount of bear sign on or near the trail such as mark trails, mark trees, wallows, scats, tracks in soft substrate, feeding sign etc.

2.3.1. Bear Trail Characteristics

- Bears generally take the easiest route from point A to point B; so keep the lay of the land in mind.
- Bear trails commonly run along rivers and creeks, across mountain passes, through open forests and through or around shrub thickets and avalanche chutes.
- Well-established bear trails are about 30-60 cm wide, often undulating and worn down to bare soil.

- Where the bear trails enter thickets of dense shrubs, they sometimes form tunnels through them, 1-1.2 m high.
- Bear trails may take the form of two parallel ruts in soft substrates because of the wide gait of bears.
- To judge the importance of a bear trail it is important to assess the amount of bear sign on or near the trail such as mark trails, mark trees, wallows, scats, tracks, feeding sign, etc.
- Bear trails link several important bear habitat types; allowing movement between important feeding and bedding areas; and allowing seasonal movements between spring, summer and fall ranges and denning areas.

2.3.2. Bear Trail Photos

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An adult male grizzly on a well-worn bear trail (above) passing through an open Douglas-fir forest near Bella Coola, BC. Note how this trail could easily be confused with a maintained hiking trail. The bear is rubbing a fir mark tree. Trails are also common along rivers, (right) especially salmon rivers like the Atnarko in Tweedsmuir Park.

2.4. Bear Mark Trails

"Mark trails" are short sections of bear trails where (often numerous) bears have repeatedly stepped in the same spots. Mark trails can be seen as a series of staggered elliptical bare depressions, which we'll call mark pads, each mark pad measuring about 18-25 cm by 15-30 cm (Lloyd 1979; Murie 1981). The mark pads appear in a typical stride sequence but are often deeper (2-5 cm or more) than those made by a normal foot imprint. Grizzly bears have been observed in the process of marking these trails, walking in a deliberate swaggering manner, vigorously twisting their feet in the mark pads.

Mark trails range from 4 or 5 pad marks on less than 10m of trail to over 100 metres in length. One mark trail, in the Khutzeymateen Valley in north coastal British Columbia, had continuous padding for more than 150m with over 100 individual pad marks S. Himmer pers. obs.). This mark trail leads over a pass into another major valley.

Mark trails are often, but not always, associated with mark trees. The reason for marking is still open to speculation; however, it is probably associated with communication among males during the mating season (LeFranc et al. 1987). This is discussed in more detail in the mark tree section. We speculate that it may also serve as displaced aggressive behaviour on the part of adult males. Typically, the distance between pad marks (stride length) is about 1 metre or more, indicating that adult bears, and most likely adult male bears, initiate mark trails. Both black and grizzly bears make mark trails.

If mark trail behaviour has occurred recently, the observer may be able to detect urine on the shrub foliage, and in a good tracking substrate the twisting motion of the feet is clearly discernible (pers. obs.). When bears make mark trails in snow, their urination is obvious. However, look closely, as sometimes the drip from the foliage and limbs of trees and shrubs overhanging a trail may discolour the snow and can be mistaken for a urine stain.

In North America, mark trails are unique to bears; no similar wildlife sign exists for other species.

2.4.1. Bear Mark Trail Characteristics

- Mark trails can be seen as a series of staggered elliptical bare depressions called mark pads, each mark pad measuring about 18-25 cm by 15-30 cm and 2-5 cm deep.
- The mark pads appear in a typical stride sequence with the distance between pad marks about 1 metre apart.
- Mark trails range from 4 or 5 pad marks on less than 10m of trail to tens of pad marks and over 100 metres in length.
- Mark trails are often, but not always, associated with mark trees and wallows.
- Both black and grizzly bears make mark trails.