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Protecting Bear Dens in BC Forests

An ELC Clinic submission prepared for:
Sierra Club of BC

SIERRA CLUB BC

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The authors of this report would like to thank Registered Professional Biologist Helen Davis M.Sc. for her contributions to this report.[1] A recognized authority on the denning ecology of black bears in Coastal BC, Ms. Davis has provided invaluable scientific research, consultation, and assistance – and she has helped the authors understand why protecting black bear denning habitat is so fundamentally important. Her expert opinion is substantively reflected in the recommendations for law reform found below. Note that Ms. Davis has worked to conserve black bear dens for over 30 years in various capacities; including working with industry leaders, academic studies and real-world field projects creating useable bear dens.[2]

Images: Cover: Bear cub exposed in old growth stump ; p4 Second growth logging around bear den in old growth stump (M. Worthing); p6 Lone bear den tree in cutblock (R. Weir); p10 road built next to bear den (H. Davis); p23 Person's shape in a stump, what was left after cutting down a standing tree with a bear den in it, showing how close it was to a retention patch (R. Weir); p33 Single bear den tree in big clear cut (R. Weir)

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[1] See more information on Helen Davis at Artemis Wildlife Consultants, "Personnel," online: <http://artemiswildlife.com/personnel>.

[2] Helen Davis, "If you build it, they will come: Black Bear dens on Vancouver Island" (20 July 2018), online: *Nature Conservancy Canada* <https://www.natureconservancy.ca/en/blog/archive/if-you-build-it-they-will.html>.

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EXECUTIVE SUMMARY

Bear experts and environmental groups have advocated laws to protect bear dens for over 20 years, with limited success. Yet such comprehensive legal protection of bear dens is urgently needed to address the current widespread destruction of bear homes on the BC Coast and elsewhere. Relevant models for reform exist. Responding to First Nations concerns, bear den protections have been legislated in Haida Gwaii and the Great Bear Rainforest. In addition, BC Timber Sales has developed model den protection standards in a *Best Management Practices* guideline document that applies to some operations in central and southern Vancouver Island.[3] Building on that experience, the Province should now amend the BC *Wildlife Act* to bar destruction of critically important denning habitat province-wide.

Currently in British Columbia, specific legal protections for black bear dens only exist in Haida Gwaii and the Great Bear Rainforest. Outside of these areas, there is no legislated protection – and bear dens are largely left to the vagaries of inadequate company policies and unenforceable guidelines.

[3] See below for an extensive discussion of (1) the legislated bear den protection provisions found in the *Haida Gwaii Land Use Objectives Order* and *Great Bear Rainforest Order*, and (2) the BC Timber Sales document, *Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island.* Note that the latter guideline document applies primarily to BC Timber Sales operations south of Port McNeil on Vancouver Island.

This report makes the following recommendations:

1. Amendments to the provincial *Wildlife Act* to provide legal protection for bear dens across the province; and
2. Regional regulations under the *Wildlife Act* to provide specific regionally appropriate provisions.

INTRODUCTION: WHY PROTECTING BEAR DENS IS IMPORTANT

To ensure the future availability of adequate black bear den sites throughout British Columbia, this report documents the need for the BC government to:

- Amend the BC *Wildlife Act* to include provisions for the protection of black bear dens; and
- Develop and implement region-specific supporting regulations.

A major concern of the report is protection of black bear dens on Vancouver Island and elsewhere.

At the outset, it should be noted that protecting bears can provide benefits to the broader ecosystem. Many scientists consider both grizzly bears (*Ursus arctos*) and black bears (*Ursus americanus*) to be critical keystone species – meaning that their decline would likely result in a subsequent decline of other species.[4] And denning habitat is crucial to the survival of these bears, and to their vulnerable cubs.

In winter, black bears survive low temperatures and low food availability by hibernating in dens that protect them – and their offspring – from the elements as well as from other predators. Ideal den sites have characteristics that provide bears with essentials needed to survive the winter

[4] Hannah Horn *et al*, "EBM Working Group Focal Species Project Part 3: Knowledge Base for Focal Species and their Habitats in Coastal B.C." (March 2009) at 4, 34 online (pdf): *Integrated Land Management Bureau, Nanaimo, B.C* <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/natural-resource-use/land-water-use/crown-land/land-use-plans-and-objectives/westcoast-region/great-bear-rainforest/ei02c_report_3_kb_focal_species_habitat.pdf>.

months – including warmth, protection from inclement weather, and security from disturbance and predation.[5] Lack of suitable protective den sites can be quite serious. It may result in death for bears, as a result of such things as:[6]

- increased predation by wolves and other predators;[7]
- increased bear-to-bear cannibalism;[8]
- death when energy reserves are fatally depleted;[9] and
- death due to inadequate protection from low temperatures or inclement weather.[10]

Lack of adequate den sites can directly lead to the death of both cubs and mothers from the above causes.

Thus, secure den sites are absolutely essential for bear reproduction and thus population sustainability. In essence, dens are "nurseries" for bears – as essential to cubs as nests are for birds. Cubs can only be born and successfully raised in safe, secure den sites.

After an investigation into this issue, the BC Forest Practices Board acknowledged:

> *Threats to black bears identified by the BC government and bear biologists 20 years ago continue today, and include reduced habitat area due to land development and high road densities; widespread decline in food supply; and* ***specifically on the coast, declining denning opportunities****. These threats are expected to increase as land development continues on Vancouver Island, potentially increasing the risk of a declining black bear population.*[11]
>
> *[emphasis added]*

Research has shown that black bears on Vancouver Island rely heavily on dens associated with (standing and downed) large-diameter trees – trees which occur primarily in old-growth forests.[12] However, more than a century of logging Vancouver Island's old-growth forests has greatly reduced the supply of suitable denning trees. Meanwhile, in second-growth forests, existing dens

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[5] Kenneth G. Johnson and Michael R. Pelton, "Selection and availability of dens for black bears in Tennessee." (1981) 45:1 *Journal of Wildlife Management,* at 111, online: <https://www.jstor.org/stable/3807879>.

[6] Helen Davis, "Characteristics and selection of winter dens by black bears in coastal British Columbia" (1996) *M.Sc. Thesis. Simon Fraser University, Burnaby, BC,* at 1, online: <http://artemiswildlife.com/pubs/H%20Davis%20thesis.pdf>. Also see: Helen Davis *et al*, "Longevity and Reuse of Black Bear Dens in Managed Forests of Coastal British Columbia" (2012) 76:3 *The Journal of Wildlife Management* at 526-527, online (pdf): <http://artemiswildlife.com/pubs/Davis%20et%20al%20(2011)%20B%20bear%20den%20reuse.pdf>.

[7] For example, see: Horejsi, B. L., G. E. Hornbeck, and R. M. Raine. "Wolves, Canis lupus, kill female black bear, Ursus americanus, in Alberta." (1984) 98 *Canadian Field-Naturalist* at 368–369.

[8] Helen Davis and Alton S. Harestad, "Cannibalism by black bears in the Nimpkish Valley, British Columbia" (1996) 70:2 *Northwest Science* at 88-92, online: <https://research.wsulibs.wsu.edu/xmlui/bitstream/handle/2376/1294/v70%20p88%20Davis%20and%20Harestad.PDF?sequence=1&isAllowed=y>.

[9] Lynn Leroy Rogers, "Social relationships, movements, and population dynamics of black bears in northeastern Minnesota" (1977), PhD Thesis, University of Minnesota, Minneapolis at 194.

[10] Gary L. Alt, "Black bear cub mortality due to flooding of natal dens." (1984) 48 *Journal of Wildlife Management* at 1432–1434, online: <https://www.jstor.org/stable/3801813?seq=1#metadata_info_tab_contents>.

[11] Forest Practices Board "Conservation of Black Bear Dens on Vancouver Island Complaint Investigation #19031" (January 2020) at 1-2, online (pdf): <http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2020/703460/703460_IRC229_Black_Bear_Dens.pdf>.

[12] Helen Davis, "Characteristics and selection of winter dens by black bears in coastal British Columbia" (1996) *M.Sc. Thesis. Simon Fraser University, Burnaby, BC,* at 62, online (pdf): <http://artemiswildlife.com/pubs/H%20Davis%20thesis.pdf>.

are naturally decaying and will not likely be replaced.[13] This is because new logging is permitted long before the large-diameter trees suitable for dens have a chance to develop. Current rules that govern logging of old growth and mature forests with "old growth characteristics" are likely insufficient to ensure an adequate number of distributed and suitable bear den sites. As the Forest Practices Board warned:

> *If second-growth forests are harvested before they develop old-growth features, and old-growth harvest continues, the supply of suitable denning habitat on Vancouver Island will decline.*[14]

Indeed, recent studies have shown a decline in black bear denning sites. One 2012 study states that*:*

> *Many researchers have concluded that the rate of reuse may be linked to the supply of potential den sites… [and that] high rates of reuse may indicate low availability of suitable den sites.*[15]

The results of this longitudinal (almost 20 year) study indicate that the higher the quality of den structure, the more likely the den was to be reused.[16] Furthermore, the den structures that consistently performed best on quality and longevity, were *dens located within the hollow structure of large diameter old-growth trees and their stumps*. It is important to note that dens in second-growth forests showed considerable decline, with only 50% of such dens fully intact and usable by the end of the study. [17]

In contrast to black bears in the Interior, where black bears may dig dens in the soil, Vancouver Island and other coastal black bears rely almost exclusively on woody structures such as standing

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[13] Many of these dens are in stumps and logs that will naturally deteriorate.

[14] Forest Practices Board "Conservation of Black Bear Dens on Vancouver Island Complaint Investigation #19031" (January 2020) 3, online (pdf): <http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2020/703460/703460_IRC229_Black_Bear_Dens.pdf>.

[15] Helen Davis *et al*. "Longevity and Reuse of Black Bear Dens in Managed Forests of Coastal British Columbia" (2012) 76:3 *The Journal of Wildlife Management* at 523, online (pdf): <https://hctf.ca/wp-content/uploads/2019/04/1-496_Davis_et_al__journal_article_2012.pdf>.
This study examined the efficacy of several forest management prescriptions for conserving den structures. "With the cooperation of forest managers, several dens identified during [the authors'] radiotelemetry study were retained in or around proposed forest harvest units. Dens in hollow trees were retained as single trees within clearcuts, within retention patches in clearcuts, or on edges of clearcuts through boundary modifications. Some dens in logs were also retained in clearcuts." - Helen Davis et al. "Longevity and Reuse of Black Bear Dens in Managed Forests of Coastal British Columbia" (2012) 76:3 *The Journal of Wildlife Management* at 524, online (pdf): <https://hctf.ca/wp-content/uploads/2019/04/1-496_Davis_et_al__journal_article_2012.pdf>

[16] Helen Davis et al. "Longevity and Reuse of Black Bear Dens in Managed Forests of Coastal British Columbia" (2012) 76:3 *The Journal of Wildlife Management* at 525, online (pdf): <https://hctf.ca/wp-content/uploads/2019/04/1-496_Davis_et_al__journal_article_2012.pdf>.

[17] The study states: "…all 12 dens in hollow western redcedar and yellow-cedar trees, and 3 dens in stumps (2 Sitka spruce and 1 western hemlock) showed no significant signs of decay that made them unusable. Dens in standing trees remained usable through the entire assessment period, unless they were cut down during forest harvesting operations or blew down after retention as single trees." …. "Dens that occurred in second-growth forests showed considerable decline in suitability over the assessment period. Only 7 of 14 dens (50%) of radio-collared bears that occurred in second-growth forests in 1995 were fully intact and useable in 2010."
Helen Davis *et al*. "Longevity and Reuse of Black Bear Dens in Managed Forests of Coastal British Columbia" (2012) 76:3 *The Journal of Wildlife Management* at 525, online (pdf): <https://hctf.ca/wp-content/uploads/2019/04/1-496_Davis_et_al__journal_article_2012.pdf>; see table.

trees, logs, root boles and stumps. This is because of the cool, extremely wet climate during the denning period.[18] Unique characteristics in coastal regions present:

> *…considerable environmental challenges that limit the range of structures suitable for denning. The combination of persistent rainfall, lack of permanent snow cover, and cool temperatures affects the types of structures that provide shelter from these abiotic factors."*[19] *[Black bears in these regions]… rely heavily upon large diameter trees or wooden structures derived from trees (i.e., logs, root boles, and stumps).*[20]

While protecting large old-growth trees as bear denning habitat is demonstrably important for the Coastal regions, it is also important for the BC Interior. While there is little data on the use of large, old-growth trees for denning for the interior region, one study found that in a plateau region in the interior of British Columbia, "grizzly bears mainly excavated dens under the base of trees (90%), where roots stabilized material (80%)."[21] Dens of bears in the plateau regions (as compared to rocky mountainous regions), were found to primarily be "located in older-aged forest stands ranging from 45-99 years (40%) or >100 years (50%)."[22] These plateau bear dens tended to be in stands with tall trees and away from roads.[23] In addition to the evidence based in the Coastal region, this interior study demonstrates the need for bear den protection for all bear dens that utilize the structure of trees across the province – with the authors recommending that:

> *…within forest harvest areas, retention of large trees within riparian areas and retention of wildlife tree patches within cut areas should promote stand-level diversity, thereby enhancing the future value of those stands for grizzly denning habitat in regenerating forests.*[24]

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[18] Helen Davis "Black Bear Den Enhancement and Creation in the Jordan River" (2014) *Fish and Wildlife Compensation Program* at 1, online (pdf): <https://a100.gov.bc.ca/pub/acat/documents/r48410/14WJOR01B_Bear_1429715259112_9714970805.pdf>.

[19] Helen Davis *et al*. "Longevity and Reuse of Black Bear Dens in Managed Forests of Coastal British Columbia" (2012) 76:3 *The Journal of Wildlife Management* at 523, online (pdf): <https://hctf.ca/wp-content/uploads/2019/04/1-496_Davis_et_al__journal_article_2012.pdf>.

[20] Helen Davis *et al*. "Longevity and Reuse of Black Bear Dens in Managed Forests of Coastal British Columbia" (2012) 76:3 *The Journal of Wildlife Management* at 523, online (pdf): <https://hctf.ca/wp-content/uploads/2019/04/1-496_Davis_et_al__journal_article_2012.pdf>.

[21] Lana M. Ciarniello *et al*, "Denning behavior and den site selection of grizzly bears along the Parsnip River, British Columbia, Canada" (2005) 16:1 *Ursus*, at 47-58, online (pdf): <https://www.bearbiology.org/fileadmin/tpl/Downloads/URSUS/Vol_16_1/Ciarniello_Boyce_et_al_Vol_16_1_.pdf>.

Lana M. Ciarniello *et al*, "Denning behavior and den site selection of grizzly bears along the Parsnip River, British Columbia, Canada" (2005) 16:1 *Ursus*, at 47-58, online (pdf): <https://www.bearbiology.org/fileadmin/tpl/Downloads/URSUS/Vol_16_1/Ciarniello_Boyce_et_al_Vol_16_1_.pdf>.

[23] Lana M. Ciarniello *et al*, "Denning behavior and den site selection of grizzly bears along the Parsnip River, British Columbia, Canada" (2005) 16:1 *Ursus*, at 47-58, online (pdf): <https://www.bearbiology.org/fileadmin/tpl/Downloads/URSUS/Vol_16_1/Ciarniello_Boyce_et_al_Vol_16_1_.pdf>.

[24] Lana M. Ciarniello *et al*, "Denning behavior and den site selection of grizzly bears along the Parsnip River, British Columbia, Canada" (2005) 16:1 *Ursus*, at 47-58, online (pdf): <https://www.bearbiology.org/fileadmin/tpl/Downloads/URSUS/Vol_16_1/Ciarniello_Boyce_et_al_Vol_16_1_.pdf> [*emphasis added*].

THE CURRENT THREAT TO BEARS

LOSS OF OLD FORESTS

According to *A New Future for Old Forests* – a 2020 strategic review done by a panel of experts for government – roughly 60% of British Columbia is covered by forest, with 23% of that classified as 'old growth;'[25] however, that number may be misleading as the authors themselves highlight that the "specific information about the amount, distribution, and quality of old forest" is not addressed.[26] The report goes on to state that "as much as 80% of the area of old forests consists of relatively small trees growing on lower productivity sites" and that "[o]f the 13.2 million hectares of old forest, 33% is protected … [including] parks, ecological reserves, ungulate winter range no-

[25] BC Ministry of Forests, Lands Natural Resource Operation and Rural Development, "A New Future for Old Forests A Strategic Review of How British Columbia Manages for Old Forests Within its Ancient Ecosystems" (2020) at p. 24, online: <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/strategic-review-20200430.pdf>.

[26] BC Ministry of Forests, Lands Natural Resource Operation and Rural Development, "A New Future for Old Forests A Strategic Review of How British Columbia Manages for Old Forests Within its Ancient Ecosystems" (2020) at 25, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/strategic-review-20200430.pdf>.

harvest areas, private conservation lands, regional water supply, [and] wildlife management areas, OGMAs (legal and non-legal) and retention VQOs."[27]

The 2020 government review identifies three current challenges that are likely the result of disregard or inadequate implementation of government's own 1992 *Old Growth Strategy*.[28] The 2020 report identifies these challenges as including:

- the high risk of the loss of biodiversity in many ecosystems;
- risk to potential economic benefits due to uncertainty and conflict; and
- a widespread lack of confidence in the system of managing forests.[29]

Not only does *A New Future for Old Forests* describe potential threats to the forests that provide dens[30] – it shows how ignoring government's own *Old Growth Strategy* for decades has exacerbated the challenge of protecting biodiversity.

Consider the issue of bear dens. In her report entitled *Black Bear Den Enhancement and Creation in the Jordan River*,[31] Helen Davis identifies some prominent threats to den habitat, including current and historic land management activities in coastal forests. Most prominently, forest harvesting has removed many large trees that are needed to form den structures. Contributing to the lack of den supply is the fact that the new crop of trees is not allowed to grow to sufficient size for replacement dens to develop in future forest rotations. Further negative impacts come from harvesting of second-growth forests, which may remove or destroy the few residual structures remaining from old-growth harvesting.

A reduction in the supply of suitable den sites may impact bear populations through increased predation on denned bears[32] when bears are forced to use unsuitable, unsafe dens. The net effect of reduction in suitable bear den supply is that it may become a factor that limits black bear populations.[33]

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[27] BC Ministry of Forests, Lands Natural Resource Operation and Rural Development, "A New Future for Old Forests A Strategic Review of How British Columbia Manages for Old Forests Within its Ancient Ecosystems" (2020) at 26, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/strategic-review-20200430.pdf>.

[28] British Columbia Ministry of Forests, "An Old Growth Strategy for British Columbia" (1992), online: < https://www.for.gov.bc.ca/hfd/library/documents/Bib1569.pdf>.

[29] BC Ministry of Forests, Lands Natural Resource Operation and Rural Development, "A New Future for Old Forests A Strategic Review of How British Columbia Manages for Old Forests Within its Ancient Ecosystems" (2020) at 6, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/strategic-review-20200430.pdf>.

[30] BC Ministry of Forests, Lands Natural Resource Operation and Rural Development, "A New Future for Old Forests A Strategic Review of How British Columbia Manages for Old Forests Within its Ancient Ecosystems" (2020) at 27, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/stewardship/old-growth-forests/strategic-review-20200430.pdf>.

[31] Helen Davis "Black Bear Den Enhancement and Creation in the Jordan River" (2014) *Fish and Wildlife Compensation Program* at 1, online (pdf): <https://a100.gov.bc.ca/pub/acat/documents/r48410/14WJOR01B_Bear_1429715259112_9714970805.pdf>.

[32] Helen Davis and Alton S. Harestad, "Cannibalism by black bears in the Nimpkish Valley, British Columbia" (1996) 70:2 *Northwest Science* at 91, online: <https://research.wsulibs.wsu.edu/xmlui/bitstream/handle/2376/1294/v70%20p88%20Davis%20and%20Harestad.PDF?sequence=1&isAllowed=y>.

[33] Helen Davis "Black Bear Den Enhancement and Creation in the Jordan River" (2014) *Fish and Wildlife Compensation Program* at 1, online (pdf): <https://a100.gov.bc.ca/pub/acat/documents/r48410/14WJOR01B_Bear_1429715259112_9714970805.pdf>.

Yet, despite the knowledge that large diameter trees and stumps are critical to the over-winter survival of black bears, the BC government has not provided adequate regulatory protection for these critical structures.

Some companies recognize the problem of logging reducing dens. For example, some Vancouver Island forest companies voluntarily conserve black bear dens on a case-by-case basis, and some have policies regarding den protection. However, the extent of this unenforceable protection is not adequate for long-term black bear conservation. For example, research in 'NAMGIS territory of the Nimpkish Valley on Vancouver Island found that several dens were cut down or destroyed during old-growth and second-growth logging – despite the logging company being aware of the location of these dens.[34]

The importance of legislating protection for dens is highlighted by another documented example of the failure of the current voluntary policies at Jordan River on Vancouver Island. Based on a population study of black bears in a similar ecosystem, one would expect to find 21 to 44 bears in the Jordan River Watershed.[35] Since every black bear needs one to three dens,[36] the Jordan River Watershed would need 21 to 63 potential denning sites to support a minimum estimated population.[37] However, a study of the area concluded that the voluntary protection measures only resulted in one den that was purposely conserved, and searches of 449 ha of the highest capability forests (identified in GIS) in the watershed only found one other den. According to the scientist involved, this is a far cry from the number of dens needed.[38] Furthermore, it should be noted that

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[34] Helen Davis *et al*. "Longevity and Reuse of Black Bear Dens in Managed Forests of Coastal British Columbia" (2012) 76:3 *The Journal of Wildlife Management* at 526-527, online (pdf): <https://hctf.ca/wp-content/uploads/2019/04/1-496_Davis_et_al__journal_article_2012.pdf>.

[35] Using population estimates from a study of similar habitat in Washington, resulting in black bear population density of 13.5 bears/100 km^2 to 27.8 bears/100 km^2. - L. Welfelt *et al*. "Factors associated with black bear density and implications for management" (2019) 83 *The Journal of Wildlife Management* 7:1527-1539 at p. 1533. The area of the Jordan River Watershed is 159km^2. - Helen Davis "Black Bear Den Enhancement and Creation in the Jordan River" (2014) *Fish and Wildlife Compensation Program* at 1, online (pdf): <https://a100.gov.bc.ca/pub/acat/documents/r48410/14WJOR01B_Bear_1429715259112_9714970805.pdf>. Applying these densities to the Jordan River Watershed area of 159 km^2 results in the approximate bear counts of 21-44 bears in the Jordan River Watershed.

[36] Every black bear needs a minimum of one den, although three dens per bear is more appropriate[36] and accounts for den degradation over time. - Personal communication with Helen Davis June 29, 2021 she states that "every bear needs AT LEAST one den (and really they need a minimum of two in case they get disturbed and need to change dens, and really I'd think 3 would be a better number)."

[37] The range of potential denning sites is based on one to three dens for 21 bears, leading to the range of 21-63 potential denning sites.

[38] Bear expert Helen Davis has written the following regarding her study of the area: "In the Jordan River watershed, very few stands were expected to contain large hollow trees suitable for denning, based upon the predictive model developed elsewhere on Vancouver Islands. In total, I identified 8.37 km^2 of mapped forest stands within the 159-km^2 watershed that met the survey criteria: 3 km^2 within the 106 km^2 of privately owned timberlands (2.83%) and 5.37 km^2 within the 36 km^2 of the TFL (14.92%). The remainder of the forest land in both tenures was dominated by regenerating forests that were previously harvested and some remnant patches of low-productivity old forest. The forest stands that met the den-producing selection criteria were largely distributed in small, discontinuous patches ($\bar{x}$ = 3.3 ha, SD = 10.2 ha, *n* = 248 stands).

I conducted surveys for large-diameter, hollow western redcedar or yellow-cedar trees that were either suitable to be, or had the potential to be modified into, dens for black bears by conducting 19.8 km of transect searches in 22 of these stands, which, when buffered by the search width of two searchers, totaled approximately 449 ha searched. During these surveys, I detected only one hollow tree that appeared to have been used previously as a den and 2 other hollow trees that were investigated by bears but did not appear to have been used as dens (i.e., no bedding or bear hair present, minimal sign of chewing or scratching). In addition to the structured surveys, I also incidentally located a single hollow tree that had previously been used as a den that was retained within a recent clearcut next to a road. Overall,

protections for the one purposely conserved site was deemed poor, because it was too close to a logging road that is used year round by recreationalists.[39]

It appears that voluntary policies are insufficient.

The BC Forest Practices Board investigated this issue and issued a report, *Conservation of Black Bear Dens on Vancouver Island.*[40] Urging more study of the issue, the Forest Practices Board declined to recommend immediate regulation, but clearly acknowledged:

> *…[if] second-growth forests are harvested before they develop old-growth features, and old-growth harvest continues, the supply of suitable denning habitat on Vancouver Island will decline.*[41]

The problem with the Board's approach of urging more study is that these studies take decades to complete – and by then, there will not be any habitat left to protect. British Columbia must respect the 'precautionary principle,' a key tenet of environmental law and policy making, and put stringent protective regulations in place now despite some scientific uncertainty.[42] The province has enough evidence of the decline of bear habitat to justify regulations that protect bear habitat in an enforceable way, across the entire province.

Significantly, the province already has the experience of implementing denning protection laws in Haida Gwaii and the Great Bear Rain Forest to draw upon in drafting such regulations.

CURRENT PROTECTION REGIMES THAT COULD SERVE AS MODELS

Currently the only large-scale legal bear den protections that exist in the province are found in the Haida Gwaii and Great Bear Rainforest regions – areas where local First Nations insisted on such protections. The province, along with local First Nations, has implemented 'Land Use Orders' with dedicated provisions for the protection of denning habitat in those two regions. There is much to be learned from these Land Use Orders.

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this encounter rate equates to about 1 den in 449 ha of searching in the highest capability forests for these features. Neither the TFL tenure-holder or the private forest landowners had documented any bear dens in the watershed."

[39] Personal communication with Helen Davis June 29, 2021: "…and it was done poorly, it is within 10 m of a road that is used recreationally year round. There are more potential dens in the watershed that were "accidentally" saved in riparian areas and old growth management areas but I only ever found 2 that may have been used in the past."

[40] Forest Practices Board "Conservation of Black Bear Dens on Vancouver Island Complaint Investigation #19031" (January 2020), online (pdf): <http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2020/703460/703460_IRC229_Black_Bear_Dens.pdf>.

[41] Forest Practices Board "Conservation of Black Bear Dens on Vancouver Island Complaint Investigation #19031" (January 2020) at 3, online (pdf): <http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2020/703460/703460_IRC229_Black_Bear_Dens.pdf>.

[42] As defined in the 1992 United Nations Rio Declaration, the Precautionary Principle states: "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason of postponing cost-effective measures to prevent environmental degradation."

Haida Gwaii Land Use Objectives Order

The *Haida Gwaii Land Use Objectives Order*[43] ("Haida Gwaii LUO") offers perhaps the most stringent protections for the denning habitat of black bears in British Columbia. The Haida Gwaii LUO is:

> *…a community-based, strategic-level land use planning process led by the Council of the Haida Nation and the Province of British Columbia [that was] initiated in September of 2003.*[44]

The Land Use Objectives Order:

> *…establishe[d] legal objectives for forest-based values to support implementation of ecosystem-based management. These objectives protect important Haida cultural values, support ecosystem integrity and provide environmental benefits by maintaining the diversity and abundance of organisms on Haida Gwaii.*[45]

The Haida Gwaii LUO defines a black bear den as a: "cavity within a tree, a snag, a stump, or a log, greater than 0.80 metres in diameter which shows evidence of use by Black Bears for winter hibernation."[46]

The Haida Gwaii LUO contains three sections that are explicitly relevant to the protection of black bear denning habitat, and one section, section 16, which is indirectly relevant to denning habitat because it refers to the objectives for ecological representation.[47] First, section 18 directly refers

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[43] See Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" and related schedules, (2017), online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[44] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 1, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[45] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 1, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[46] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 3, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[47] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 18, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

Section 16 reads:

"16. Objectives for ecological representation

(1) For each common site series and each rare site series in a landscape unit, retain an amount of old forest equal to or greater than the landscape unit targets listed in Schedule 10.

(2) Where practicable, include within old forest retention areas retained to meet the requirements in subsection (1), habitat for local species at risk and regionally important wildlife species including, but not limited to:

(a) Northern Goshawk nesting and foraging habitat;

(b) Marbled Murrelet nesting habitat, Great Blue Heron nesting habitat, and Northern Saw-whet Owl core nesting areas; and

(c) Black Bear dens and denning habitat.

(3) Areas retained to meet the requirements in subsection (1), must be documented and submitted as digital spatial data at the end of each calendar year to the Council of the Haida Nation and the Province of British Columbia.

to the "objectives for black bear dens"[48] and requires that all black bear dens are protected within a reserve zone[49] of at least 20 metres in width around the den. It also provides for an additional special management zone of one tree length in order to protect the integrity of that reserve zone.[50]

Section 18 supports the development of long-term development and recruitment of new den habitat by mandating that:

> *(4) Where practicable, maintain suitable western redcedar and yellow-cedar in management zones, for long term Black Bear den recruitment;"*[51] *and*

(4) If there is insufficient old forest available to meet the targets in subsection (1), identify and retain, and recruit where necessary, through natural processes and voluntary management intervention, forest stands to meet representation requirements in the shortest possible timeframe."

[48] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 19, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.
Section 18 reads:
"18. Objectives for Black Bear dens
(1) Protect all Black Bear dens within a reserve zone, measuring at least 20 meters in width, around the Black Bear den.
(2) Despite subsection (1), alteration or removal of a Black Bear den or its reserve zone, or both, may occur, provided that:
(a) an intergovernmental process is completed;
(b) the alteration or removal is required for road access or to address a safety concern; and
(c) the alteration or removal does not occur during the winter hibernation season.
(3) Adjacent to any reserve zone required in subsection (1), maintain a management zone with an average width equal to 1.0 tree length, measured from the outer edge of the reserve zone, to protect the integrity of the reserve zone.
(4) Where practicable, maintain suitable western redcedar and yellow-cedar in management zones, for long term Black Bear den recruitment.
(5) Within the management zone required under subsection (3), alteration or removal of trees may occur, outside of the winter hibernation season, to:
(a) accommodate operational requirements for road and bridge construction, where no practicable alternative exists;
(b) accommodate road maintenance and deactivation, the removal of danger trees, and brushing and clearing within the right-of-way, for safety purposes, on any existing road under active tenure; or,
(c) mitigate the impact of windthrow.
(6) All existing and newly discovered Black Bear dens, and areas reserved or managed in accordance with subsections (1) to (5), must be documented and submitted to the Council of the Haida Nation and the Province of British Columbia at the end of each calendar year.
(7) Where practicable, include trees, snags, stumps and logs that are greater than 0.80 meters in diameter within stand level retention, for the recruitment of future denning habitat."

[49] The Haida Gwaii LUO defines 'reserve zone' as: an area referred to in this Order where timber harvesting may not occur, unless harvest limits are otherwise specified in this Order. - Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 5, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[50] For further detail, please refer to schedule 5 of the Haida Gwaii LUO.

[51] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 20, s.18(4), online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

> *(7) Where practicable, include trees, snags, stumps and logs that are greater than 0.80 meters in diameter within stand level retention, for the recruitment of future denning habitat.*[52]

The Land Use Orders do not create an absolute obligation to protect denning habitat. Section 18 (2) allows for the alteration or removal of trees within the reserve zone if three conditions are met: (1) an intergovernmental process is completed, (2) alteration or removal of a tree is required for road access or to address a safety concern, and (3) the alteration or removal does not occur during winter hibernation season.[53] Similar exemptions are provided for in the management zone under subsection 18(5), outside the winter hibernation season.[54] The objectives set for recruitment of new dens in subsections 18(4) and (7), are also somewhat weakened by the qualifier "where practicable." Nevertheless, the Haida Gwaii rules are the strongest in the province, likely because the Haida Nation insisted on strong den protection.

Great Bear Rainforest Order

The current *Great Bear Rainforest Order*[55] *("GBRO")* of 2016 replaces the 2007 South Central Coast and Central and North Coast land use orders, as amended in 2009 and 2013. The Order's stated intent is to:

> *…improve protection and maintenance of first nation forest and cultural values; achieve further progress toward long term protection and maintenance of aquatic ecosystems, biodiversity and wildlife; and provide for stable social and economic benefits, including carbon benefits, for first nations and other citizens dependent upon the area, ensuring worker safety and maintaining stable access to forest lands that support viable commercial forestry opportunities.*[56]

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[52] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 20, s.18(7), online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[53] Winter hibernation season means the period between November 1st and May 15th when Black Bear dens may be in use for hibernation. – Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 6, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[54] S.18 (5) allows for alternation of removal of trees in the management zone, outside the winter hibernation season to: "(a) accommodate operational requirements for road and bridge construction, where no practicable alternative exists; (b) accommodate road maintenance and deactivation, the removal of danger trees, and brushing and clearing within the right-of-way, for safety purposes, on any existing road under active tenure; or, (c) mitigate the impact of windthrow." - Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 20, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[55] Ministerial Order from Ministry of Forests, Lands, and Natural Resource Operations, "Great Bear Rainforest Order" (2016 January), online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-pricing/coast-timber-pricing/maps-and-graphics/great_bear_rainforest_order_-_jan_21_2016.pdf>.

[56] Ministerial Order from Ministry of Forests, Lands, and Natural Resource Operations, "Great Bear Rainforest Order" (2016 January) at 2, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-pricing/coast-timber-pricing/maps-and-graphics/great_bear_rainforest_order_-_jan_21_2016.pdf>.

The GRBO is divided into two regions: the Central and North Coast and the South Central Coast, each with their own provisions. However, the provisions on protection of black bear dens mirror each other, and are both covered under section 19 of the Order. While similar to the provisions in the Haida Gwaii LUO, the provisions for the GRBO are more generalized, lacking the more specific retention guidelines for black bear dens found in the Haida Gwaii order.

Nevertheless, section 19 of the GBRO sets an objective to "Protect grizzly bear and black bear dens."[57] It defines 'bear den' as "a den identified by a Qualified Professional that is suitable for winter hibernation and maternity."[58] The GBRO combines protections for black bear dens with that of grizzly bear dens under section 19.[59] Section 19 sets this legal Objective to govern forestry:

> *Protect grizzly Bear Dens and black Bear Dens.*[60]

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[57] Ministerial Order from Ministry of Forests, Lands, and Natural Resource Operations, "Great Bear Rainforest Order" (2016 January) at 20, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-pricing/coast-timber-pricing/maps-and-graphics/great_bear_rainforest_order_-_jan_21_2016.pdf>.

[58] Ministerial Order from Ministry of Forests, Lands, and Natural Resource Operations, "Great Bear Rainforest Order" (2016 January) at 11, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-pricing/coast-timber-pricing/maps-and-graphics/great_bear_rainforest_order_-_jan_21_2016.pdf>.

[59] Ministerial Order from Ministry of Forests, Lands, and Natural Resource Operations, "Great Bear Rainforest Order" (2016 January) at 20, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-pricing/coast-timber-pricing/maps-and-graphics/great_bear_rainforest_order_-_jan_21_2016.pdf>.
Section 19 reads:
"19. Objectives for grizzly and black Bear Dens
(1) Protect grizzly Bear Dens and black Bear Dens.
(2) Adjacent to grizzly Bear Dens, maintain a Reserve Zone with a minimum width of 50 metres.
(3) Despite subsections (1) and (2), alteration or removal of: January 2016 Great Bear Rainforest Order - Part 2 21
(a) a black Bear Den; or
(b) a grizzly Bear Den or its Reserve Zone, or both, may occur, provided that:
(c) there has been First Nation Engagement with Applicable First Nations;
(d) the alteration or removal is required for road access or to address a safety concern and there is no practicable alternative; and
(e) the alteration or removal does not occur during the winter hibernation season.
(4) In addition to subsections (1) and (2), adjacent to any Reserve Zone required in subsection (2), maintain a Management Zone with an average width equal to 1.0 Tree Length, measured from the outer edge of the Reserve Zone, to protect the integrity of the Reserve Zone.
(5) Within the Management Zone required under subsection (4), alteration or removal of trees may occur outside of the winter hibernation season to:
(a) accommodate operational requirements for road and bridge construction, where no practicable alternative exists;
(b) accommodate road maintenance and deactivation, the removal of danger trees, and brushing and clearing within the right-of-way, for safety purposes, on any existing road under active tenure; or
(c) mitigate the impact of windthrow.
(6) All found Bear Dens must be documented and this documentation must be submitted to the Applicable First Nations and the Province of British Columbia at the end of each calendar year."

[60] Ministerial Order from Ministry of Forests, Lands, and Natural Resource Operations, "Great Bear Rainforest Order" (2016 January) at 20 s. 19(1), online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-pricing/coast-timber-pricing/maps-and-graphics/great_bear_rainforest_order_-_jan_21_2016.pdf>.

In addition, section 19(6) requires that:

> *All found Bear Dens must be documented and the documentation must be submitted to the Applicable First Nations and the Province of British Columbia at the end of each calendar year.*[61]

Note that grizzly bear den protection is more specific under this Order. A reserve zone of 50 metres and an associated restricted management zone is specifically required around grizzly bear dens.

The exceptions to the protection provisions echo those in the Haida Gwaii LUO, where it may be permissible to alter or remove protected trees under certain specific conditions listed in section 19(5). These conditions include: to accommodate road and bridge construction where there is no practicable alternative; road maintenance and de-activation activities; to remove dangerous trees and vegetation; and to mitigate the impact of windthrow.[62]

British Columbia Timber Sales

Small businesses and others can purchase through auction the right to harvest Crown timber through government's British Columbia Timber Sales.[63] BC Timber Sales (BCTS) retains responsibility for operational planning, silviculture and major road construction for such auctioned harvests. BC Timber Sales has published a number of Best Management Practices (BCTS BMP), including those regarding the protection of bear dens on some parts of Vancouver Island.

The published *Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island*[64] recognizes that:

> *Most black bear dens in the BCTS Strait of Georgia (SoG) area are located within cavities of large diameter trees. Although there is currently no direct legal protection of black bear habitat on Vancouver Island, BCTS SoG recognizes that den structures suitable for winter hibernation and maternity may be rare in some stands or landscapes.*[65]

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[61] Ministerial Order from Ministry of Forests, Lands, and Natural Resource Operations, "Great Bear Rainforest Order" (2016 January) at 20 s. 19(6), online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-pricing/coast-timber-pricing/maps-and-graphics/great_bear_rainforest_order_-_jan_21_2016.pdf>

[62] These exceptions, however, can only occur outside the winter hibernation season.

[63] Part of the Ministry of Forests, Lands, Natural Resource Operations and Rural Development.

[64] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020), online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>.

[65] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 1, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>.

One of the objectives of the BC Timber Sales Best Management Practices is to:

> *Conduct forest operations in a manner that preserves post-harvest den utility by bears where suitable hibernation and maternity structures are or seem rare.*[66]

Furthermore, another BCTS BMP objective is to:

> *Minimize disturbance to occupied bear dens during harvest activities where possible.*[67]

However, the BC Timber Sales document clearly acknowledges that there are no definitive legal protections and that "the level of protection afforded to the den will be determined by BCTS."[68] The BCTS BMP process begins with the positive identification of a den and notification of the BCTS.[69] Then, if it is determined that protection is warranted, the level of protection is determined by a number of factors including the local abundance of other suitable den sites, as well as the location and quality of the den itself.[70]

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[66] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 1, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>.

[67] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 1, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>.

[68] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 2, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>. The BCTS BMP itself states that "Protection of bear dens is not legally required; the prescribed level of protection may be influenced by:" a range of factors including local abundance of known dens, local abundance of trees likely to provide suitable dens, and the location and quality of the den. – page 2 of the BCTS BMP <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>.

[69] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 2, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>.

[70] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 3, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>. The prescribed level of protection for identified bear dens may be influenced by:

- "The local abundance of known dens within the landscape unit, and local abundance of trees likely to provide suitable dens, such as the presence of suitably large Cw and Yc within the stand
    - (ie. Dens in second growth should be afforded more protection due to relative scarcity of suitable trees)
- The location of the den, such as:
    - Near edges of cutblocks
    - Riparian areas
    - Other features with attributes beneficial to wildlife
    - Near key road construction locations
        - These may require removal if options are limited due to engineering constraints
- The quality of den:
    - Those with good future potential may be afforded greater protection than a den of marginal quality that is expected to degrade over time
    - Dens of higher value, such as dens with elevated entrances or located in cavities at the base of large trees should be managed to a higher standard where possible

Once it has been determined that a den should be protected, the BCTS BMP suggests five beneficial attributes to consider for the reserves:[71]

1. Retaining a den within a wind firm leave patch (TLA/WTRA - preferably minimum 1ha in size).
2. Leaving a minimum 20m distance to the edge of the reserve from the bear den.
3. Retaining security and thermal cover around the den including some larger trees or snags where adult females and cubs can "escape" from predation.
4. Retaining a healthy shrub layer around the entrance for visual security screening.
5. Retaining large fallen trees > 1 metre dbh.[72]

While this BCTS Best Management Practices document is a positive step, there are limitations to the magnitude of its effect. The BCTS BMP is simply a policy tool where compliance is not mandated by law and lacks meaningful enforcement mechanisms. To illustrate the issue, the BCTS BMP explicitly states that "BCTS must be mindful of the licensee's harvesting rights under the TSL [Timber Sale Licences] and their autonomy to direct their own operations."[73]

This lack of government enforceability is problematic. In addition, the BMP standards have some egregious loopholes. For example, if a company does not feel the above restrictions are "logical," it may be able to opt out of the BMP standard.[74]

- Any required alteration or removal must not occur during the winter hibernation season if the den is occupied.
- Areas with good quality dens, potential denning cavities, or other wildlife features may be a good anchor point for the required Wildlife Tree Retention Area (WTRA)"

[71] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 3, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>.
[72] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 3, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>. Also note, 'dbh' is a unit of measurement within dendrometry that means diameter at breast height.
[73] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 4, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>.
[74] "If the restrictions above are not logical or practicable for a particular block, contact a QEP to provide site specific recommendations." – British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 5, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bearden_bmp.pdf>.

Voluntary Company Policies

We cannot rely solely on companies to set their own rules. In 2020 the Forest Practices Board conducted an investigation into the loss of denning habitat during harvest of large-diameter trees on Vancouver Island. The Board was responding to a complaint about the loss of several specific black bear dens to forestry operations – including one den where the company cut down an old-growth tree with a den that loggers had failed to identify.

In the latter case, the Board pointed out:

> *…forest tenure holder [had] voluntarily covered the latter stump with plywood to provide potential future den use, and adopted a best-management practice to avoid similar den losses in future operations.*[75]

However, this type of incident should be prevented by regulation. Indeed, the Forest Practices Board pointed out the dearth of legal protections for bear dens – but recognized that some companies had voluntary policies:

> *There are no legal requirements in the Forest and Range Practices Act (FRPA) to specifically protect bear dens. There are no objectives in the Vancouver Island Land-Use Plan and no legal orders to protect black bear dens. In addition, black bear dens are at risk to not be identified and protected through selection of wildlife trees and wildlife-tree-retention areas…*
>
> *…some licensees voluntarily identified and manage for black bear dens on Vancouver Island.*[76]

The loss of dens investigated by the Board in that case demonstrate the failure of simply relying upon companies to make and enforce the rules. Although the Board did not go so far as to recommend immediate legislation, the Board did point out the pitfalls of merely voluntary action:

> *The Board heard from some licensees of the importance of managing black bear dens; however, since there are no legal requirements, the implementation of voluntary practices by licensees is not consistent across Vancouver Island.*[77]

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[75] Forest Practices Board "Conservation of Black Bear Dens on Vancouver Island Complaint Investigation #19031" (January 2020) at 2, online (pdf): <http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2020/703460/703460_IRC229_Black_Bear_Dens.pdf>.

[76] Forest Practices Board "Conservation of Black Bear Dens on Vancouver Island Complaint Investigation #19031" (January 2020) at 1-2, online (pdf): <http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2020/703460/703460_IRC229_Black_Bear_Dens.pdf>.

[77] Forest Practices Board "Conservation of Black Bear Dens on Vancouver Island Complaint Investigation #19031" (January 2020) at 2, online (pdf): <http://www.llbc.leg.bc.ca/public/pubdocs/bcdocs2020/703460/703460_IRC229_Black_Bear_Dens.pdf>.

Bear expert Helen Davis has summarized the problem with relying upon voluntary measures to protect bear dens:

> *Voluntary measures are insufficient to conserve a sustainable population of black bears on coastal BC. Although several forest licensees have conserved a subset of known dens in the past (mostly by leaving den trees as single trees or with a couple of standing trees in clearcuts), the majority of licensees do not survey for and protect dens, and in some cases, have failed to retain dens that were reported directly to them (Davis et al. 2012). Only a fraction of bear dens have been protected over the 100+ year history of logging of forests in coastal BC.*
>
> *In the last few years, BC Timber Sales Strait of Georgia Business Area and Western Forest Products have created protection measure guidelines as part of their normal operations that will help improve the conservation of dens in some areas, but this will likely be insufficient to adequately conserve dens for a number of reasons. Vast areas of Vancouver Island (and the rest of the Province) are not covered by the better guidelines. Forest licensees that have developed their own conservation measures may not have adequate standards – and there is no oversight to determine if company guidelines are being followed. Perhaps most important, outside of Haida Gwaii and the Great Bear Rainforest, the standards are simply guidelines, and not legally enforceable.*
>
> *Meanwhile, dens are steadily lost to ongoing old growth logging. In second growth forests, legacy dens (in stumps, root boles and logs) are also decaying – and not being replaced because second growth gets re-harvested before new dens can form. New dens are not being created to mitigate the extensive past losses of dens. There ought to be a law."*

RECOMMENDATIONS

Below we make recommendations for law reform to better protect black bear denning habitat, including:

1. Amendments to the Provincial *Wildlife Act*; and
2. Regulations subsequent and supportive to the amended *Wildlife Act* provisions.

Recommendation 1. Amend Provincial *Wildlife Act* Provisions

We recommend adding a provision to the *Wildlife Act* stating that destroying or damaging a bear den contrary to the regulations is prohibited. This would allow for the introduction of subsequent protection regulations that are tailored to suitably protect bear dens found in different ecosystems across British Columbia.

There are similar broad protective provisions in the British Columbia *Wildlife Act*[78] that not only afford protections for other animals, such as birds[79] and beavers;[80] but also for other classes of species, such as those classified as endangered or threatened.[81]

For example, section 34 states that:

> *A person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys (a) a bird or its egg, and (c) the nest of a bird when the nest is occupied by a bird or its egg.*[82]

It is crucial to note that bear dens are functionally "nests" for bears and their cubs.

Section 9(1) provides similar protection for beavers and muskrats, stating:

> *A person commits an offence if the person disturbs, molests or destroys (a) a muskrat house or den, or (b) a beaver house or den or beaver dam.*[83]

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[78] *Wildlife Act,* RSBC 1996, c 488.
[79] *Wildlife Act,* RSBC 1996, c 488, s 34.
[80] *Wildlife Act,* RSBC 1996, c 488, s 9.
[81] *Wildlife Act,* RSBC 1996, c 488, s 6.
[82] *Wildlife Act,* RSBC 1996, c 488, s 34 reads:
> **"34** A person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys
> (a)a bird or its egg,
> (b)the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl, or
> (c)the nest of a bird not referred to in paragraph (b) when the nest is occupied by a bird or its egg."

[83] *Wildlife Act,* RSBC 1996, c 488, s 9 reads:
> **"9** (1)A person commits an offence if the person disturbs, molests or destroys
> (a)a muskrat house or den, except on diked land, or
> (b)a beaver house or den or beaver dam.

These current provisions demonstrate the use of the *Wildlife Act* to provide protections for the homes, nests, and dens of various animals. Requesting that these same protections are expanded to the homes, nests, and dens of black bears is not an extraordinary request, nor is it unreasonable.

A *Wildlife Act* prohibition on damaging dens should apply to timber harvesting on both public and private land – in contrast to many forest laws that apply only to public lands.[84] To adequately protect denning habitat and maintain a level playing field within forestry and other industries, any rules or regulations that are implemented must be applicable to both the public and private sectors.

Recommendation 2: Create Specific Regulations under the *Wildlife Act* that Protect Dens

[Note: The recommendations below for specific new regulations were proposed by Helen Davis in her report "Stand-Level Retention Guidelines for Bear Dens."[85] These recommendations should apply across the Province to all bear dens that rely upon tree structure for stability.

Note that these recommendations represent "the best-available information synthesized from independent… empirical data on dens and den management collected over the past 25 years."[86] It is not coincidental that the BCTS Best Management Practices and Haida Gwaii LUO closely align with the recommendations.]

New regulations for black bear dens should require 3 elements:

1. **Mandatory pre-harvest surveys by a Qualified Registered Professional Biologist to identify and clearly mark dens.**
2. **Mandatory within-stand retention prescriptions developed by a Qualified Professional that:**
    a. **Retain bear den structures in unmodified form.**

(2)Subsection (1) does not apply
(a)to a licensed trapper,
(b)if the action is taken to provide irrigation or drainage under lawful authority for the protection of property, or
(c)if the action is authorized by regulation."

[84] For example, *Forest and Range Practices Act* rules do not generally apply to privately owned forests.
[85] Helen Davis, "Stand-Level Retention Guidelines for Bear Dens" (2021), online (pdf): *Artemis Wildlife Consultants* <http://www.artemiswildlife.com/AWC%20stand%20level%20bear%20den%20retention%20guidelines.pdf>.
[86] Helen Davis, "Stand-Level Retention Guidelines for Bear Dens" (2021) at 2, online (pdf): *Artemis Wildlife Consultants* <http://www.artemiswildlife.com/AWC%20stand%20level%20bear%20den%20retention%20guidelines.pdf>.

b. **Retain resilient windfirm forest patches ≥1 ha around dens: A buffer of at least 30 m of undisturbed forest must be maintained around the den within a windfirm legal reserve[87] of contiguous mature or old forest.**
c. **Maintain a minimum distance separation between dens and roads. Road rights-of-way should not be allowed within 75 m from any den.**

3. **Mandatory continued management to protect dens.**

1. Mandatory Pre-harvest Surveys

The new legislation needs to require mandatory pre-harvest surveys to identify dens. The objective of Pre-Harvest Surveys is to identify bear dens in or near proposed harvest units *before* cutblock boundaries and harvesting plans are finalized. Identification of dens at early stages of cutblock development (i.e., reconnaissance phase) gives the planning/operations foresters the most flexibility to retain den trees with minimal effect on harvest efficiencies. Options for conserving dens identified later in the development or harvest process become considerably more limited. Failure to plan ahead may hinder both den retention and smart and efficient harvesting.

Essentially, all personnel that conduct groundwork before and during cutblock layout should have a clear legal responsibility to lookout for dens – and identify them. For example, reconnaissance crews and timber cruisers conducting preliminary surveys of the block[88] may encounter den trees. Surveyors conducting ecological assessments to verify site conditions may also notice den trees during their surveys. First Nations cutblock surveyors looking for culturally modified trees, culturally important plants and archaeology sites can often identify bear dens – because such surveys conduct detailed evaluations of individual cedar trees that may form bear dens.

Requiring all personnel to attempt to identify dens early will help the planning and development foresters to seamlessly incorporate retention of identified dens into logging plans. Early identification and verification by a Qualified Professional of dens – and communication to these foresters – is crucial. This will make it easier to design forest retention areas that protect dens while minimizing unnecessary impacts to volume.

Finally, the regulation should require permanent marking of dens with signs, tags, spray paint or flagging tape so that these trees can clearly be identified by layout crews and operators. The regulation should also require that information on the location of den trees be submitted to government data repositories (e.g., Wildlife Species Inventory Portal, regional den inventories) for tracking purposes.

[Note: Training of all staff to identify dens:

Although pre-harvest surveys are critical, it should be noted that during later forest development there will also be opportunities for field staff to identify and mark den trees. Because of this, all field staff that conduct groundwork in the proposed cutblock and retention areas must be trained to identify bear dens.)[89]]

[87] e.g., Wildlife Tree Retention Area, Old Growth Management Area.
[88] In order to verify timber quality/volume and initial operational constraints.
[89] See Helen Davis, "Coastal Bear Den Identification Manual" (2020) available online at <http://artemiswildlife.com/bear-dens3>.

1.1 Precedents

The requirement for identification and documentation of dens is important – and can be found in the BC Timber Sales *Best Management Practices*[90] as well as in both the Haida Gwaii LUO and GBRO in sections 18(6)[91] and 19(6)[92] respectively. It is important to note that both land use orders require documentation of all found bear dens – and submission of that documentation to local First Nations and the Province of British Columbia annually.

2. Mandatory within-stand retention prescriptions

Once dens have been identified in or near proposed harvest units, the legislation should require protection of these critical habitat features. Among other things, the law should ensure that (1) the den remains usable by black bears into the future; (2) bears that attempt to use the den are not disturbed or displaced by forest harvesting activities; and (3) female bears that reproduce in dens have access to secure escape cover, upon emerging from the den.

To ensure that den structures remain useful as black bear winter dens, the regulation should generally require the following:

1. **The bear den structure must be retained in its unmodified form;**
2. **Resilient windfirm forest patches ≥1 ha must be retained around dens. A buffer of at least 30 m of undisturbed forest must be maintained around the den within a windfirm legal reserve[93] of contiguous mature or old forest.**
3. **Road rights-of-way should not be allowed within 75 metres of any den.**

[90] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 1, online: <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bmp-bear-den-vi.pdf>.
[91] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 20, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.
[92] Ministerial Order from Ministry of Forests, Lands, and Natural Resource Operations, "Great Bear Rainforest Order" (January 2016) at 21, online: < https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-pricing/coast-timber-pricing/maps-and-graphics/great_bear_rainforest_order_-_jan_21_2016.pdf>.
[93] e.g., Wildlife Tree Retention Area, Old Growth Management Area

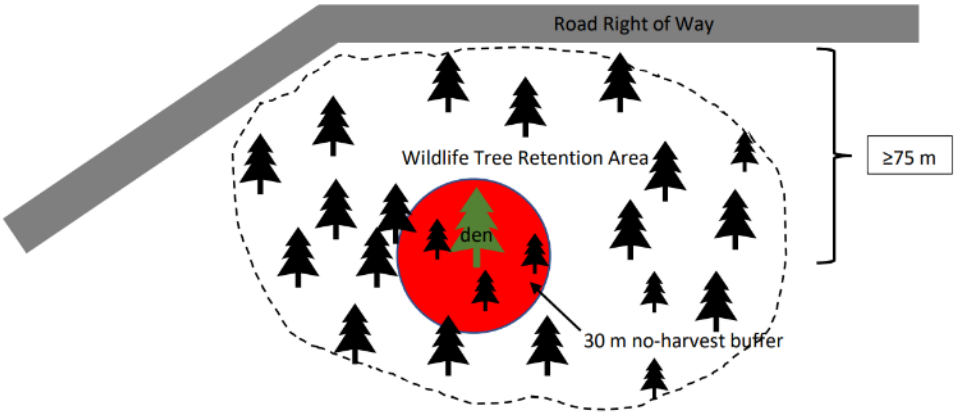

Figure 1. A den contained within a 30 metre no-harvest buffer in an 1ha Wildlife Tree Retention Area. The den is at least 75 metres from the edge of the road right of way.[94]

Below is the rationale for the above three recommendations.

2.1 Retaining the Bear Den structure

Retaining the den structure itself is clearly the first necessary priority. The most common type of bear den in old-growth coastal forests are found in standing live hollow trees (often western redcedar and yellow-cedar), with entrances through the base of the tree or through an aboveground opening in the side of the tree. Such den trees provide the most secure and thermally advantageous dens for bears – and contribute significantly to the survival and reproduction of the population. Furthermore, these optimal den trees persist for many generations of bears and are key habitat features. Such hollow live trees are the priority features that we should strive to retain as dens for black bears. However, they can be lost without adequate forest management consideration.

In addition, dens that occur in fallen or harvested trees (i.e., stumps, root boles and logs) are structures often found in second-growth forests – and are important to conserve to bridge the gap, until there is sufficient recruitment of new hollow-tree denning habitat at the landscape scale.

2.2 Retaining Resilient Forest Patches Around Dens

A resilient patch of unharvested forest must be left around the den structure. This buffer of unlogged forest can provide:

- structural stability to den retention patches,
- visual screening for den trees that have above-ground entrances; and
- critically important escape trees for reproductive females and their cubs.

[94] This figure is found at Helen Davis, "Stand-Level Retention Guidelines for Bear Dens" (2021) at 3, online (pdf): *Artemis Wildlife Consultants*, <http://www.artemiswildlife.com/AWC%20stand%20level%20bear%20den%20retention%20guidelines.pdf>.

The buffer can prevent structural damage to the den tree itself, help exiting bears escape detection by predators, and provide trees that cubs and mothers can climb if pursued. Individual dens can be protected using several approaches – but all should include a minimum 30 metre no-harvest reserve zone around the den.[95] Whenever possible, standing den trees should be kept at least 30 metres from any cutblock edge – to minimize windthrow. (This is important because windthrow damage dissipates rapidly with distance from the edge, even on exposures facing strong prevailing winds.)[96]

In addition to the "no-harvest" buffer, dens in hollow trees near the edges of proposed cutblocks are best retained in *contiguous forest* through adjustments to the cutblock boundaries. If that is not possible, then they should be retained within windfirm legal reserves such as Wildlife Tree Retention Areas, Old Growth Management Areas, riparian management areas or gully buffers. Den forest retention areas should be ≥1 ha, with a minimized edge exposure to prevailing winds and include trees with future den potential (e.g., large trees with structural defects).[97]

Limited Exceptions to alter or remove certain trees

Limited exceptions may be made to allow tree alteration or removal, as is done in Haida Gwaii. Therefore, outside the 30 m no-harvest zone but within the den forest retention area, alteration or removal of trees may occur (outside of the winter denning season) to: (1) accommodate operational requirements for road and bridge construction where no practicable alternative exists, (2) accommodate road maintenance and deactivation, the removal of danger trees (except for those identified as bear dens) and brushing and clearing within the right-of-way, for safety purposes, on any existing road or, (3) mitigate the impact of windthrow.[98]

Note: Further research is needed on the factors affecting persistence of den retention areas in coastal forests, to validate the most effective management prescriptions for long-term retention of dens in standing hollow trees.

2.3 Distance to Roads

The legislation should also require that roads be located away from dens. Roads near dens can render the dens ineffective, because bears will abandon dens if too much human activity occurs nearby. The edge of the rights-of-way of new roads should be located at least 75 metres from dens, although the rights-of-way of tertiary or terminal roads in cutblocks that will be deactivated may be within 50 metres.

If there is no option to relocate roads away from a known den, then deactivation of such roads after harvesting should be a high priority. Road deactivation will help prevent fire wood and cedar shake salvagers from destroying structures that were specifically retained for denning. Activities on roads that are in use prior to and through the start of the den season do not need to be

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[95] Although wind-firming treatments may be done within the buffer.

[96] Scott Maxwell *et al*., "Identifying the determinants of windthrow damage in wildlife tree patches in the Boreal White and Black Spruce biogeoclimatic zone of northeastern British Columbia" (31 March 2010) 10:3 *Journal of Ecosystems & Management* at 3, online: <https://jem-online.org/index.php/jem/article/view/5>.

[97] Helen Davis, "Stand-Level Retention Guidelines for Bear Dens" (2021) at 4, online (pdf): *Artemis Wildlife Consultants* <http://www.artemiswildlife.com/AWC%20stand%20level%20bear%20den%20retention%20guidelines.pdf>.

[98] *Note*: Windthrow of retained hollow trees can be a considerable risk that can negate all positive actions taken to retain dens, if not properly managed. Crown modification techniques such as edge-feathering, pruning and topping to reduce the effective crown size and density can considerably reduce the risk of windthrow of den trees.

restricted if a bear deliberately establishes a den closer to a road than 75 metres – as the bear selected the site despite the existing activity.

2.4 Precedents for Stand level management

Precedents for the above proposed requirements can be found in BC Timber Sales *Best Management Practices*[99] as well as in the *Haida Gwaii Land Use Order* in sections 18 (1)(3) and (4).[100]

BC Timber Sales Best Management Practices lists five attributes that apply to managing reserves around dens, including:

- leaving a wind firm leave patch of 1 ha,
- leaving a minimum of 20 metres from the edge of the reserve to the bear den, and
- retaining sufficient brush and cover throughout the reserve. [101]

The Haida Gwaii LUO require a reserve zone of 20 metres around the den *plus* a management zone adjacent to the reserve zone with an average width equal to 1.0 tree length to maintain the integrity of the reserve zone.[102]

While these current policies and regulations provide a good starting point, our science-based recommendations include slightly larger retention patches and reserve zones of 30 metres around the den and a minimum windfirm reserve of 1 ha.[103]

3. Mandatory Continued Management Around Dens

Once den trees are conserved within retention patches, there needs to be on-going management to minimize disturbance to denned bears during the den season, minimize impacts of salvage operations, and respond to den structures blowing down, dying or decaying.

3.1 Disturbance of Denned Bears

New legislation should limit industrial disturbance of denned bears. Female black bears with cubs may den for as long as six months (between October 21-May 15) and disturbance during this period has tremendous physiological impact (e.g., a 56% increase in weight loss) and can prove

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[99] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 3, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bmp-bear-den-vi.pdf>

[100] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 19-20, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[101] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 3, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bmp-bear-den-vi.pdf>

[102] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 19-20, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[103] Helen Davis, "Stand-Level Retention Guidelines for Bear Dens" (2021) at 4, online (pdf): *Artemis Wildlife Consultants* <http://www.artemiswildlife.com/AWC%20stand%20level%20bear%20den%20retention%20guidelines.pdf>.

fatal if newborn cubs abandon a den site.[104] Research has shown that even minor activity that occurs off road surfaces is likely to cause greater negative effects on denned bears than predictable-route (e.g., roads) activity. Therefore, operational activity should not occur within 1 km of occupied bear dens.[105] However, the displacement potential of industrial activity has not been well studied and more empirical information is needed to determine whether these buffers suggested in the BC Timber Sales Best Management Practices are adequate:

Table 1. Suggested activity restrictions October 21-May 15 near occupied bear dens[106]

Disturbance Type	**Minimum Suggested Distance (m)***
Primary harvesting, falling	200
Road construction (no blasting)	200
Blasting, heli-yarding	1000
Hauling	200

* based on preliminary research done by biologists from BMP's in other jurisdictions. These guidelines are subject to revision based on new research, guidance, or site-specific recommendations from a QEP.

The regulation of disruption should have other provisions. For example, before potentially disruptive activities are conducted near a known bear den, a Qualified Environmental Professional should assess whether the den is occupied. This assessment should take place at defined critically important times.[107]

3.2 Precedents

Among the policy and regulation provisions we have reviewed, each addresses the disturbance of areas around bear dens during the hibernation window.

[104] Helen Davis, "Stand-Level Retention Guidelines for Bear Dens" (2021) at 5, online (pdf): *Artemis Wildlife Consultants* <http://www.artemiswildlife.com/AWC%20stand%20level%20bear%20den%20retention%20guidelines.pdf>.
[105] John D C Linnel *et al.*, "How vulnerable are denning bears to disturbance?" (2000) *Wildlife Society Bulletin* at 28, online (pdf): <http://bearproject.info/wp-content/uploads/2015/11/2000-A027-Linnell-How-vulnurable-are-denning.pdf>.
[106] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 4, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bmp-bear-den-vi.pdf>.
[107] Preferably, monitoring would be set-up in advance of the start of the den season either by installing a motion-sensitive trail camera or by placing string or sticks across the entrance so that potential disturbance/entry could be determined at a safe distance. Bears are most prone to den abandonment at the start of the denning period so this should be taken into consideration when deciding on when to check dens for occupancy. The timing and continuity of forest operations also affect the disturbance potential at dens. If activities, such as hauling, begin prior to the start of denning season (i.e., before Oct. 21) and are continuous (no break greater than 5 days) and a bear chooses to use a den structure within the recommended disturbance distances, then no changes to activities are needed. If, however, disruptive activities are initiated after the denning season start then the den needs to be checked for occupancy, and timing of activities may need to be adjusted to avoid displacing bears that are denned. If potentially disruptive activities are discontinuous (i.e., a break in activity longer than 5 days), the den should be rechecked before restarting operations and timing of activities may need to be adjusted accordingly.

For example, the Haida Gwaii Land Use Order prohibits any alterations or removal of trees to designated areas around bear dens during the hibernation window from November 1 to May 15, with very narrow exceptions.[108] While the Great Bear Rainforest Order prohibits alterations or removals of protected trees during the winter hibernation season, it does not define the hibernation window.[109] The BC Timber Sales Best Management Practices states that for dens that are identified:

> *…[a]ny required alteration or removal must not occur during the winter hibernation season if the den is occupied.*[110]

In addition, the BCTS BMP also includes a restriction on activities such as harvesting, falling, blasting, road construction and hauling, depending on their proximity to an occupied den.[111]

3.3 Salvage operations

Note that legislation is needed to prevent forest salvage operations from damaging dens in harvested areas. After clearcutting, firewood cutting and the salvage of cedar stumps and logs for shakes may negatively impact retained den structures. Salvage operations must be controlled and monitored, to avoid damage to structures that were purposefully retained to provide habitat for bears.

Restricting access and conducting awareness programs may help reduce post-harvest removal of elements retained for wildlife. Operators salvaging cedar shakes may need to be specially regulated because workers often use helicopters to access harvested areas that have closed roads.

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[108] Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 19-20, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.
Winter hibernation season means the period between November 1st and May 15th when Black Bear dens may be in use for hibernation. – See: Haida Gwaii Management Council, "Haida Gwaii Land Use Objectives Order (Consolidated Version)" (2017) at 6, online (pdf): <http://www.haidagwaiimanagementcouncil.ca/wp-content/uploads/2019/03/HGLUOO-Consolidated-Order-2017-Final-Signed.pdf>.

[109] Ministerial Order from Ministry of Forests, Lands, and Natural Resource Operations, "Great Bear Rainforest Order" (January 2016) at 20, online: < https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/timber-pricing/coast-timber-pricing/maps-and-graphics/great_bear_rainforest_order_-_jan_21_2016.pdf>.

[110] British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 2, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bmp-bear-den-vi.pdf>.

[111] Exceptions can made at the discretion of a Qualified Environmental Professional.
See Table 1 at: British Columbia Timber Sales, "Best Management Practices for Bear Dens within BCTS Strait of Georgia Operating Areas on Vancouver Island" (2020) at 4, online (pdf): <https://www2.gov.bc.ca/assets/gov/farming-natural-resources-and-industry/forestry/bc-timber-sales/ems-sfm-certification/business-area/strait-of-georgia/tsg_bmp-bear-den-vi.pdf>.

CONCLUSION

It is time to codify protection of bear dens. Good examples of such legislated protection already exist in Haida Gwaii and the Great Bear Rainforest. For some areas on Vancouver Island, BC Timber Sales has already developed *Best Management Practices* guidelines to protect bear dens. However, those largely unenforceable guidelines do not apply at all to vast areas of forest.

The comprehensive, enforceable legislation we propose draws on the experiences of the legislated protection in Haida Gwaii and the Great Bear, on the *Best Management Practices* developed by government, on a review of the relevant literature, and on the expert opinion of bear scientist Helen Davis.

Therefore, we call on the Provincial Government of British Columbia to amend the *Wildlife Act* and implement specific regional regulations, as recommended above.