

Appendix B
Assessment of Mule Deer
Winter Range in Crown Land

Cascadia Natural Resource Consultants Inc.

Pincushion/Ponderosa Area Structure Plan:
**Assessment of Mule Deer Winter Range in Crown Land
Proposal Area A**

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18 July 2007

Executive Summary

Proposed development of a Crown Land parcel in the Pincushion Mt area occur within Mule Deer (*Odocoileus hemionus hemionus*) Winter Range. A golf course is proposed for Area A, which occurs within the PPxh1 Biogeoclimatic Ecosystem Classification variant, and is classed as Low Snow Zone, a Resource Management Zone for Mule Deer Winter Range designated by the Okanagan-Shuswap Land and Resource Management Plan (LRMP). Mule deer winter habitat was assessed for Area A and management recommendations for integration with proposed development were made.

Quality mule deer winter habitat characterizes Area A where forest cover is primarily dominated by older Ponderosa pine, sub-dominated by Douglas-fir, and shrubs characterize the understory. Ponderosa pine-dominated forest cover does not tend to provide cover for wintering mule deer, whereas mature Douglas-fir dominated sites (≥ 140 years) should be targeted to meet or exceed Okanagan-Shuswap LRMP management guidelines specific to the low snow zone of 15% cover retention. Large, mature Douglas-fir trees should dominate travel corridors that connect retention patches of similar forest structure in the golf course.

Earlier objections made in 1990 by Ministry of Environment to any development in the Pincushion Mt area may have been addressed for the most part by the provincially approved Okanagan-Shuswap LRMP. Currently, the LRMP provides mule deer winter range management guidelines at both a site specific and landscape level. Furthermore, original objections may have targeted deer in general, whereas current management concerns are specific to mule deer. Finally, nearby areas were selected by the local LRMP mule deer winter range sub-committee for preservation as Projected Areas; Area A was not included, suggesting less habitat importance in the landscape context. Therefore, an innovative proposal that integrates critical mule deer winter habitat features and maintains their connectivity with surrounding landscape, may be considered more favourable for development by Ministry of Environment.

Table of Contents

| | |
|---|----|
| Executive Summary | 2 |
| 1.0 Introduction..... | 4 |
| 1.1 Background and Rationale..... | 4 |
| 1.2 Project Objectives | 4 |
| 2.0 Mule Deer Habitat Description of Area A..... | 4 |
| 3.0 Methods..... | 5 |
| 4.0 Habitat Assessment..... | 6 |
| 5.0 Management Recommendations | 6 |
| 5.1 Proposed Golf Course Development in Area A..... | 7 |
| 5.2 Address of Ministry of Environment’s Concerns | 8 |
| 6.0 Summary of Management Recommendations | 10 |
| 7.0 References Cited | 10 |

1.0 Introduction

The project goal was to assess potential integration of mule deer winter habitat with proposed development at Pincushion/Ponderosa Crown Land parcel A (see Appendix 1: area map), near Peachland. Management recommendations for retention of critical habitat features within a landscape context should provide an opportunity for a proposal to Ministry of Environment for consideration of Crown Land development.

1.1 Background and Rationale

Appendix 1 shows the Crown Land area map for proposed development near Peachland, BC. An extension to the existing Ponderosa Golf course is proposed for Area A.

Ministry of Environment rejected a previous application for condominium development in the area in 1990. Some of the reasons Ministry of Environment cited in their letter of 25 June 1990 may no longer be applicable. For example, current land use planning for the Okanagan (Okanagan-Shuswap Land and Resource Management Plan), specifically targeted at protection of mule deer winter range in the Peachland and surrounding area, should provide alternative management options. As a result, an integrated proposal may be acceptable if it includes retention of critical habitat areas and follows guidelines for development in the low snow zone as designated within the Okanagan-Shuswap Land and Resource Management Plan (LRMP). Although the LRMP guidelines are not legislatively applicable to Crown Land annexation and successive development outside forest development operations, the LRMP document provides a baseline management guide that may be prudent to follow.

1.2 Project Objectives

1. Assess habitat quality for mule deer winter range; and
2. Develop corresponding integrated management recommendations that
 - a. mitigate specific impacts from proposed land development and
 - b. apply current mule deer winter range management guidelines (LRMP).

2.0 Mule Deer Habitat Description of Area A

Area A, as shown in Appendix 1, is within the Ponderosa Pine Biogeoclimatic zone (PPxh1, or Okanagan Ponderosa Pine very dry, hot variant) (Lloyd et al. 1990). A field reconnaissance of the area suggested the highest elevation area within Area A (upper west half) is more representative of the Interior Douglas-fir Biogeoclimatic zone (IDFxh1, or Interior Douglas-Fir very dry hot variant) (Lloyd et al 1990; <http://www.for.gov.bc.ca/hfd/pubs/docs/Bro/bro47.pdf>). The understory was characterized by shrub patches, including common snowberry (*Symphoricarpus albus*),

Saskatoon (*Amelanchier alnifolia*), and rose (*Rosa* spp); the forest canopy was dominated by Douglas-fir, with Ponderosa pine clearly sub-dominant. Where terrain dropped off in elevation on east and south aspects, forest cover tended to shift to open stands of pure Ponderosa pine with a grassy understory, characteristic of PPxh1 (<http://www.for.gov.bc.ca/hfd/pubs/docs/Bro/bro60.pdf>).

Broken terrain with steep slopes and Douglas-fir dominated forest cover with shrub-grassland mixed understory were typical throughout the site, indicating high quality mule deer winter range. Habitat quality was assessed for capability (physical features, primarily terrain, or the ability of a site to support a specific habitat type) and suitability (biological features of a site, primarily forest cover and understory). High capability was suggested by steep, south aspects slopes among broken terrain, and high suitability was indicated by Douglas-fir dominant, Ponderosa pine sub-dominant forest cover, with well developed shrub understory; as noted, the lower slopes of Area were dominated by Ponderosa pine, where Douglas-fir tended to become sub-dominant in the canopy.

Xeric, or very dry, knobs, and sub-hygic, or moisture-receiving, areas, were common among the diverse terrain. Sites of both moisture extremes appeared to provide mule deer winter range browse species. Terrain diversity also commonly provided escape and security features, providing opportunities for mule deer to bed down, and forest canopies provided snow interception, at least on the upper slopes dominated by Douglas-fir.

Area A is within the LRMP designated Low Snow Zone, a Resource Management Zone for mule deer.

3.0 Methods

Habitat assessment for mule deer winter range quality was completed by

1. reviewing past reports, including detailed field analyses (ie: Simpson and Gyug 1992, Summit Environmental Consultants Ltd. 2006, and others);
2. mapping: overlaying proposal Area A onto Okanagan-Shuswap LRMP mule deer winter range polygons (<http://ilmbwww.gov.bc.ca/lup/lrmp/southern/okan/plan/chap4.pdf>) and Biogeoclimatic Ecosystem Classification units (ie: PPxh1 and IDFxh1 variants);
3. completing a brief field reconnaissance; and
4. reviewing Okanagan-Shuswap LRMP guidelines for mule deer winter range management.

Online LRMP data for mule deer winter range polygon linework regarding snow zones and any Protected Areas was accessed 19 June 2007.

The field reconnaissance comprised of a walk-through 12 July 2007. Some observations were documented with digital photos and recorded GPS locations; GPS navigation was used to ensure reconnaissance within proposed boundaries.

4.0 Habitat Assessment

Observations made of the forest cover and understory during the field reconnaissance strongly suggested the higher elevation sections of proposed Area A were at the very least in transition to IDFxh1, if not actually IDFxh1. The abundance of snowberry, rose, willow (*Salix* spp), and Saskatoon, particularly observed in the west half and north part of Area A, is characteristic of late seral IDFxh1 ecosystems (Lloyd et al. 1990). Douglas-fir was dominant in the forest canopy at these upper elevations, and only where the east slopes dropped off toward Trepanier Creek did Ponderosa pine become the dominant forest cover species. Similar Ponderosa pine forests dominated the southern portion of Area A where slopes dropped off toward Okanagan Lake.

The upper elevations of Area A (much of the west half and north section) appear to have high quality mule deer winter range resulting from both high-moderate capability (broken terrain with steep slopes, xeric knobs) and high suitability (well developed understory shrubs of key browse species, Douglas-fir – dominated forest cover).

South and southeast facing slopes dominated by very open Ponderosa pine forest cover do not provide abundant quality forage for wintering mule deer, since the understory is primarily grass with little suitable browse availability. Security features are limited to terrain since pine forests offer little cover. As well, in lieu of quality browse, Douglas-fir needles will be consumed by wintering deer (Armleder et al. 1986), however this food is unavailable in the pine dominated forest; Douglas-fir is also not available for snow interception in the event of an exceptionally heavy snowfall winter. The key habitat feature available to wintering mule deer in the Ponderosa pine forest cover is the low snow load and snow shedding capabilities of the steep south-aspect slopes that would only be necessary during an exceptionally cold winter with heavy snowfall.

Nevertheless, the PPxh1 and most of the IDFxh1 tend to be classed within the shallow snow zone of the Mule Deer Winter Range Resource Management Zone (RMZ) Map as designated by the Okanagan-Shuswap LRMP (<http://ilmbwww.gov.bc.ca/lup/lrmp/southern/okan/plan/chap4.pdf>). Therefore, the entire part of Area A is within the shallow snow zone, suggesting that following LRMP guidelines specific for management within that RMZ should be acceptable as per government standards.

5.0 Management Recommendations

As such, the LRMP guidelines indicate retention of 15% of the forested area for snow interception in Low Snow Zones. Wherever possible, retention composition should include the largest and oldest Douglas-fir trees (≥ 140 years); smallest trees on site should be selected for removal for development. Specific sites where retention should be

targeted include the driest and wettest. Xeric knobs should be incorporated into patches, and riparian areas, including ephemeral sites (those without surface water year round), should be retained with sufficient buffer that will maintain windfirm trees in the retained patch.

Sites characterized either by pure or leading Douglas-fir should be prioritized for retention for cover for wintering mule deer. As well, animal travel corridors should be included in development plans, and pure or leading Douglas-fir stands should be connected as well as prioritized for retention as corridors.

In particular, sites with some terrain diversity that currently support patches of shrubs and have some veteran Douglas-fir component should be retained as 'green space'. Corridors that connect these sites will contribute to mule deer winter habitat needs.

To ensure critical winter habitat features are retained, it may be advisable to retain >15% original Douglas-fir cover, where available. Permanent structures will have a persisting impact through winter in Area A, although few, if any of these should be relevant in a golf course development.

Furthermore, including input from a qualified mule deer winter range biologist at the initial planning stage of development should ensure critical mule deer winter habitat features are incorporated. Key forage, security, and cover areas, including travel corridors and their connectivity should be integrated with the plans by initially quantifying availability of suitable habitat areas within the low snow zone sites. Quantifying available habitat within the entire proposed development parcels will permit prioritizing highest quality habitat patches and connecting them to meet retention requirements.

The surrounding Peachland area landscape in which proposed Area A occurs appears to have similar terrain and forest cover characteristics along the elevational gradient; current development appears to be closer to the lakeshore. Furthermore, mule deer winter range management guidelines delineated in the Okanagan-Shuswap LRMP document have addressed habitat conservation and protection in the Peachland and surrounding area. It would appear that current land use management practices, with some habitat-integrated development, should contribute to sustainability of mule deer populations.

5.1 Proposed Golf Course Development in Area A

Retention in Area A should target dry and moist sites, so that golf greens occupy mesic, or moderate soil moisture sites typical for this ecosystem type; mesic sites typically have a grass-dominated understory, with few or no shrubs, and even terrain, characterized by low, gentle or no slopes.

Mature-old Douglas-fir trees (≥ 140 years) should be retained in patches between golf greens and within corridor-oriented patches to create some connectivity between retention areas. Deer will likely use these sites primarily in winter, so potential conflict between golfers and wildlife should be mitigated; some deer presence during cooler temperatures in the golfing season may enhance tourism, as seen elsewhere (Sun Rivers, Kamloops: Kamloops Indian Band pers. comm.).

Retention of broken dry terrain, xeric knobs, draws, and riparian (including ephemeral) sites with golf greens as openings between may actually provide some habitat enhancement; opening some of the retained patches to increase ground sunlight should also stimulate browse development. Terrain will likely become more heavily relied upon by deer for security if forest cover is opened up. Broken terrain, therefore, should be selected for retention areas, particularly sites where browse species are already present and may be enhanced.

Most or all of the 15% retention recommended in the LRMP document should occur as Douglas-fir in the higher elevation sections of Area A; retention should be prioritized where terrain and habitat structure are characteristic of classic mule deer winter range (ie: large, veteran Douglas-fir trees with full canopies, and well developed shrub understories in adjacent openings). Retention of Ponderosa pine trees in pine-dominated forests can be determined by golf course planning objectives, although the largest trees are preferred for wildlife objectives.

No further development should occur within the surrounding landscape, so that remaining mule deer winter range remains contiguous and any habitat enhancement created by opening forest cover is permitted full potential benefit.

5.2 Address of Ministry of Environment's Concerns

Ministry of Environment's first stated concern in their letter dated 25 June 1990, objecting to any development, is that the Pincushion Mt area is one of the highest quality mule deer winter ranges in the Okanagan. However, since the letter was written, the Okanagan-Shuswap Land and Resource Management Plan has been published. In particular, Chapter 4 that addresses resources including Mule Deer Winter Range, does not designate the Crown Land at and surrounding Area A as Protected Areas for wintering deer. Rather, proposed Area A falls within the low snow zone of Resource Management Zones (RMZ) for mule deer; a set of management regulations exists for each RMZ snow zone, and retention of 15% forest cover is recommended for the low snow pack zone. Therefore, Crown Land in and around proposed Area A was not selected by the LRMP committee for protection. The results suggest that after carefully considering the landscape of Crown Land supporting mule deer winter range, resource management experts, including Ministry of Environment biologists, agreed that potentially more important mule deer habitat occurred elsewhere, but did not include Area A.

Furthermore, it would appear from Ministry of Environment's report commissioned in 1992 (Simpson and Gyug 1992) for the Pincushion Mt area, that White-tailed deer (*Odocoileus virginianus*) habitat may have contributed to their assertion of the importance of the area (Area A and surrounding areas) for wintering deer. In their letter, Ministry of Environment does not specify mule deer, and their 1992 report assesses habitat quality for both deer species. Currently, White-tailed deer appear to be moving into historic mule deer winter range (pers. obs.), potentially at the expense of mule deer. As such, management for White-tailed deer for Area A should not be considered a priority; only mule deer habitat characteristics should be retained. Furthermore, the potential threat of White-tailed deer excluding mule deer should contribute to Ministry of Environment reconsidering their assessment of Area A.

In their June 1990 letter, Ministry of Environment also cite land use, including private land ownership, as a reason for objecting to development in the Pincushion Mt area. Such land use planning issues for resource management were among the main reasons the provincial government created a land use and resource management planning initiative and applied it to all regions throughout the province. The Okanagan-Shuswap Land and Resource Management Plan process was one of the successfully completed LRMPs in the province; the process included local stakeholders and relevant government agencies, Ministry of Environment among them. Therefore, the Ministry of Environment's concerns regarding land use are also addressed, to a large extent, by the mule deer winter range management guidelines outlined in the LRMP that regulate development on Crown Lands in designated habitat zones.

Ministry of Environment's concerns in 1990 regarding long-term impacts of the Coquihalla Connector on wintering populations can also be addressed in 2007. In particular, since the wildfires of 2003, browse development has been stimulated within several landscapes throughout the Okanagan-Thompson Region. It would appear that mule deer numbers are increasing in response to forage production (pers. obs.; Ministry of Environment pers. comm.).

Finally, current social concerns focused on global warming suggest higher elevations may become more commonly utilized by wildlife in general during winter, and may in fact become more important for wintering mule deer. Since Douglas-fir (IDF) forests have higher shrub components that provide important winter browse, higher elevation forests within the IDFxh1 and dk1 may become increasingly important if snowloads continue to be lower than they were historically, or even continue to decline. Consequently, snow interception in low snow zones, as identified by the Okanagan-Shuswap LRMP may decrease in importance. For example, lower elevation forests in the past decade have and may continue to exhibit lower snow loads than historic trends, alleviating the need to retain as much snow interception capabilities; alternatively, management practices that encourage shrub develop as quality forage for wintering mule deer may become increasingly important.

Ministry of Environment may be favourable to an innovative development proposal that not only incorporates mule deer winter habitat features, but proposes to include a qualified biologist at the project planning and layout stages. Government biologists may feel greater assurance that critical mule deer winter habitat features will be retained, particularly within a relevant landscape context that is more likely to be utilized by and provide a benefit to wintering deer. Finally, including Ministry of Environment biologists at the planning stage to review proposed snow interception and connectivity retention strategies may also facilitate development approval.

6.0 Summary of Management Recommendations

Current mule deer winter range management guidelines are provided in the Okanagan-Shuswap LRMP, including Protected Areas and designated snow zones with specific management regulations. As such, LRMP management guidelines address most of the land use and quality habitat supply concerns originally identified by Ministry of Environment as reasons to object to development in the Pincushion Mt area. Proposed Area A was not designated as a Protected Area under the LRMP, suggesting other habitat areas may have been more important as mule deer winter range. Area A is identified within a Low Snow Zone, and management within that Resource Management Zone (RMZ) requires 15% original forest cover retention for timber harvest.

Although proposed Area A has high quality mule deer winter habitat features, these can be incorporated into development plans through retention strategies. Mature Douglas-fir - dominated forest cover in dry and moist (riparian, draw) soil extremes, including broken terrain, should be targeted for retention. Browse species (willow, rose, and Saskatoon, etc) and large veteran Douglas-fir trees with healthy canopies are critical features that should be included in retention patches and connecting corridors.

In Area A, such retention patches should be located between and around golf greens and be connected, thereby permitting travel corridors with snow interception and security cover; patches should provide forage and bedding opportunities. All patches that retain the healthiest, largest, mature-old Douglas-fir trees with well developed shrub understories should be connected by mature-old Douglas-fir dominated travel corridors.

7.0 References Cited

- Armleder, H.M., R.J Dawson and R.N.Thomson. 1986. Handbook for Timber and Mule Deer Management Co-ordination on Winter Ranges in the Cariboo Forest Region, Land Management handbook Number 13. BC Ministry of Forests, Victoria BC.
- Lloyd, D., K. Angove, G. Hope and C. Thompson, 1990. A Guide to site identification and interpretation for the Kamloops Forest Region, Land Management Handbook No. 23, Research Branch, British Columbia Ministry of Forests, Victoria, B.C., 399 pp.

Ministry of Environment letter dated 25 June 1990 from W.A. Kastelen to Ministry of Crown Lands, Attention to David Whiting, Land Officer; Re: Potential of Phased Condominium Development – Pincushion Mt.

Okanagan-Shuswap Land and Resource Management Plan, Process Support Team. 2001. <http://ilmbwww.gov.bc.ca/lup/lrmp/southern/okan/plan/index.html>.

Summit Environmental Consultants Ltd. letter dated 7 November 2006 from Corinna Hoodicoff, MSc, RPBio, to New Town Planning Services, Attention Mr. Keith Funk; Re: Pincusion/Ponderosa Area Structure Plan – Environmental Assessment Revised Interim Report.

Simpson, K. and L. Gyug. 1992. Deer capability and land use in Peachland. Keystone Bio-Research. Prepared for Ministry of Environment, Lands and Parks, Penticton, BC.

Ponderosa/Pincushion Area Structure Plan: Detailed Considerations for Proposed Actions/Policies to Mitigate Potential Losses to Mule Deer Winter Range

11 January 2008

**Prepared by: Astrid M. van Woudenberg, MSc, RPBio
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1a. Retention of most valuable shrubs and forest cover

- retain largest Douglas-fir and Ponderosa pine trees in terms of diameter and height; this selective retention strategy will be the main determinant to locate retention patches as intervening spaces between fairways/throughout golf course; include any snags and/or trees with cavities to address Species at Risk.

- secondary criteria for locating patch retention areas would be shrub cover; younger plants of preferred species types that are accessible to mule deer as forage (ie: suitable forage below 1.5m enabling deer to reach) should be selected; preferred species should include willow, rose, Douglas maple, ceanothus, saskatoon, Oregon grape

- ideal areas for retention, therefore, include both tree and shrub components as described

1b. Enhance food availability through planting

- where only preferred tree structure is available and/or associated shrub development is poor (ie: little or no shrubs or shrubs are mature/old plants with little quality forage at appropriate heights for deer access)

- plantings should include only local varieties of preferred shrub species described above; in particular, where possible, plantings should be made from grafts from old, mature plants on site, as described; absolutely no non-indigenous varieties of species should be introduced to the site.

- aggressive management of plantings should at least mitigate if not eliminate risk of non-native plant establishment (ie: noxious weeds, invasive plants);

- any non-native species detected after plantings should be physically extracted, including entire root systems, bagged and removed appropriately from site; absolutely no pesticides should be applied.

1c. Provide intervening spaces throughout the golf course

- size of retained patches should be maximized as much as possible to permit security and forage opportunities together and in suitably sized areas that would permit bedding and oblique cover for both bedding and browsing activities

- retained areas should also include any sites with terrain breaks that might provide bedding opportunities, including benches, ridges, or xeric knobs; cover in the form of trees and/or shrubs should be retained surrounding these features, thereby permitting natural features to determine size of intervening/retention areas.

- fewer larger patches are preferable to several small patches, although a mix is may be suitable and appropriate; optimal number and sizes should be determined based on terrain features and available habitat present (mapped inventory).

2. Restrict fencing or other movement-restricting structures or practices to permit deer mobility and access to the site

- if required, maintain any fencing only at the golf course-housing interface and absolutely no fencing anywhere near the golf course-forest interface

- create paths and any access adjacent to the golf course-housing interface and/or lower

slope/elevation of the golf course as much as possible and avoid any structures other than fairways near the forest interface;

- all areas planned as habitat retention/intervening spaces should be upslope of any structures and access routes as much as possible, and completely upslope of any fencing/barrier structures;

- similarly, locate any buildings or structures near the housing interface and/or lowest slopes of the golf course, where lake views are still plentiful; do not plan for establishments that would be busy throughout the winter months in terms of attracting people/creating disturbance (ie: year round restaurants and/or pubs; avoid winter attractions) as much as possible; if unavoidable, locate structures as far from retention habitat areas and as far downslope as possible; this will also mitigate disturbance to Species at Risk, including during breeding periods.

- consider and potentially consult Sun Rivers Golf Course in Kamloops and glean from lessons learned

3. "No-dogs" signs to discourage residents from encroaching on deer after course hours and during off-season

- also include signage regarding threats from and risk of introduction of non-native plants and invasive weed species

- Potential opportunity: create an ecosystem-friendly recreation and living environment and promote safe-ecological practices

4. Planting and remedial measures on other Crown Lands to result in a net-gain to overall Crown land habitat (ie: rehabilitate an area that has recently been grazed or overcome with noxious weeds)

- consult MoE for direction on specific parcels

- consider land acquisition opportunities for rehabilitation (ie: Nature Conservancy, and other examples)

- conduct a problem analysis, if need be, to identify candidate parcels based on past and current land use practices

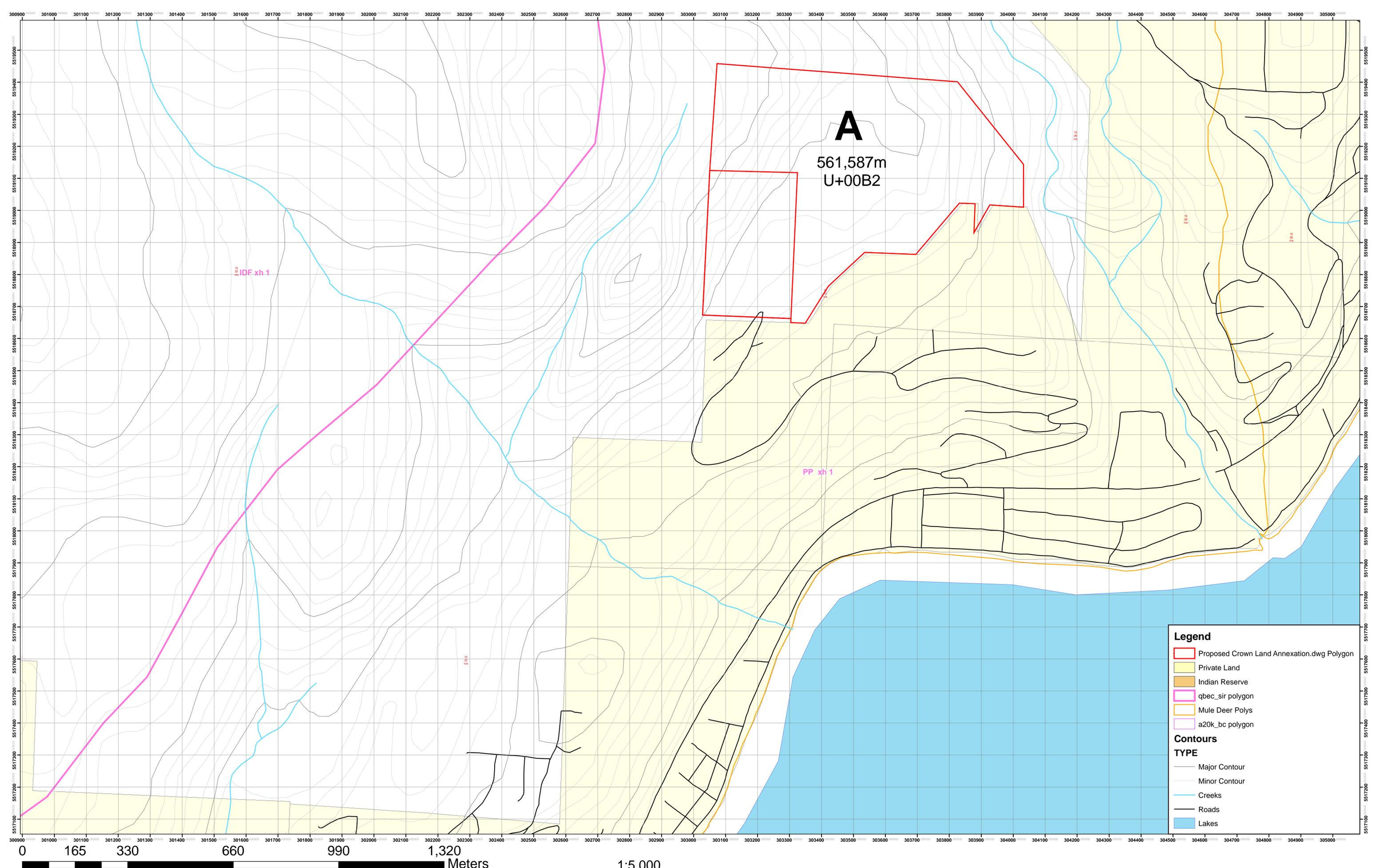
- contribute to and build on the 'ecosystem-friendly recreation and living environment' concept (as mentioned above) as a program of local initiative

5. Measures to protect Ponderosa pine in the area from Mountain Pine Beetle

- Apply verbenone patches aggressively and learn from Kamloops' successes/errors (City of Kamloops program largely failed, private residents' efforts have been somewhat successful)

6. Planting Douglas-fir for forest enhancement

- monitor Douglas-fir Beetle situation to prevent attack/mitigate any loss of existing trees; Douglas-fir plantings would safeguard against potential future losses.



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Legend

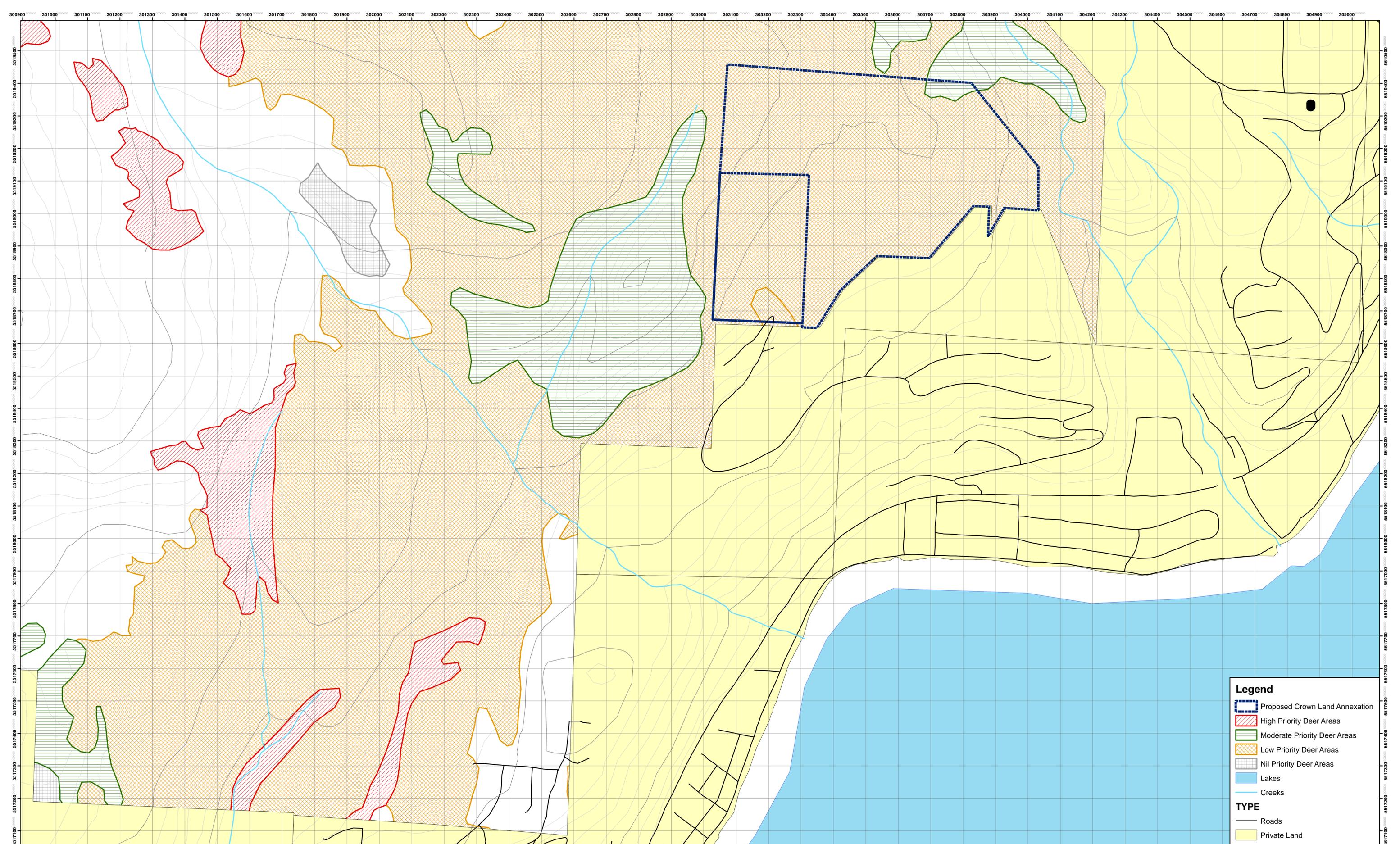
- ▭ Proposed Crown Land Annexation.dwg Polygon
- ▭ Private Land
- ▭ Indian Reserve
- ▭ qbec_sir polygon
- ▭ Mule Deer Polys
- ▭ a20k_bc polygon

Contours

TYPE

- Major Contour
- Minor Contour
- Creeks
- Roads
- ▭ Lakes





Legend

- Proposed Crown Land Annexation
- High Priority Deer Areas
- Moderate Priority Deer Areas
- Low Priority Deer Areas
- Nil Priority Deer Areas
- Lakes
- Creeks
- Roads
- Private Land

TYPE

- Roads
- Private Land

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Crown Land Mule Deer Winter Range Habitat Suitability:
 Forest Cover Only (Suitability classification in progress).

Drawn by: *Cascadia Natural Resource Consultants Inc.*