

**Sunshine Coast
Community Forest
Roosevelt Elk
Habitat
Assessment**

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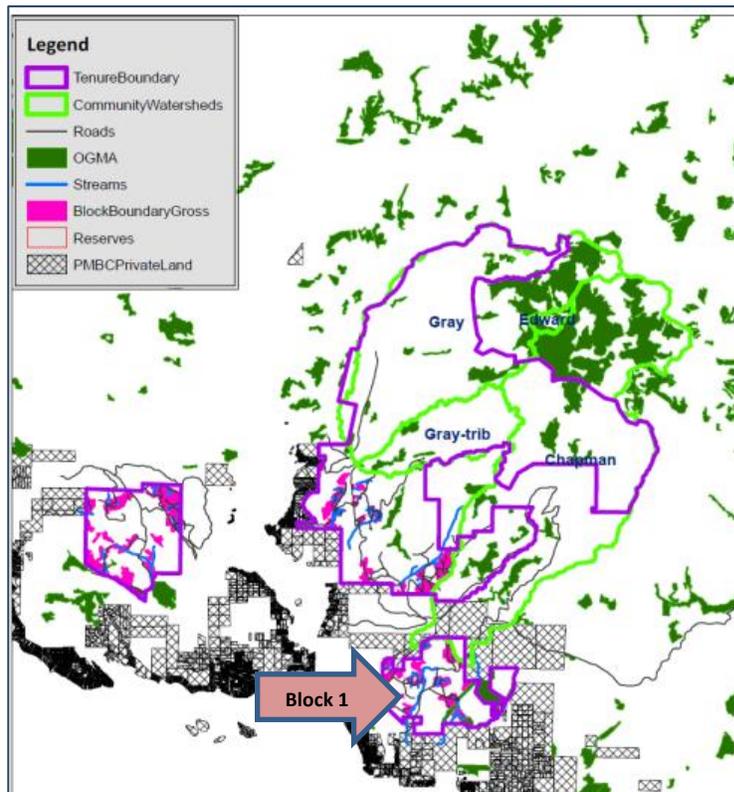
Sunshine Coast Community Forest Roosevelt Elk Habitat Assessment

1.0 Introduction

The Sunshine Coast is home to a large population of Roosevelt Elk that were relocated from various locations on Vancouver Island in 1987 and again in 1993 (LMRERP 2011). The success of establishment of the herd and the growth of the population has provided many animals for other relocations along the mainland coast. The herds on the Sunshine Coast have thrived on the lower to mid-elevation south and west aspect sites that have ample year-round forage and relatively snow free winters. There is an abundance of suitable closed canopy forests that provide both summer and winter thermal cover.

Upon request of the Sunshine Coast Community Forest (SCCF) in late November 2017, Sally Leigh-Spencer (R.P. Bio.) of Ecologic Consulting conducted a field assessment to look at the suitability and connectivity of Roosevelt Elk seasonal habitats within the SCCF tenure (Block 1) of the Wilson Creek Watershed (Figure 1).

Figure 1: Sunshine Coast Community Forest tenure boundary



3.0 Background

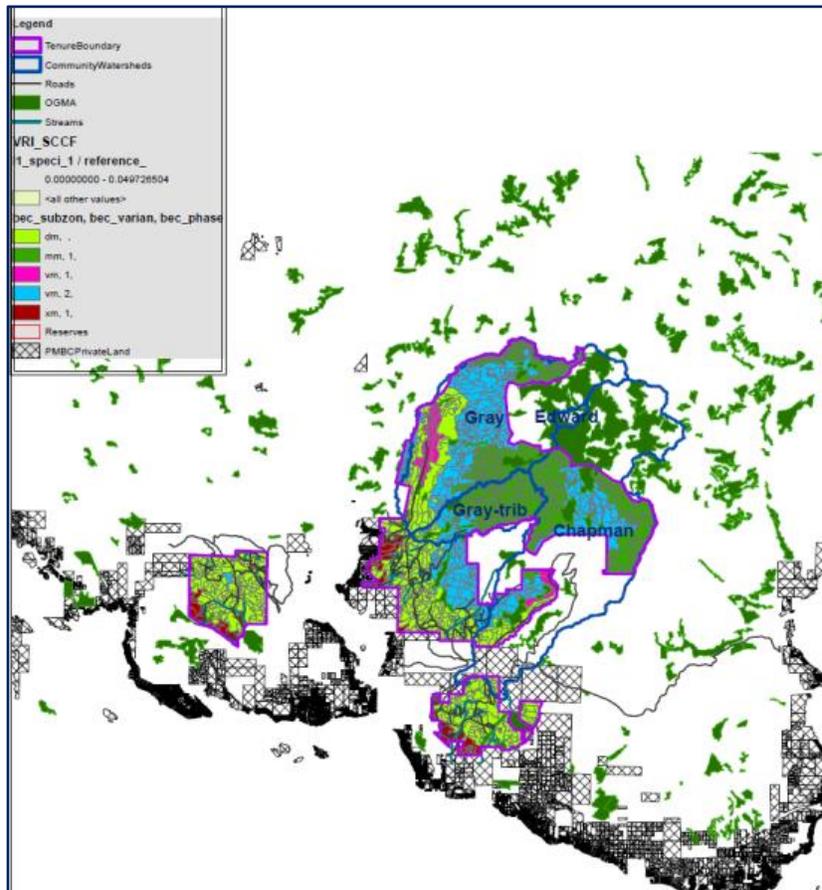
3.1 Sunshine Coast Community Forest

The Wilson Creek Watershed is comprised of Wilson Creek, East Wilson Creek and Husdon Creek and is approximately 2,207 ha in size (Horel 2012). The Wilson Creek portion of the SCCF (Block 1) is situated within the lower to mid-portion of the overall watershed and is comprised of 822.7 ha (Figure 2).

There are 5 Biogeoclimatic (BEC) Variants represented within the Sunshine Coast Community Forest (Figure 3):

- CWHxm1 (Coastal Western Hemlock Eastern Very Dry Maritime)
- CWHdm (Coastal Western Hemlock Dry Maritime)
- CWHvm1 (Coastal Western Hemlock Submontane Very Wet Maritime)
- CWHvm2 (Coastal Western Hemlock Montane Very Wet Maritime)
- MHmm1 (Mountain Hemlock Windward Moist Maritime)

Figure 3: Biogeoclimatic Variants represented within the Sunshine Coast Community Forest



Within the Wilson Creek watershed, Block 1 of the SCCF, two BEC Variants are represented, the CWHxm1 and the CWHdm.

The CWHxm1 occurs at low elevations from sea level to 700m and has dry, hot summers and moist, mild winters with relatively little snowfall. Growing seasons are long with a water deficit. The zonal forests are characterized by Douglas fir (Fd) dominating sites with lesser amounts of western hemlock (Hw) and minor cover of western redcedar (Cw). The understory is dominated with salal, dull Oregon-grape, red huckleberry and the mosses *Hylocomium splendens* and *Kindbergia oregana*. Depending on the richness and soil moisture of the site other species include vanilla-leaf, sword fern, twinflower and bracken fern (Green and Klinka 1994).

The CWHxm1 is considered to fall within the shallow snowpack zone or rain zone (below 300m) with usually shallow snowpack averaging <30cm. Critical snowpacks occur less than once in every 15 years (Table 1). Above 300m in elevation the zone changes to the rain-on-snow zone; however on warm aspect sites the elevation of the rain zone will increase significantly. Some younger stands can provide winter thermal cover given appropriate height, cover and canopy (Nyberg and Janz 1990). During average years snow depths do not restrict access to food so winter, spring and summer ranges often overlap. Snow interception and thermal cover is required during years where there are critical snow depths (Nyberg and Janz 1990).

The CWHdm has warm, relatively dry summers and moist, mild winters with little snowfall. Zonal forests are dominated by Fd, Hw and Cw with salal and red huckleberry dominating the understory with minor amounts of dull Oregon-grape, vine maple, bracken fern and sword fern (Green and Klinka 1994).

The CWHdm falls within the shallow to moderate snowpack zone (rain-on-snow transition zone). The lower elevations the snowpack does not exceed 30 cm and is considered ephemeral while the higher elevations the snowpack can persist longer. On warmer aspect slopes such as the slopes of Wilson Creek, the snowpack will be less significant and will melt more frequently. Some young stands can provide cover given appropriate height, cover and canopy closure. During average years snow does not restrict access to food so winter, spring and summer ranges often overlap (Nyberg and Janz 1990).

The snowpack zones (rain/snow zones (Horel 2014)) and associated elevations represented by the BEC Zones within the SCCF are listed in Table 1.

Table 1: Snowpack zones (Rain/Snow Zones) and associated elevations represented by the BEC Zones within the SCCF

BEC Variant	Elevation Range	Snowpack Zone	Rain/Snow Zones (Horel 2014)
CWHxm1	sealevel to 300 m	Shallow	Rainfall Zone
	300 - 900 m	Shallow	Rain and Rain-on-snow (transient) Zones
CWHdm	sealevel to 650m or above the CWHxm	Shallow to Moderate	Rain and Rain-on-snow (transient) Zones
CWHvm1	sealevel to 650m or above the CWHdm	Shallow to Moderate	Rain and Rain-on-snow (transient) Zones
CWHvm2	650m to 1000m or above the CWHvm1	Moderate to Deep	Snow Zone
MHm1	800m to 1350m	Very Deep	Snow Zone

3.2 Roosevelt Elk Status

Roosevelt Elk (*Cervus elaphus roosevelti*) are native to Vancouver Island, the south coast of British Columbia, including the Sunshine Coast and coastal areas of Washington, Oregon and northern California. The range of Roosevelt Elk has been reduced and fragmented in coastal areas and hence is blue-listed (species of special concern) by the Conservation Data Centre (BC.CDC 2017). Although there are local declines, the population is currently stable to increasing overall. The provincial ranking as of March 2017 is S3/S4 (3 = special concern, vulnerable to extirpation or extinction, 4 = apparently secure). The greatest rate of increase has occurred on the mainland coast around the site of re-introduction (Sunshine Coast) where there is an approximate increase of range and population of 20% per year ((D. Reynolds, pers. comm., 2010) from BC CDC 2017)). Both the Vancouver Island and the Sechelt populations have continued to expand in recent decades (D. Reynolds, pers. comm. 2017).

The planning process for ungulates was established by the Minister of Water Land and Air Protection in 2004. An Order under the Government Action Regulation (GAR) declared which ungulate species would be included under the category of Ungulate Winter Range (UWR) for the entire province.

In the Sunshine Coast Forest District, only Mountain Goat (one out of three of the ungulate species) were declared as urgent. Roosevelt Elk and Black-tailed Deer were considered non-urgent thereby not part of the UWR regulated planning process. Therefore, there are no designated UWRs for deer and elk.

3.3 Roosevelt Elk Habitat

Roosevelt Elk habitat requirements are driven by their need for abundant, high quality forage. As a result, they are typically found in any habitat dominated by dense shrub cover, including open coniferous or deciduous forest stands, wetlands, riparian areas, vegetated slides in the summer

and around the edges of rock outcrops with warm aspects in the winter and spring (Nyberg and Janz 1990).

Winter is the most critical season for Roosevelt elk. Winter ranges for elk on Vancouver Island and the Sunshine Coast are generally found in low elevation river valleys and the lower part of watersheds. Warm aspects, specifically south and southwest south facing slopes provide suitable thermal attributes where forested stands are interspersed with rock outcrops and open hill slopes. During mild winters or in the shallow snowpack zone (rain zone), elk forage extensively in openings (natural openings and recent clear-cuts) and open forests, especially those on rich, moist sites. When snow conditions preclude feeding in more open areas (snow depth >30 cm or snow crusted), elk will shift to densely canopied mature or old-growth forests on floodplains or moderately steep southerly slopes where snowpacks are lower (Brunt 1990). Second growth stands can satisfy winter range requirements in the shallow to moderate snowpack zone (rain and rain-on-snow zone) while older forests with suitable snow interception are required to satisfy critical winter habitat requirements in the moderate to deep snowpack zones depending on the aspect and hillside shading (Nyberg and Janz 1990).

Both migratory and non-migratory (resident) elk occur on Vancouver Island and the Sunshine Coast. Migratory elk occupy distinct seasonal ranges during the winter, summer/fall and, sometimes, spring seasons. Migratory elk benefit from shallower snow depths on low-elevation winter ranges and abundant, diverse forage on higher elevation summer/fall ranges. There are two different movement patterns associated with migratory elk. There are those herds that are obligate migrators that move annually to their traditional winter ranges and those herds that are facultative, moving only when snow depths cause the animals to move to lower elevations with less snow.

Migratory elk populations generally move into high elevation sub-alpine and alpine areas in summer. The location of spring ranges is variable; they are often located between winter and summer ranges. Important sites include riparian areas, warm aspect vegetated slides and rock outcrops that are snow-free early in the season and provide an abundance of forage. There are some non-migratory elk populations that must meet all their life history requirements within relatively small, low-elevation ranges that may or may not be captured by existing UWRs, riparian zones and OGMAs.

Seasonal ranges of migratory elk are usually within the watershed of a single river, but can be separated by as much as 40 km. Individual seasonal ranges may be up to 30 km² in size. Non-migratory or resident elk also occur in favourable low-elevation habitats on Vancouver Island and the Sunshine Coast. Resident elk occupy single annual home ranges of about 5-10 km² at lower elevations that sometimes overlap the winter ranges of migratory elk herds (Brunt 1990).

Roosevelt elk require snow interception cover in winter when snow depths exceed 30 cm (BC Ministry of Water, Land and Air Protection 2004). Older stands are preferred as they provide

suitable snow interception characteristics and access to forage. In other seasons elk are usually associated with cover for predator-avoidance reasons and thermal cover, often bedding down just inside a forested edge (Shackleton 1999).

Important landscape level considerations affecting the relative value of an area as elk winter range include the following (Brunt 1990):

- position in the watershed (low, mod, or high snowfall area – Elk Winter Range (EWR) more critical in areas of higher snowfall);
- distance to other winter ranges (greater distances between winter ranges increases their individual importance);
- adjacency to high quality spring and summer range;
- the capability of adjacent areas to satisfy elk habitat requirements; and factors affecting local climatic conditions such as exposure to dominant winds or marine influences,
- warm aspect sites (south and southwest) provide thermal radiation during colder winter periods.

Roosevelt Elk range in herds and can occupy habitat features for days at a time (Nyberg and Janz 1990). As a result, they are susceptible to harassment by human-related activities that can displace them from otherwise suitable habitat.

3.4 Roosevelt Elk Translocations

- 24 Roosevelt Elk were relocated from Vancouver Island to the Sunshine Coast from 1987 to 1993.
- The need to control nuisance animals and the goal to continue re-establishing elk populations in other areas resulted in the development of the Lower Mainland Roosevelt Elk Recovery Project (LMRERP) in 2000.
- From 2001 to 2015, 405 Roosevelt Elk have been translocated from the original Sechelt herd.
- As of 2015, the population is estimated to be 200 and considered stable. The carrying capacity is estimated at 333 animals with a target population of 200. The Sechelt herd is considered a source population for translocations (MFLNRO 2015).

4.0 Discussion

- Roosevelt Elk within the SCCF are either resident herds and/or facultative migrators that move to lower elevations when snow depths exceed around 30cm. Therefore, mid to older second growth forests provide suitable thermal and snow interception cover.
- The openings created by the spaced stands provide suitable forage opportunities of conifers, woody shrubs and ferns. The pruned/spaced stands provide ease of movement for elk.
- The open fields within the lower elevations of the Wilson Creek watershed provide suitable year-round grazing and adjacent protective/thermal cover.
- There is an abundance of suitable year-round forage and both summer and winter thermal cover for elk herds within the Wilson Creek watershed.
- The older forests of 130+ years comprised of Douglas fir, western hemlock and western redcedar within the reserves, riparian zones and OGMA provide connectivity, forage, thermal and snow interception cover to the east side of Wilson Creek (Figures 2, 4 and 7).
- Many of the 40 to 60 year old stands, especially those that have been spaced provide suitable winter forage. Sword fern and *Vaccinium* ssp. were abundant in the different age stands assessed. Important elk forage species are listed in Appendix1 (Nyberg and Janz 1990).
- The lower Wilson Creek watershed at 154m receives 5% of precipitation falling as snow water equivalent and at 550m receives 11% (Horel 2012). The elevation below 500m would be considered the shallow snowpack zone and therefore younger to moderate age stands provide suitable winter cover and forage.
- The Sunshine Coast Roosevelt Elk herd is considered stable and has reached the target population goal (FLNRO 2015). The herd is one of the primary source of animals for translocations on the coast. The lack of designated UWRs on the Sunshine Coast has not impacted the continual population growth of the herds.
- Block EW28 in East Wilson is slated for harvest in 2018. The block is 25ha of which 8ha are in reserve (Figure 4). It is comprised of age class 7 (121 to 140 years) forest of Douglas fir, western hemlock and western redcedar with sword fern dominating the understory along with red huckleberry and salal (Figure 2, Figure 5). The block has a southwest (warm) aspect and ranges between 210m and 290m in elevation and is within the CWHdm BEC variant. The block is considered to be within the shallow snowpack zone (rain zone) (Table 1).

- Block EW16 is an age class 4 (61 to 80 years) stand of primarily Douglas fir and western hemlock. The canopy cover is approximately 80% and there are no shrubs or herbaceous growth in the understory. The site could provide thermal cover however there are no forage opportunities (Figure 6).

Figure 4: Lower Wilson Creek portion of SCCF showing block reserves and OGMAs

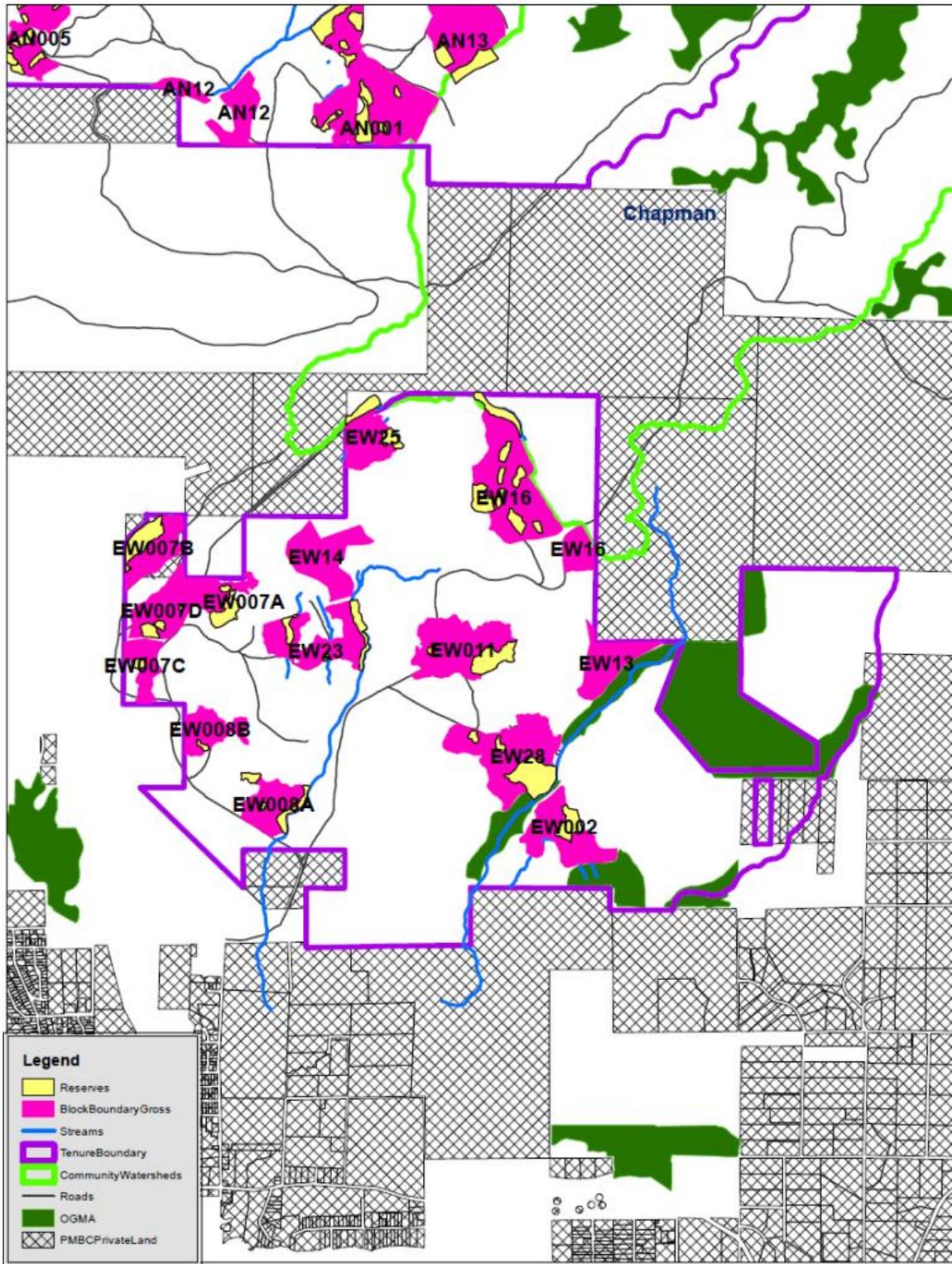


Figure 5: Block EW28



Figure 6: Block EW16



Figure 7: The older forests comprised of Douglas fir, western hemlock and western redcedar within the reserves, riparian zones and OGMA provide connectivity, forage, thermal and snow interception cover.



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APPENDIX 1: Important forage plants for Roosevelt Elk (Nyberg and Janz 1990)

Table 6. Important forage plants for Roosevelt elk on Vancouver Island.^a The most important or preferred species are printed in bold type.

	Winter	Spring	Summer
TREES	amabilis fir Douglas-fir western hemlock western redcedar	amabilis fir Douglas-fir western hemlock	amabilis fir western hemlock western redcedar
SHRUBS	devil's club dull Oregon-grape Pacific ninebark red elderberry <i>Rubus</i> spp. (salmonberry, blackberry, thimbleberry, raspberry, bramble) salal twinlineflower Vaccinium spp. (blueberry, huckleberry, cranberry) willow spp.	devil's club hardhack Pacific ninebark salmonberry	bunchberry devil's club dull Oregon-grape Pacific ninebark red elderberry salmonberry twinlineflower
FERNS	deer fern lady fern sword fern	deer fern sword fern	deer fern lady fern sword fern
HERBS	grass spp. sedge spp. skunk cabbage	bunchberry grass spp. sedge spp. skunk cabbage	grass spp. sedge spp. skunk cabbage wall lettuce

^a References: Janz 1983; Brunt *et al.* 1989.