

## MT. ELPHINSTONE SOUTH WATERSHED ASSESSMENT: PHASE 1 & 2 INFORMATION BULLETIN

### WATERSHED ASSESSMENT BACKGROUND

- The Mt. Elphinstone area is located adjacent to the communities of Gibsons and Sechelt on the Sunshine Coast of B.C. and is currently managed between the Sunshine Coast Community Forest, Private Managed Forest Land, Mount Elphinstone Provincial Park and BC Timber Sales (BCTS) Operating Area.
- BCTS operations in this area assist in market value determinations for timber in the province and supports local businesses through the auction of timber sales licenses.
- Values such as recreation, visual landscapes, cultural heritage, soils, timber supply, wildlife, water, fish and biodiversity are managed in accordance with legislation and in conjunction with local community organizations.
- In recognition of population growth in adjacent communities and associated water management concerns, BCTS voluntarily commissioned a water study of the relevant operating area to ensure sustainable forest management.

### MT ELPHINSTONE WATERSHED ASSESSMENT: PHASE 1 & 2

- The contract for this water assessment was opened to all qualified water resource specialists through unbiased provincial procurement processes. Polar Geoscience Ltd. (Squamish, B.C.) was awarded the contract.
- The methodology and report for the *Mt. Elphinstone Watershed Assessment: Phase 1 & 2* was planned and developed by Lars Uunila, Professional Geologist, Professional Hydrologist, and an erosion and sediment control professional registered with several professional associations across Canada and the US.
- The draft report underwent peer review by Ministry of Forests Coast Area Research Hydrologist, Dr. William Floyd. Recommendations from this review were incorporated into the final report.
- The scope of the report established the baseline watershed condition, completed a partial risk assessment, and established methodology for site-level development based on an extensive scientific literature review, LiDAR and imagery data, field assessments, and consultation with property owners.
- Provincial climate change models were integrated into the methodology of the report to address potential future water changes.
- Review of the draft report was requested from First Nations, municipal government, local community organizations and the public. Results of this review were incorporated into the final report.
- BCTS has committed to adopting all recommendations listed in the report for planned developments within the study area.

## RECOMMENDED CHANGES TO BCTS OPERATIONS RESULTING FROM ASSESSMENT

- More restrictive Equivalent Clearcut Area (ECA) limitations. The more restrictive approach extends beyond previous recommendations to avoid an increase to peak flows in recognition of climate change. The ECA is to remain below 20% for the portion of the watershed within BCTS' operating area. This does **not** mean 20% harvest of the watershed. Please see the *Equivalent Clearcut Area (ECA) and Peak Flow* section below for definition of the ECA and what this recommendation means for harvest levels.
- Clearcut alternatives to be utilized in the study area. Alternatives to clearcuts include small openings (<8 hectares), strip cuts or partial harvesting.
- Development upslope of streams that are steeply entrenched should be tailored to decrease downstream sediment in consideration of values such as wells.
- Minimize heights of road cuts and/or use alternative road construction methods with limited disturbance to natural drainage.
- Restore natural drainage patterns by deactivation of unnecessary roads.
- Increased management zones for high mature conifer retention around small, classified streams to minimize changes to riparian water demands resulting from water evaporation. Trees with an increased risk of being uprooted from strong winds should be removed or treated for enhanced wind tolerance to improve bank stability.
- Reforest with a species ratio similar to preharvest stands to maintain similar water evaporation rates over time.
- Terrain stability assessments to guide development where slope grades exceed 50%.
- Work involving soil disturbance within 50 metres of a stream channel must be monitored by a qualified professional experienced in erosion and sediment control.
- Sourcing of material for road work must come from areas where geology is primarily intrusive rock due to its structural stability.
- Risk ratings and mitigation options are to be included across stages of new access projects from construction to deactivation.

## AREAS OF INTEREST IN REPORT METHODOLOGY

### EQUIVALENT CLEARCUT AREA (ECA) AND PEAK FLOW

*References: Mt Elphinstone Watershed Assessment: Phase 1 & 2 report (Sections 3.1.1, 6.1.1, Table 6.2, Conclusions 7, 8, 9, 10, Appendix B, Appendix E); Mt Elphinstone South Watershed presentation (Slides 27, 28, 29, 30 and 31)*

- **Peak flows** are increases in flow levels and are related to the level of natural or human disturbance in a catchment. Peak flows are correlated to the Equivalent Clearcut Area (ECA) in a watershed.
- **Equivalent Clearcut Area (ECA)** is a commonly used metric defining the hydrologic recovery of a forested area following disturbance (e.g., harvesting, insect infestation and/or wildfire).

- **Hydrologic recovery** describes how a regenerating forest compares to a mature/old growth forest in terms of its ability to intercept rain and influence snow accumulation and melt. As the stand reaches maturity, the hydrologic recovery approaches 100%. Another way to look at it would be Hydrologic recovery (%) = 100 – ECA (%).
- **ECA is calculated by** converting the percent of hydrologic recovery into an equivalent area. For example, a 10 hectare regenerating stand that has recovered 30% of its hydrologic function would equal an ECA of 7 hectares [7 hectares = 10 hectares x (100% - 30%)].
  - ECAs for the Mt. Elphinstone area were calculated using stand heights derived from high resolution LiDAR data and comparing them to a stand-level hydrologic recovery curve generated from research conducted on Vancouver Island and Gray Creek near Sechelt.
- Research shows that effects on peak flows are detectable when ECA exceeds 20% of the catchment area (i.e., the percentage of a catchment that behaves hydrologically similar to a clearcut). As such, Polar Geoscience has recommended that ECA should not exceed 20% within the BCTS chart area in any given watershed.
- **Example of ECA effect on harvest levels:** The Slater Creek watershed has a total area of 142.4 hectares, 54.1 hectares of which is within BCTS chart area. To remain below 20% ECA, only 3.7 hectares (2.6% of the total watershed area, or 6.8% of BCTS chart area within the watershed) is available for harvest. The Slater Creek watershed within the BCTS chart area recovers at approximately 0.2 – 0.4 hectares annually, future harvesting is limited by this recovery rate. (See table E.1 in the Mt. Elphinstone South Watershed Assessment.)
- See *Appendix B of Mt. Elphinstone South Watershed Assessment* for more on ECA modelling.

#### SURFACE WATER USE AND GROUNDWATER WELLS

*References: Mt. Elphinstone South Watershed Assessment: Phase 1 & 2 (Section 4.12); Mt Elphinstone South Watershed presentation (Slides 45, 46, 47 and 48)*

- The assessment referenced the provincial *BC Water Rights* database to determine the number and location of water licences, and the *BC Groundwater and Aquifers* database for groundwater wells. Data for the 94 registered wells connected to the assessment area contributed to report findings and recommendations.
- Registered water licence holders were contacted to request information on their water systems and permission for assessment.
- Upon public review of the report, it was noted that there were inconsistencies between local knowledge of wells, and wells included in the government database. Available verified well data was utilized for the report.

#### CLIMATE CHANGE

*References: Mt. Elphinstone South Watershed Assessment: Phase 1 & 2 (Section 4.7, 4.9, Conclusion 4, 5, 6, Recommendation 6)*

- 12 global climate models were used to project potential changes to water balances.

- Model shows an increase in high intensity precipitation with low frequency, limited snowpack and reductions in summer rain.
- Potential risks connected to climate change have been assessed and the report recommendations are based on these models.