

**Environmental
Assessment
and
Biophysical
Review**

**Proposed Development at 2571
and 2971 10th Avenue SW, Salmon Arm,
BC**



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Avenue SW, Salmon Arm, BC**

Environmental Assessment and Biophysical Review

Prepared For:
WETLAND ALLIANCE: THE ECOLOGICAL RESPONSE

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EXECUTIVE SUMMARY

Ecoscope Environmental Consultants Ltd. (Ecoscope) completed an overview environmental assessment and review of the proposed Smart Centre development site located at civic addresses 2571 and 2971 10th Avenue SW, Salmon Arm, BC (Property).

The Salmon River estuary and floodplain represent unique ecological features within the Shuswap Lake watershed. The City of Salmon Arm defines the Salmon River as an Environmentally Sensitive Watercourse and the entire Property occurs within the Hazardous Floodplain of the Salmon River. The freshwater delta formed at the mouth of the river represents a biodiversity hotspot and provides critical habitat for a number of provincially significant species.

Active floodplain areas are those that are flooded generally at least once in five (5) years. Field indicators include channels free of terrestrial vegetation, the location of rafted debris, or alluvial sediments that were recently deposited on the surface of the forest floor or suspended on trees or vegetation. Rafted material was identified along the Salmon River approximately 15-30 cm higher than the top-of-bank. In addition, recent alluvial deposits (sand) were documented adjacent the river bank, clearly indicating that the Salmon River regularly overtops these banks – inundating the mid flood bench cottonwood communities and the low flood channels that meander through these broadleaf forests. Furthermore, waterlines and deposits of silt were documented within the outer cortex of cottonwoods occurring along the river bank to over 30cm vertically above the top of channel bank.

The Riparian Areas Regulation (RAR) Detailed Assessment Methods consider the active floodplain to ensure that the Streamside Protection and Enhancement Area (SPEA) starts at the edge of this feature; seasonally inundated channels are to be included in the active floodplain. Review of the RAR report (Stantec 2009), submitted on behalf of the Developer, indicates that riparian setbacks for the development have been based on the defined channel banks and have not included floodplain areas of the Salmon River. Considering the above indicators (rafted debris, alluvial deposits, and watermarks and silt deposits in tree bark), it is evident that the active Salmon River floodplain extends well beyond the defined channel bank throughout the cottonwood floodplain and low-lying flood channels. Therefore, in accordance with the RAR, the SPEA boundary should encompass these low lying areas and flood channels and be measured relative to the maximum extent of these features within the Property.

Although disturbed, the mosaic of forested and graminoid floodplain communities that occur in the north half and eastern portion of the Property form part of a provincially significant core habitat area – the remnant Salmon River Delta. The Property is directly adjacent to the Salmon River at

Traditional Aboriginal uses of the area include berry picking and medicinal plant collection. Local residents have observed major declines of these culturally significant plants as the natural riparian and upland communities have been removed or degraded. The most drastic changes were observed following major disturbances to flooding and flow regimes.

Spatial analysis of the proposed development indicates that approximately 33% of the total coverage of polygons (plant communities) ranked as High Environmental Sensitivity (e.g., cottonwood floodplain, marsh) will be lost. Of this, approximately 3.1 hectares (ha) of existing mid flood bench cottonwood communities; accounting for 53% of broadleaf forest on the subject Property would be lost. In addition, site compaction and construction of a predominantly impervious surface is likely to negatively impact the groundwater regime, surface hydrology, and water quality, which could affect adjacent properties and local and regional ecological values.

The Salmon River sockeye run has become drastically reduced and a return of over 300 fish hasn't been witnessed in over 10 years. Intensive agriculture, which has denuded much of the riparian communities along the river, is a major contributing factor to degraded instream habitat (i.e., higher sediment loading, loss of spawning habitat, and reduced structural complexity). The scale of imperviousness and spatial extents of the proposed development will only further compound the problem.

Ecoscope recommends a number of additional surveys be completed prior to any decisions regarding the proposed development. The surveys should satisfy, as a minimum, the clarification and confirmation of 1 in 5-year high water levels of the Salmon River and Shuswap Lake. This includes delineation of connected surface floodwaters on the active Salmon River floodplain; clarification of the connectivity of low-lying and backwater areas to the Salmon River and Shuswap Lake; and assessment of the potential impacts (of the development scheme) on groundwater, rare or endangered fish, wildlife, and plants. A thorough Environmental Assessment would provide an appropriate review of the potential impacts to the Property and address the important local and regional ecological values sustained within it.

After reviewing existing information and given the sensitive nature of the site, its regional significance, proximity to rare and endangered wildlife, and the dynamic nature of the water regime, it appears this is not an appropriate location for a development of this magnitude and spatial extent. The combined impact of removing 3.1 ha (>50% of total existing) of mid flood bench cottonwood floodplain communities and 2.3 ha of marsh and seasonally flooded sites (reed canarygrass), followed by compaction and paving of the floodplain, and the subsequent discharge of stormwater into critical salmon rearing and migratory bird nesting habitat, is likely to have significant adverse ramifications on channel dynamics, water table and overall functioning of the

TABLE OF CONTENTS

EXECUTIVE SUMMARY.....	I
1.0 INTRODUCTION.....	1
1.1 Project Objectives.....	1
2.0 ENVIRONMENTAL ASSESSMENT.....	1
2.1 Biophysical Overview.....	1
2.2 Floodplain Setting.....	2
2.3 Vegetation Communities.....	6
2.4 Rare Plants.....	8
2.5 Fish and Wildlife Values.....	8
2.6 Rare and Endangered Species Potential.....	11
3.0 ENVIRONMENTALLY SENSITIVE AREAS.....	12
4.0 TRADITIONAL USE.....	13
5.0 IMPACT ASSESSMENT OVERVIEW OF INTERPRETED DEVELOPMENT FOOTPRINT.....	14
6.0 FUTURE CONSIDERATIONS.....	16
7.0 CLOSURE.....	18
REFERENCES.....	19

TABLES

Table 1.....	Summary of Provincially and Federally listed species with the potential to occur within the Property
Table 2.....	Estimated Extents of Community/Habitat Loss from Development Footprint
Table 3.....	Summary of Environmental Sensitive Areas Lost to Development Footprint

FIGURES

Figure 1.....	Site Location
Figure 2.....	Vegetation Communities
Figure 3.....	Environmental Sensitivity Analysis
Figure 4.....	Environmental Impact Assessment Overview

1.0 INTRODUCTION

Ecoscape Environmental Consultants Ltd. (Ecoscape) was retained by Wetland Alliance: The Ecological Response (WA:TER) to provide an environmental assessment and biophysical review of the proposed SmartCenter development site located at civic addresses 2571 and 2971 10th Avenue SW, Salmon Arm, BC (Property). The Property is adjacent to the Salmon River on the Salmon River Delta at the confluence of the Salmon River with Shuswap Lake (Figure 1). The Property includes riparian habitat features associated with the Salmon River, Shuswap Lake and Hobbs Creek, which combine to form the active Salmon River estuary and floodplain.

1.1 Project Objectives

The objective of this assessment is to review biophysical information for the site and adjacent areas and to subsequently map vegetation communities, significant habitats (e.g., streams, wetlands, floodplains, and riparian communities etc.) and corresponding environmentally sensitive areas for the Property that considers current condition, capability, conservation status, and adjacency to significant habitat areas, buffers, wildlife habitat, and biodiversity values.

2.0 ENVIRONMENTAL ASSESSMENT

For the purposes of the assessment, information was obtained from aerial imagery interpretation, anecdotal information, historical evidence, and existing technical reports. Aerial interpretation was verified in the field during Salmon River channel assessments; where it was possible to view portions of the floodplain communities occurring within the Subject Property from the river and adjacent lands to the north. The Riparian Areas Regulation (RAR) report for the Property was completed by Stantec (2009) and was provided to Ecoscape by WA:TER for review. Other information was obtained from correspondence and publicly available documents.

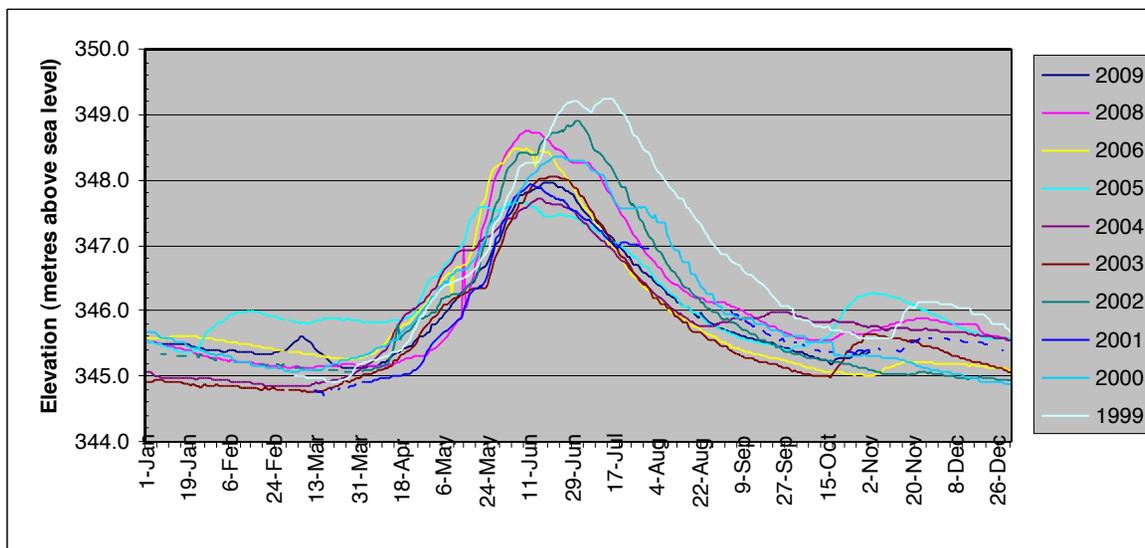
2.1 Biophysical Overview

The principal historic use of the Property has been agriculture and commercial use. Several buildings occur within the southern portion of the Property with old field and grazing areas occurring throughout the south and central portions. An auto wrecking lot had occurred within the south extent (vehicles and scrap have since been removed), and fill has been

(*Ulmus americana*). Remnant riparian flood sites and old seasonally flooded fields occurring both to the north and east of existing urban disturbance comprise a mosaic of seasonally flooded mid-bench cottonwood floodplain communities and a meandering network of low-lying relic river channels predominated by reed canarygrass (*Phalaris arundinacea*).

2.2 Floodplain Setting

The Property occurs at the confluence of two floodplain systems and its location on the Salmon River Delta makes it highly dynamic, both in terms of the ever-changing hydrologic regime and the associated vegetation community shifts. The Property is very closely linked to the water quality and quantity of the Salmon River and is subject to flooding, erosion, and sedimentation. Simultaneously, the Property occurs partly within (i.e., below) the Shuswap Lake (Graph 1) active floodplain and is directly affected by lake hydrological processes.



Graph 1. Shuswap Lake water levels recorded from 1999 – 2009

(<http://www.salmonarm.ca/siteengine/ActivePage.asp?PageID=223>).

A recent review of the Salmon River stream flow data determined that the magnitude of the 200-year flood that was calculated when the floodplain maps were prepared in 1990, has

Shuswap Lake mean annual high water levels, a detailed hydrological and floodplain assessment should be completed by a qualified professional.

Topographic surveys along the Salmon River (Juniper Consulting, 2009) indicate that Shuswap Lake backwaters upstream the Salmon River beyond the Property during normal highwater levels (348.7 m.a.s.l.) (Plate 1). The effect of this backwatering creates a 'blocking effect' essentially backing-up the Salmon River causing it to spill over into the adjacent cottonwood floodplain communities (Plate 2) – indicated by alluvial deposits and rafted debris (discussed below). Adding to the resistance of flows through the floodplain is the tortuous meandering of the river channel – having high irregularity. Furthermore, the rail bed situated downstream of the site acts like a dam, further compounding the blocking effect. Evidence of the rail bed influence, having a constricted outlet, can be seen in the accumulation of fine sediments on the upstream side of the railway. Given the above backwatering and blocking factors, the magnitude and timing of the independent spring freshet flood events of the river versus the lake, appear to be causing a more elevated active floodplain than that estimated for the downstream side of the railway, which is based solely on the Shuswap Lake normal highwater level.



Plate 1 Topographic Survey of Salmon River Channel (Source: Juniper Consulting, 2009)

adjacent to the Property. Beaver (*Castor canadensis*) activity in this area has resulted in removal of cottonwoods, which may further reduce the integrity of the bank, speeding up erosion and natural channel migration in the direction of the proposed development.

Active floodplain areas are those that are flooded generally at least once in five (5) years. Field indicators include channels free of terrestrial vegetation, the location of rafted debris, or alluvial sediments that were recently deposited on the surface of the forest floor or suspended on trees or vegetation. Rafted material was identified along the right bank (looking downstream) of the Salmon River approximately 15-30 cm higher than the top-of-bank, which was surveyed between 349.0 and 349.2 m a.s.l. In addition, fresh alluvial deposits (sand) were documented adjacent the river bank, clearly indicating that the Salmon River regularly overtops these banks – inundating the mid flood bench cottonwood communities and the low flood channels that meander through these broadleaf forests. Furthermore, waterlines and deposits of silt were documented within the outer cortex of cottonwoods occurring along the river bank to over 30cm vertically above the defined top of channel bank.

Ecoscope reviewed topographic survey data produced by Stantec Inc. (2009). This information was obtained by WA:TER from the City of Salmon Arm through a “Freedom of Information Request” and was subsequently provided to Ecoscope for review. Survey profiles illustrate natural levees along the right bank of the Salmon River. Natural levees are formed by the process of overbank flood sedimentation and are most often associated with lowland meandering river floodplains that regularly flood (Hudson 2005).

Developments occurring on large floodplains and alluvial fans can result in requests for diking, bank revetment and stream channelization, all of which can negatively affect the proper functioning condition of the riparian ecosystem. The RAR Detailed Assessment Methods consider the active floodplain to ensure that the SPEA starts at the edge of this feature; with seasonally inundated channels to be included in the active floodplain. Review of the RAR report (Stantec 2009), submitted on behalf of the Developer, indicates that riparian setbacks for the development have been based on the defined channel banks and have not included active floodplain areas of the Salmon River. Considering the field indicators identified by Ecoscope (rafted debris, alluvial deposits, and watermarks and silt deposits in tree bark), it is evident that the active Salmon River floodplain extends beyond the defined channel bank throughout cottonwood floodplain and low-lying flood channels. Therefore, in accordance with the RAR, the SPEA boundary should encompass these mid-bench cottonwood floodplain ecosystems and flood channels and be measured relative to the maximum extent of these features sustained within the Property.

