Woodlot 45 – Chilliwack Forest District
Site Examination of Wetland
Notes and Observations From a Site Visit on April 22, 1999

by
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1. Objective

The objective was to verify the presence and class, under the Forest Practices Code of British Columbia Act, of a wetland in Woodlot 45 on Sumas Mountain in the Fraser Valley, near Abbotsford and to provide a report.

2. Location and Description

The area examined is in the southern part of the private-land component of Woodlot License 45, held by Kelle Bros. Ltd. (Daryl Kelleher, principal). The wetland is in the upper reaches of McKay Brook Community Watershed. The brook flows westward and southward off Sumas mountain. The stream water from the wetland flows through forested land which is interspersed with rural development and logged areas, eventually draining into Sumas Slough. Following the method described by Anonymous (1998, p7) the x coordinate of the wetland is 15.9 and the y coordinate is 15.8 on aerial photograph 30 BC96084 No. 171.

2.1. Ecosection

The area of Woodlot 45 is in the Fraser Lowland Ecosection. This ecosection is mostly restricted to the lower Fraser Valley (Figure 1).

2.2. Biogeoclimatic Unit

The wetland area is at around 435m, in the CWHdm (Dry Maritime Coastal Western Hemlock Biogeoclimatic Subzone). This unit is indicated on the biogeoclimatic map of the area (Nuszdorfer and Boetger 1994). Also, a component of vigorous western hemlock[1] in upland forests indicates the presence of this unit. Due in part to the vigor of coniferous species, including western

1. Names of all plant species are based on the provincial series by Douglas et al., eds. (1989, 1990,1991, 1994). The Latin names are in Appendix C.

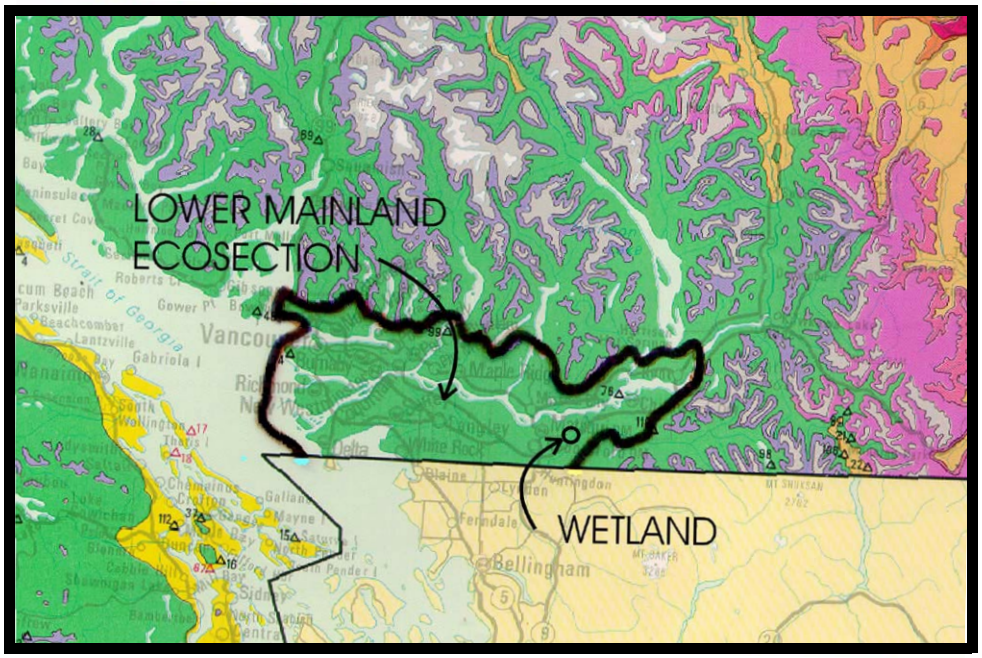

Figure 1. Location of the Lower Mainland Ecosection in southwestern British Columbia and the wetland in Woodlot 45, near Abbotsford.

hemlock, on upland sites that are not dry and have mature or older forests, there are few vascular plant species in the understorey and the area they cover tends to be small. Thus, the zonal sites (average in moisture and nutrient regime) of the CWHdm that are used to characterize the unit have few plant species that clearly identify it. Rather, identification of the CWHdm is done by noting the lack of species that distinguish adjacent biogeoclimatic units. Also, many sites in the CWHdm, including those in the vicinity of the wetland, do not have the older forests that are most useful to identify biogeoclimatic units. Even if there were older forests in the area, the nutrient regime is rich rather than medium, so zonal sites are rare. The other biogeoclimatic units that are present in the area are CWHxm1 (Eastern Very Dry Maritime CWH) and CWHvm2 (Montane Very Wet Maritime CWH). That these units are not present in the area of the wetland is described next.

To the south of the area of the wetland, near Sumas Canal, the CWHxm is present. This biogeoclimatic unit is generally below about 150m. Although western hemlock is present in the CWHxm, its vigor and abundance tends to be lower than in the CWHdm, except on wetter sites. On zonal sites in the CWHxm, vine maple, ocean spray, baldhip rose and prince's pine are commonly present.

The CWHvm2 is found on the upper elevations of Sumas Mt., at 670m on northerly aspects to 760m on southerly aspects. The presence of species such as amabilis fir, Alaska and oval-leaved blueberry, along with the increased abundance of lanky moss on zonal sites in the CWHvm2 are an indicator of a wetter climate and the lack of a period in the summer when the soils of zonal sites are dry.

Elevationally, the unit is well within the range for the CWHdm. Because of the absence of zonal sites, it is difficult to make an evaluation based on plant species. However, the species listed for the adjacent biogeoclimatic units occur on non-zonal sites in their respective units as well. They were sparsely distributed (species listed, above, for CWHxm1) or not found (species listed, above, for the CWHvm2) in the upland forests near the wetland area. Thus, I consider the wetland area to be in the CWHdm.

2.3. Access

Access to the area was off Highway 1 at the Whatcom Road Interchange. From there the route was northeastward on North Parallel Road (2.4km), northward on Sumas Mtn. Road (5.5km), northward on Upper Sumas Mtn. Road (2.8km), east on Batt Road (approximately 1.1km), southeast on Sumas Mtn. Forest Service Road (approximately 1.1km) to a gated, unnamed access road (R03664) which led to the south. The wetland area was at the present end of this road, approximately 2.4km from the gate (Figure 2). The UTM coordinates of the area examined are 560 554m northing, 5 437 920m easting. It is in UTM Zone 10.

2.4. Forest Cover

Forest cover mapping is not designed to be applied at the scale of site examination used in this field trip. However, I am including information about forest cover in this report to give a general description of the forest in the area surrounding the wetland. The published Forest Cover Map (92G010, 1992) is interpreted mostly from 1970 aerial photographs. The more recent mapping is interpreted from 1996 photographs. The general vegetation composition of the wetland area is interpreted similarly among the two generations of forest cover maps. The forest cover polygon that includes the wetland area is dominated by hardwoods: mainly red alder and paper birch with lesser cover of bigleaf maple. The age of the dominant hardwoods is estimated to be around 80 years. A minor component of Douglas-fir is also identified in the forest cover labels.

The wetland in Woodlot 45 is not mapped as a separate polygon on either the older or newer forest cover mapping. The reasons include: 1, it is small relative to the scale of mapping (1:20,000) and 2, it is forested in an area that is generally heterogeneous due to site conditions and disturbance history.

The area immediately upstream of the wetland is forested, with a clearcut approximately 0.15km above it, to the east (Figure 2). From examination of the aerial photographs, the stream that runs through the wetland appears to originate in or slightly to the east of the clearcut which is approximately 0.3km wide in this area.

2.5. Parent Materials, Soil and Humus Form

The outcroppings of rock exposed by the road cut on the approach to the woodlot indicate the parent material in the area is volcanic in origin, possibly basaltic.

Near the area examined, on the upland immediately adjacent to the wetland, there is a layer of eolian loess (wind-deposited material with a loamy soil texture and relatively low bulk density). The depth of the loess is greater than 1m. Mountain beaver create their burrows in this soil (Figure 3). This eolean soil probably underlies the wetland as well. The soil of the area examined in the wetland matches the characteristics of a Typic Humisol (Agriculture Canada Expert Committee

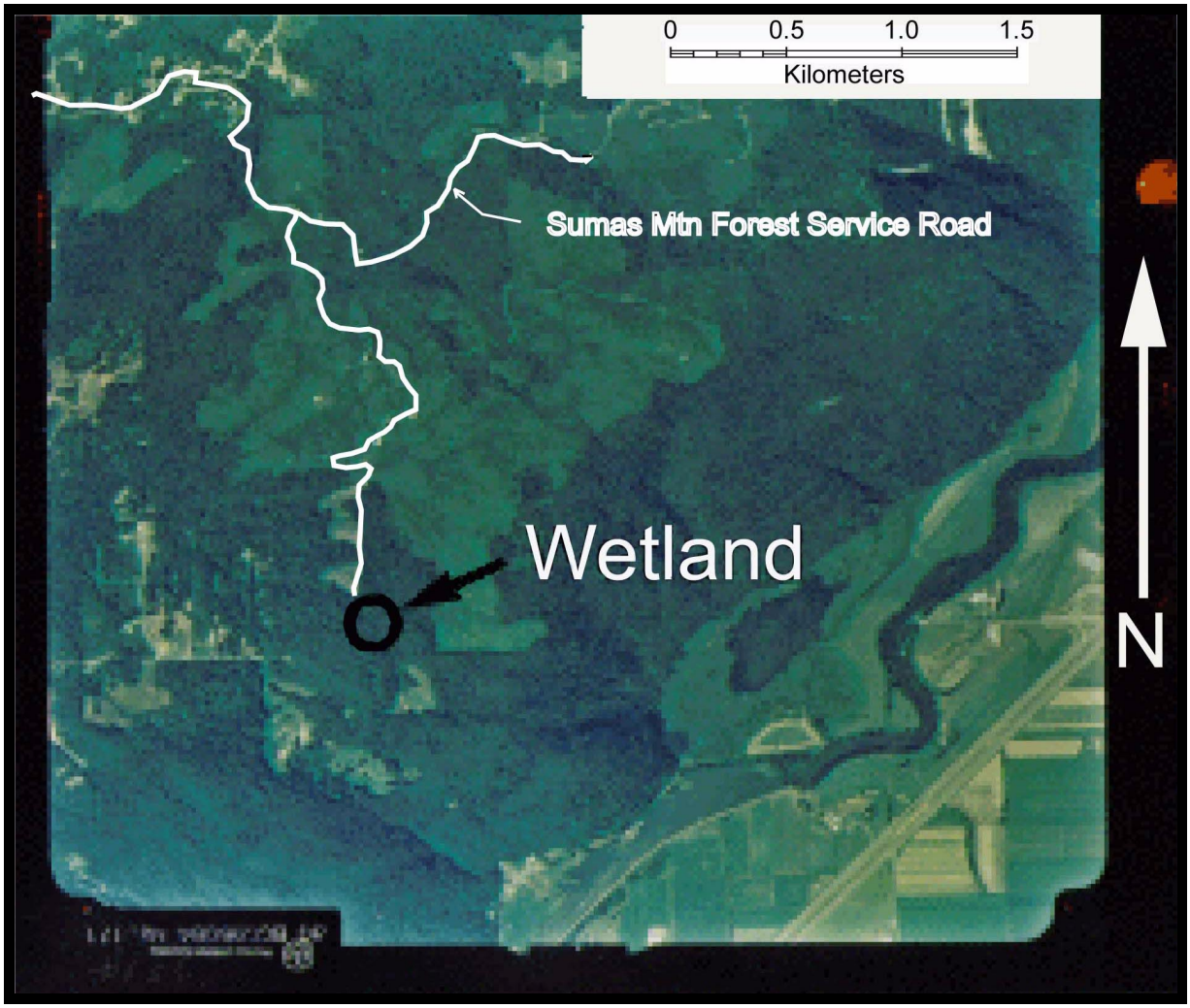

Figure 2. Aerial photograph (BCC96084 #171) of the wetland and surrounding area. The road to the wetland area has been sketched onto the photograph from the forest cover map of the area (92g010). The photograph was taken in 1996.

on Soil Survey 1987). One soil pit, augmented with several probes using the handle of a fire shovel, in the northwest portion of the wetland, indicated that the organic material was over 1m deep. This organic material is well decomposed (von Post 8 or 9). Additional analysis of the soil horizons would be necessary to confirm the soil identification. For the purposes of identifying the area as a wetland, it was only necessary to confirm the presence of an organic soil that was saturated with water for most of the year. The water table was near or at the surface in a number of pools in the area that was examined.

The humus form for the wetland area can best be described as a Saprimoder (Green et. al. 1993). This is consistent with the predominance of the Oh soil horizon.

Figure 3. Photograph of opening of mountain beaver burrow in loess. The opening is approximately 15cm across.

2.6. Site Series

Analysis of the soil moisture and soil nutrient regimes (Green and Klinka 1994) indicates the area is wet and rich. In the guidebook referred to above there are three possible ecosystems with these characteristics: wet areas on the standard grid, floodplains and ecosystems with rapidly fluctuating water tables. The area examined does not meet the criteria of a floodplain because the stream is small and there is no over-bank deposit occurring. Also, the concepts of high, medium and low benches, used in the site identification and interpretation guide (Green and Klinka 1994), do not apply to this wetland. Nor does the ecosystem have a rapidly fluctuating water table; for much of the year the water table is at or near the surface, perhaps dropping below the surface only during the driest period of the summer to early fall. Thus I conclude that the site series is from the standard grid, i.e. it is: *CWHdm - CwSs - Skunkcabbage* (also know as site series number 12).

3. Vegetation

A limited survey of vegetation was done at one site in the wetland and grab samples of plants were taken while walking within it. This area is unusual and unique enough to warrant considerably more vegetation sampling later in the growing season when it is better developed.

3.1. Trees

There was no sign of cut stumps in the area of the wetland that we visited. If this is the case for all of the wetland area, then it means that it is in its natural state (as opposed to having developed after being logged). The processes by which this wetland has developed and is now being maintained would make an excellent research topic.

Tree growth is limited in the wetland area by the high water table. With the restriction of tree roots to elevated microsites (decaying tree boles and root wads of overturned trees) two things have occurred: 1, the distribution of trees is uneven across the area with many canopy openings (Figure 4); 2, trees are often uprooted by windthrow. Trees in a sampled area of the wetland and

Figure 4. Photograph from northwest edge into the wetland. The tree to the left is Sitka spruce, growing on the decaying wood of a downed tree. Note the open nature of the wetland in the background.

their cover are listed in Table 1. Note this is in a more densely forested area compared to the area indicated in Figure 4.

There is very limited, or no, growth of tree roots into the organic soil. The productivity of the wetland area for trees is dependent on the supply of decaying tree boles and root wads. If this supply were to be reduced, say by logging or salvaging of windthrown trees, then the site's productivity for trees would decline over time. This decline in site productivity would be slow, since the current substrate would only be affected if it were destroyed or removed during the yarding of trees to a landing. Only as this material slowly decayed away and replacement was reduced would the decline become apparent.

Table 1: Tree Species and Cover in a 400m^2 Plot in the Northwest part of the Wetland. (The total for the tree layer is less than the sum for tree species, due to overlap among tree crowns).

Tree Species/Stratum	Cover (%)
Sitka spruce	12
western hemlock	10
western redcedar	20
paper birch	30
red alder	10
Tree Layer	70

I have not addressed the question about increasing site productivity for trees in this area by channeling the stream, since this was not part of the purpose of the field trip and would destroy most or all of the wetland.

Reforestation by planting coniferous trees on the raised microsites would be difficult, if not impossible, since suitable plantable spots for plug or bare root seedlings would be difficult to find. The presence of natural regeneration could be relied upon for reforestation, but this would require a seed source of the desired species or its presence as advanced regeneration. At the moment, both appear to be present. If the Sitka spruce were to be logged from the wetland, its seed source would decline over time. Seed from older western hemlock and western redcedar would fall or be blown into the wetland from the adjacent upland. Seed for the Sitka spruce would not be available similarly, since it is not re-established by planting in the CWHdm due to a very high risk of Sitka spruce weevil attack which kills the leader of the tree, preventing it from growing upwards.

3.2. Other Vegetation

There are many upland species on raised microsites in the wetland. These are not listed here since they are not indicators of the site's wet soil moisture regime. Skunk cabbage, bigleaf sedge, and water-parsely are present in the wetland and indicate a wet soil moisture regime. The skunk cabbage is distributed throughout the area. The latter species are less common. All three species are indicators of a wet soil moisture regime. Bigleaf sedge is listed as "blue" and "G4 S1?" in (Douglas 1998). This means that, it is estimated to be extremely rare in British Columbia (S1?). The rating of G4 means that bigleaf sedge is frequent to common globally.

3.3. Wetland Classification

In the draft of the BC wetland classification (MacKenzie and Banner 1998) the area examined fits the description of the class *swamp*. They describe the essential features of swamps as:

- "*dominated by flood-tolerant trees or tall shrubs*
- *a nearly permanent, gently flowing water table*
- *freshwater rich in minerals and nutrients*
- *substrate of woody peat or mineralized material.*"

According to the Operational Planning Regulation of the Forest Practices Code of British Columbia Act a wetland "*means a swamp, marsh or other similar area that supports natural vegetation that is distinct from adjacent upland areas*". Thus, since the area is a swamp it is also a wetland under the code.

The area of the wetland is described as 2.3 ha in the silvicultural prescription, dated 16 October 1995, which is on file with the Chilliwack Forest District. This size appears to be correct based on the site visit and a check of the aerial photographs for the area. In the regulations a wetland of this size in the CWHdm belongs to the W2 class. This confirms the identification that was made earlier.

4. Wetlands of the Fraser Lowland Ecosection

Much of the Fraser Lowland Ecosection covers the floodplain of the Fraser River. Sumas Mountain, Vedder Mountain and the lower parts of the Coast Mountains project above this floodplain. The wetlands of the floodplain have been substantially reduced during settlement. Those that

remain are affected by such activities as urban and rural development, farming, animal rearing, and diking for flood control. Prior to settlement by Europeans and others, wetlands that are upland from the floodplains would have been much less common than those of the floodplains of the valley below. But these areas have also been reduced or are being influenced by the activities listed above. As a result, the relative value in terms of maintaining habitat diversity, of the remaining intact wetlands in the upland areas is very high.

5. Conclusions

1. The soil and vegetation characteristics of this area satisfy the criteria for a wetland under the Forest Practices Code of BC Act.
2. The size of the area in combination with its presence in the CWHdm indicates it is W2 according to the Operational Planning Regulations.
3. It appears that this type of wetland is very uncommon in the Fraser Lowland Ecosection so contributes greatly to its habitat diversity.

6. Literature Cited

Agriculture Canada Expert Committee on Soil Survey (1987). The Canadian system of soil classification. 2nd ed. Ottawa, Canada, K1A 0S9, Canadian Government Publishing Centre, Supply and Services Canada.

Anonymous (1998). Field manual for describing terrestrial ecosystems. 712 Yates Street, Victoria, BC, V8W 9C2, Resources Inventory Branch, BC Min. Env. Lands and Parks; and Research Branch, BC Min. For. Land Management Handbook 25

Douglas, G. W. (1998). Rare native vascular plants of British Columbia. Victoria, BC, British Columbia Conservation Data Centre, Resources Inventory Branch, Ministry of Environment, Lands and Parks, PO Box 9344 Stn. Prov. Gov.**:** 423p.

Douglas, G. W., G. B. Straley and D. Meidinger, eds. 1989. The vascular plants of British Columbia. Part 1 - Gymnosperms and Dicotyledons (Aceraceae through Cucurbitaceae). Research Branch, BC Min. For. Victoria, BC. 208p.

Douglas, G. W., G. B. Straley and D. Meidinger, eds. 1990. The vascular plants of British Columbia. Part 2 - Dicotyledons (Diapensiaceae through Portulacaceae). Research Branch, BC Min. For. Victoria, BC. 158p.

Douglas, G. W., G. B. Straley and D. Meidinger, eds. 1991. The vascular plants of British Columbia. Part 3 - Dicotyledons (Primulaceae through Zygophyllaceae) and Pteridophytes. Research Branch, BC Min. For. Victoria, BC. 177p.

Douglas, G. W., G. B. Straley and D. Meidinger, eds. 1994. The vascular plants of British Columbia. Part 4 - Monocotyledons. Research Branch, BC Min. For. Victoria, BC. 257p.

Green, R. N. and K. Klinka (1994). A Field Guide to Site Identification and Interpretation for the Vancouver Forest Region. Victoria, British Columbia Ministry of Forests. Land Management Handbook 28.

Green, R. N., R. L. Trowbridge and K. Klinka. 1993. Towards a taxonomic classification of humus forms. Forest Science Monograph 29. 49p.

MacKenzie, W. and A. Banner (1998). Classification and description of wetlands and related ecosystems in British Columbia. Smithers, BC, Ministry of Forests Research Program**:** 86p.

Nuszdorfer, F. C. and R. Boetger, compilers and editors (1994). Biogeoclimatic Units of Vancouver Forest Region, Mapsheet 6 of 6, Fraser Valley - Lillooet River. Victoria, Province of British Columbia, Ministry of Forests, Research Branch.

7. Acknowledgements

Although I am solely responsible for the content of this report, a number of individuals provided assistance to me. I thank Daryl Kelleher for background information, attending the site examination and providing access to the private-land area of the woodlot. Rick Aitchison, Director and Corrine Wright, Alternate Director, Fraser Valley Regional District, viewed the site and provided valuable ideas about possible alternative solutions that would be appropriate for the wetland area. Greg George and Tom Plath of BC Environment added critical wildlife information during the field examination. John Coles and Steve DeMelt, representing the Chilliwack Forest District, added important information and insights during the field visit and afterwards. Paul Tataryn provided transportation to and from the site, file information about it and very helpful editorial comments; Kevin Hardy loaned me a digital camera; John Markilla provided the recent forest cover map, associated database and the UTM coordinates of the wetland area; Greg Brown restored my computer files after the software was corrupted by a map viewing program; Peter Pitsakis assisted with microstation; and Ron Jordans provided information about the Sumas Mountain Forest Service Road.

Appendix A – Ownership

The legal description (May 3, 1995 letter to Land Titles Office) is defined as: “Legal Subdivision 2 and 7 of Section 4, Township 20, except: the west quarters, New Westminster Division”. The original woodlot submission describes this private-land contribution as 24.28ha. On a subsequent document (Schedule ‘A’, 1996-08-12) the total area is 25ha.

Appendix B -- Persons Attending

Woodlot License Holder
Kelle Bros Auto Ltd. (Daryl Kelleher)

MOF
John Coles, Woodlot Coordinator, Chilliwack Forest District
Steve DeMelt, Operations Manager, Chilliwack Forest District
Paul Tataryn, Regional Woodlot Forester, Vancouver Forest Region
Fred Nuszdorfer, Research Ecologist, Vancouver Forest Region

BC Environment
Greg George, Forest Ecosystem Specialist
Tom Plath, Wildlife Technician, Fish, Wildlife and Habitat Protection
Hartland Ross, Work Placement Program

Fraser Valley Regional District
Rick Aitchison, Director
Corrine Wright, Alternate Director

Appendix C. List of Species

Alaskan blueberry	Vaccinium alaskaense
amabilis fir	Abies amabilis
baldhip rose	Rosa gymnocarpa
bigleaf maple	Acer macrophyllum
bigleaf sedge	Carex amplifolia
Douglas-fir	Pseudotsuga menziesii
lanky moss	Rhytidiadelphus loreus
mountain beaver	Aplodontia rufa
ocean spray	Holodiscus discolor
oval-leaved blueberry	Vaccinium ovalifolium
paper birch	Betula papyrifera
prince’s pine	Chimaphila menziesii
red alder	Alnus rubra
Sitka spruce weevil	Pissoides strobii
skunk cabb1age	Lysichiton americanum
vine maple	Acer circinatum
water-parsely	Oenanthes sarmentosa
western hemlock	Tsuga heterophylla