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Dear Sir:

The attached report entitled: FLORISTIC
DESCRIPTIONS OF COVER-TYPES IN WELLS GRAY PARK is submitted,
herewith for your approval.

Yours very truly,

F.H.
per.

F.H. Hartman,
Forester-in-Training,
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APPROVED

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Date:

May 27, 1957.

APPROVED in accordance with attached
addenda.

H.G. McWilliams

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Date:

Sept. 16, 1957

APPROVED: _____

Date: _____

ADDENDA

ADDENDA

FLORISTIC DESCRIPTIONS OF COVER-TYPES IN

WELLS GRAY PARK

by

F.H. Hartman

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Parks and Recreation Division,
H.G. McWilliams, Forester.

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FLORISTIC DESCRIPTIONS OF COVER-TYPES IN WELLS GRAY PARK

I. INTRODUCTION

In the summer of 1955 a project was started to cover-type map the burn areas important as moose winter range in Wells Gray Provincial Park. (See Wildlife Report No. 55). Aerial photographs were used as the basis of the 1955 project. Ground checks were done by the author and an assistant in 1956.

The ground checking work provided a good opportunity to describe the plant cover in general. Detailed floristic descriptions were completed in the field. This work was carried beyond the burns to include nearby conifer stands as well as sub-alpine conifer and meadow country. The main associations or types encountered were described. Areas given little or no attention included hemlock forests, dense alpine fir -- engelmann spruce type, and high alpine areas.

In brief; the aim of the study, besides serving as a check of the photo interpretation, was:

- 1) To get a detailed floristic description of the cover-type.
- 2) To find the plants most characteristic of each cover-type.
- 3) To find characteristics of soil, site, etc., of the respective cover-types.

Also, a modest plant collection and check list were started in connection with this study. This was given to the Provincial Museum and may be referred to there.

Limited references enabled the author to key out some plants in the field. Those not identified were collected and given a code number. Some of these have been identified by the B.C. Provincial Botanist, Dr. Szczwinski, who will complete the identification work at a later date.

For field identification the following references were used:

1) Lyons, C.P.; Trees, Shrubs and Flowers to Know in B.C. (2nd Edition).

2) Peck, M.E.; A Manual to the Higher Plants of Oregon.

3) Henry, J.K.; Flora of Southern British Columbia and Vancouver Island.

In many of the more difficult genera such as Salix, Antennaria, etc., only the generic name was used. Grasses were referred to as Grammineae. Mosses and lichens, although attempted, were incompletely dealt with. The author had no reference with moss or lichen keys.

II. METHOD

A. Sample Selection

Photograph types were checked with ground types by travelling to individual types and comparing photo - types with ground vegetation. Field notes for this study were made at the same time.

Small sections of types were taken as samples and these were described in detail. The samples were chosen at random far enough into the type to eliminate the effect of "edge". The size of sample areas varied but were usually at least twenty yards in diameter. The object was to include most of the plants present in the type.

B. Field Notes

The field notes included: A list of all of the plants present on the sample area; age - height records of dominant tree species to determine the site-index; soil moisture; height of tree canopy; elevation; and the species of snags, where present.

1) Plant list. All plants on the sample area were listed, grouping trees, shrubs, herbs, and mosses and lichens separately.

Species were valued as to abundance and vigor. The method used was as follows:

If a species was very abundant and vigorous in relation to surrounding vegetation it was given a rating of three. Plants in moderate abundance or in local concentrated patches were given a rating value of two. Plants represented only by scattered individuals were valued at one. Those very scarce or obviously dying out were valued at one-half. Thus totals of resulting values for any one species in a type would indicate its relative abundance and vigor. A more detailed method than the above has been described by Kiichler (1955) and should be referred to in any further study of this kind. Kiichler used a very good method for detailed descriptions of small areas.

2) Site Records. The site index classification used is meant to be only a standard for comparison of cover-types.

The method of site determination was as follows. If present, one or two dominant or co-dominant conifers were chosen on each sample area. These trees were aged at one foot above ground level using a standard ten inch increment borer. Three years were allowed for the one foot growth. The d.b.h. was taken using a diameter tape. Height was estimated if in young immature stands, and was measured with tape and abney if in coniferous stands that were established before the 1926 burn. The site index (height at age of 100 years) was calculated assuming that the tree would

continue to grow at the same rate as it had previous to measurement. It is felt that the actual site index of the young immature stands is lower than indicated because competition in later years will probably reduce growth rate.

3) Height of Canopy. On each area visited the general height of the canopy was estimated. These data are most useful for photo-type recognition in the mapping project.

4) Soil Moisture. The soil moisture in each sample was recorded. With increasing soil moisture the quantitative terms; dry, moist, damp, wet, were used.

5) Snags Present. It was hoped that some record of previous cover could be obtained. An attempt was made to recognize the snag species on the burn but the data were very incomplete. Therefore only generalizations can be drawn on this subject. In another study of this type it would be advisable, if at all possible, to get an accurate description of the previous timber.

6) Elevation. Estimates of the elevations of samples were included in the field notes.

PART I

A. Low Elevation Floristic Descriptions with Type Lists.

1) Coniferous Type. Most samples of the coniferous type were taken east of the Clearwater River between Hemp Creek and the John Ray Farm. One sample, of a fir stand, was made on the west side of the Clearwater River.

The site index of the conifer stands varies from 60 to 150, with the average being 110.

The average height of canopy is 90 feet.

There are few lodgepole pine stands in the park. This does not appear to be the main sub-climax species as in much of the drier interior of British Columbia. The most widespread sub-climax type in the park appears to be the douglas fir — aspen forest. Fir and aspen grow vigorously but are quite soon crowded out by the more tolerant cedar or hemlock. Engelmann spruce regenerates in some local areas but is quite heavily infected by Engelmann spruce tip weevils. Engelmann spruce stands are usually succeeded by cedar. The climax forest is usually pure cedar or hemlock.

A study and evaluation of coniferous types in the park could be a work in itself, requiring individual consideration of types and sites . Reference should be made to the B.C. Forest Service

inventory data.

All mature coniferous types were grouped together.

Therefore typical understory plants are difficult to find. However, some plants not found to any great extent in other types, Tiarella spp. and plants of the Liliaceae group, as well as the ferns, are common under conifer cover.

Conifer Type List - (All type lists given are in order of abundance - from greatest to least). (Complete species list in Appendix I a.)

1. *Thuja plicata*
2. *Pseudotsuga taxifolia*
3. *Pachystima myrsinites*
4. *Picea engelmanni*
5. *Linnaea borealis*
6. *Aralia nudicaulis*
7. *Rubus parviflorus*
8. *Tsuga heterophylla*
9. *Cornus canadensis*
10. *Betula papyrifera*
11. *Tiarella unifoliata*
12. *Disporum oregonum*
13. *Clintonia uniflora*
14. *Alnus tenuifolia*

15. Populus trichocarpa
16. Abies lasiocarpa
17. Corylus californica
18. Smilacina stellata
19. Peramium decipiens.

Ferns - Dryopteris Linnaeana

Athyrium filix - femina.

2) Regeneration Type. The regeneration type, which usually grows on moist soil, has an average site index of 140. (Based on Douglas fir).

Douglas fir and lodgepole pine are the major species of coniferous regeneration. Areas of regeneration are local and almost exclusively a result of proximity to available seed. Over most of the burn regeneration is dense near mature timber but thins out toward the centers of the burned areas.

The growth rate is good but much regeneration is not dense enough to self-prune. Thus many trees take the form of wolf trees. Outstanding fir regeneration was found on the west side of McLeod Hill and down through much of the Blackwater area. If multiple use is to be considered for the park, these areas should be immediately considered for thinning and pruning operations.

The dense stands of lodgepole pine are most common in the southern end of the park. Throughout most of the burn pine and fir are scattered in almost equal amounts. Because pine is probably more abundant in the park now than before the fire it is possible that further fires would result in a greater preponderance of pine and a decrease in fir.

The average height of the canopy of regeneration is 40 feet.

Regeneration Type List. (Complete species list in Appendix I b.).

1. *Pinus contorta*
2. *Pseudotsuga Laxifolia*
3. *Salix* spp.
4. *Pachystima myrsinites*
5. *Shepherdia canadensis*
6. *Linnaea borealis*
7. *Cornus canadensis*
8. *Alnus sinuata*
9. *Chimaphila umbellata*
10. *Pyrola secunda*
11. *Epilobium angustifolium*
12. Gramineae group
13. *Spirea lucida*
14. *Hieracium* sp.

15. Rosa spp.
16. Vaccinium membranaceum
17. Rubus parviflorus
18. Populus tremuloides.

3) Mixed Type. Only three samples were taken in the mixed type. It is very difficult to describe for the plant species are so mixed and variable.

The soil is quite dry in the mixed type.

On the few samples studied the site index was high - (150 and 190 based on Douglas fir).

Conifers in the mixed type represent advance regeneration which will soon produce seed. Thus conifer cover will soon dominate these areas. In 1956, 20 to 25 year old fir and pine were producing good seed crops.

The major tree species found in the samples are lodgepole pine, willow and aspen. Pachystima myrsinites, Linnaea borealis, and Vaccinium membranaceum are predominate in the understory.

The average height of the canopy is 25 feet.

Mixed Type List. (Complete species list in Appendix I c.)

1. Pinus contorta
2. Salix spp.

3. *Pachystima myrsinites*
4. *Populus tremuloides*
5. *Linnaea borealis*
6. *Vaccinium membranaceum*
7. *Pseudotsuga taxifolia*
8. *Betula papyrifera*
9. *Cornus canadensis*
10. *Picea engelmanni*
11. *Sorbus sitchensis*
12. *Shepherdia canadensis*
13. *Mahonia aquifolium*
14. *Chimaphila umbellata*
15. Gramineae group
16. *Lonicera involucrata*.

4) Aspen Type. The soil under the shade of aspen is generally dry to moist. Growth is extremely good in this type as conifer growth indicated an average site index of 160 (based on Douglas fir).

The aspen type has an average height of canopy of 36 feet.

The aspen type may almost be considered as a Populus tremuloides - Shepherdia canadensis - Pachystima myrsinites association. Aralia nudicaulis and Lilium parviflorum are also

characteristic of this type.

The areas covered by the aspen type in the south end of the park makes up much of the late winter moose range. Aspen is rapidly shading out the lower willow and other available browse in its understory. Consideration should be given to methods of opening up these stands and producing more browse.

Aspen Type List. (Complete species list in Appendix I d.)

1. *Populus tremuloides*
2. *Salix* spp.
3. *Shepherdia canadensis*
4. *Betula papyrifera*
5. *Pachystima myrsinites*
6. *Pinus contorta*
7. *Cornus canadensis*
8. *Aralia nudicaulis*
9. *Linnaea borealis*
10. *Spirea lucida*
11. *Epilobium augustifolium*
12. *Populus trichocarpa*
13. *Pseudotsuga taxifolia*
14. *Mahonia aquifolium*
15. *Aster* sp.
16. *Hieracium* sp.

17. *Alnus sinuata*
18. *Picea engelmanni*
19. *Vaccinium membranaceum*
20. *Acer glabrum*.

The foliose lichens with Cladonia, and Polytricum mosses, form the moss and lichen layer in most cases.

5) Willow Type. Studies of the willow type were made in 21 locations.

In the majority of willow sites the surface soil is dry and sandy. However most willow types occur where there is high available root moisture. This is due to naturally high water tables or seepage layers. Most of the extensive willow burns are on areas cut by wet gullies and meadows. Where surface moisture is high on willow covered burns alder dominates, as in the wet gullies, and the willow, if present, is tall and of at least different form if not of different species.

The average site index of the willow type is 120. This is lower than in the aspen type which is 160.

Willow burns in general are at higher elevations than aspen covered areas. The common pattern if going from the valley up a mountain is to go from aspen through willow and thence into open sub-alpine burn.

The question of why willow dominated some areas while aspen came back thickest on others is confusing but interesting. It would not appear to be due to available seed source as with conifers. A study of recent burns seems to indicate that willow regenerates mainly from roots not killed by the fire. However this would require that willow be present in the present willow types before the fire. Therefore it follows that when assessing willow site we should look for site differences that would not be drastically changed by fire.

Differences in elevation probably affects the site. However the salient feature that separates the willow and aspen site is the fact that willow appears to dominate areas with a high available root moisture content well below the surface of the soil, while aspen does better in the uniformly moist soils.

Many of the better willow browse areas are the result of reburns after the main burn of 1926. For example, much of the Stillwater areas appears to have been reburned. The willow covered part of the Archer Creek burn was about ten years old at the time of this study.

It appears that dry ground Salix spp. have a short life span. The age of individual willow stems was found to be 20 years old or less. However a willow bush when normally browsed may persist for many years with old stems dying out and new suckers