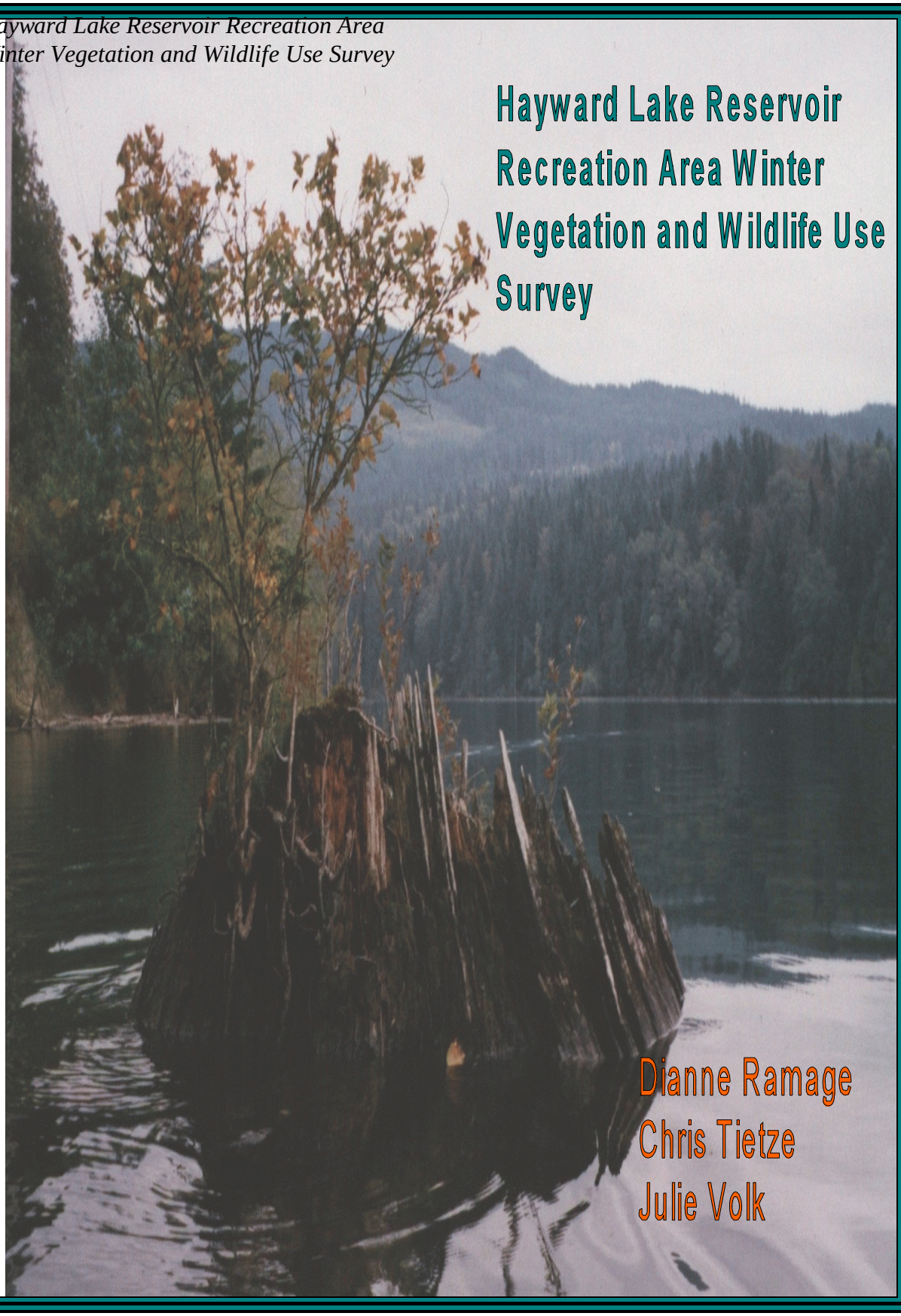
Hayward Lake Reservoir Recreation Area Winter Vegetation and Wildlife Use Survey



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Hayward Lake Reservoir Recreation Area
Winter Vegetation and Wildlife Use Survey

Abstract

A winter vegetation inventory and presence/not detected wildlife use survey was completed of BC Hydro's Hayward Lake Reservoir Recreation Area from October 1999 to March 2000. This study was done to provide BC Hydro with baseline data on the vegetation and wildlife found during the winter period at Hayward Lake.

Aerial photographs and maps were used to stratify BC Hydro's property around the lake into four vegetation strata:

- **Old Growth**: Areas displaying complex structure, mature trees and no evidence of logging
- **Second Growth**: Areas displaying evidence of past logging activity
- **Riparian**: Areas paralleling water courses; streams, creeks
- **Wetland**: Areas with water as the dominant ecosystem feature.

The site was visited by car, canoe and on foot to verify these strata.

Four plots in each of the strata were randomly selected to complete sixteen vegetation and wildlife use plots. The site was visited bi-weekly, on Wednesday mornings to complete these surveys. From the plot centre, four levels of vegetation were identified and surveyed:

- **Moss Layer**: Vegetation within 2.50 metres of plot centre; vegetation from 0m-0.5m high
- **Herb Layer**: Vegetation within 5.64 metres of plot centre; vegetation from 0.5m - 1.0m high
- **Shrub Layer**: Vegetation within 5.64 metres of plot centre; vegetation from 1.0m - 10m high
- **Tree Layer**: Vegetation within 10 metres of plot centre; vegetation over 10 metres

Wildlife or wildlife use seen in each of the 10 metre radius plots was recorded. A wildlife tree count was completed in each of the plot areas.

The second growth strata had the highest vegetation species richness. The plants found were typical of a Coastal Western Hemlock biogeoclimatic zone and were abundant. The riparian and wetland strata had the most wildlife use. There were nineteen species of birds found in the Hayward Lake area and four species of animals.

A complete, year-long vegetation survey should be completed in order to detail and record all species found during the year. For example, Pacific bleeding heart (*Dicentra formosa)* was

found

on the last visit to the site that had not been recorded on previous trips. A full year-long study would provide BC Hydro with all the vegetation found at Hayward Lake throughout the entire year.

In addition, a relative abundance wildlife survey should be completed in order to completely detail the animals found at the Hayward Lake. A complete wildlife tree analysis, including mapping and taking measurements of the trees, could provide BC Hydro with enhancement opportunities as well as recreational ones by providing the public an opportunity to learn about and see wildlife trees.

Hayward Lake Reservoir Recreation Area

Winter Vegetation and Wildlife Use Inventory

Presented to

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May 10, 2000

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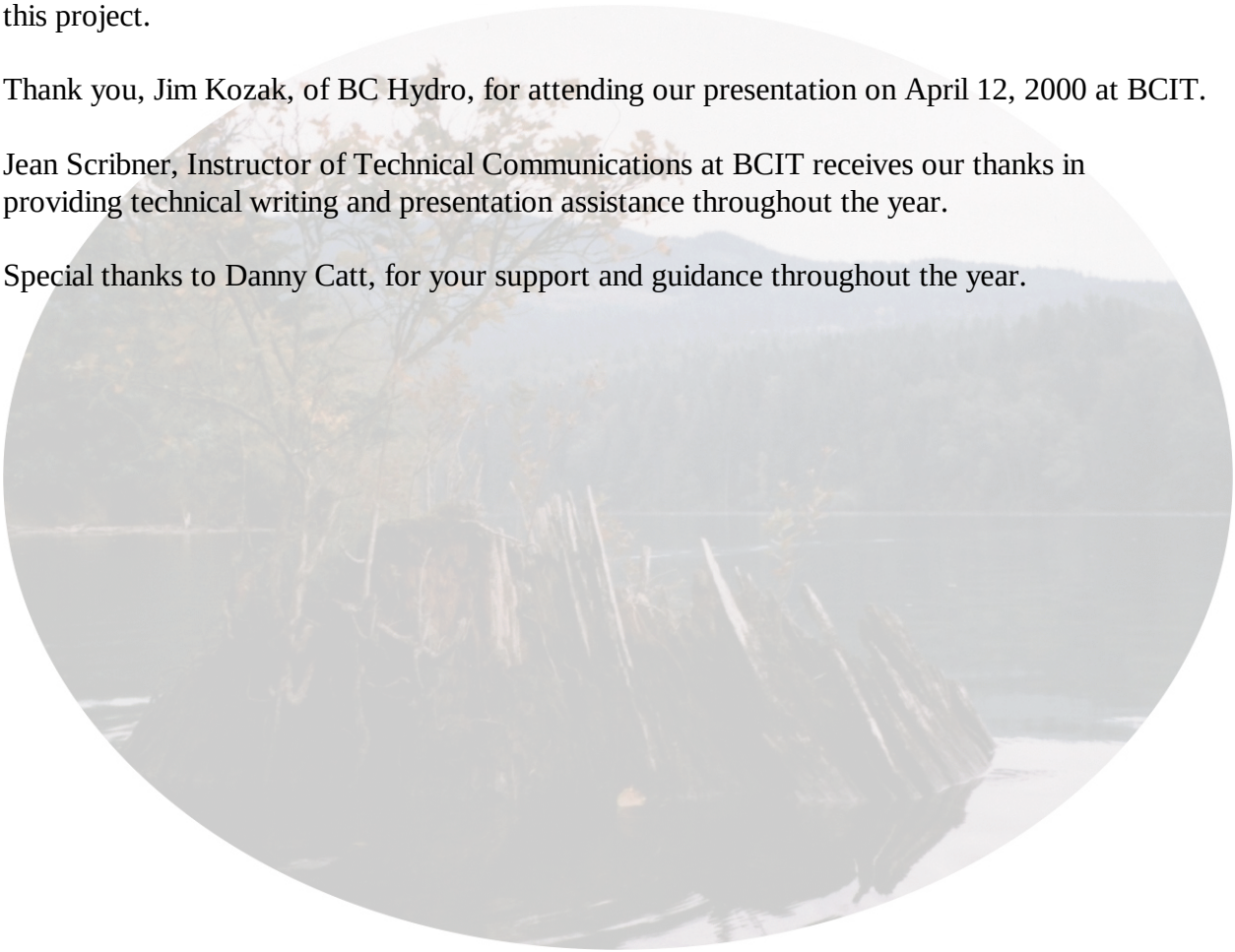
Acknowledgments

Dianne, Chris and Julie would like to thank Colin Gurnsey, Manager Community Interests, Power Supply Environment, BC Hydro for providing the opportunity and support to complete this project.

Thank you, Jim Kozak, of BC Hydro, for attending our presentation on April 12, 2000 at BCIT.

Jean Scribner, Instructor of Technical Communications at BCIT receives our thanks in providing technical writing and presentation assistance throughout the year.

Special thanks to Danny Catt, for your support and guidance throughout the year.



1.0 Introduction

1.1 Purpose

The purpose of this study was to carry out a vegetation and wildlife use survey of the Hayward Lake Recreation Area. BC Hydro will use this information to make decisions regarding future plans in and around the area. In their Hayward Lake Recreation Area Management Plan (BC Hydro, 1997), BC Hydro indicates a need for a vegetation survey to be completed in the area to provide feedback as to what vegetation is in the area and whether any introduced species, noxious weeds or rare/endangered species were found.

Autumn and winter, in a Temperate Zone, are the times of the year with the least diversity in plants and animals. Migrating or hibernating wildlife are absent during this time, as are the non-woody seasonally sensitive plants. In discussions with BC Hydro (Gurnsey, 1999), it was determined that a vegetation and over-wintering wildlife use survey would provide valuable wildlife management information to BC Hydro.

A presence/not detected intensity level was chosen as the most appropriate level for this wildlife habitat use survey. Presence/not detected intensity level surveys indicate the presence of a species, not its abundance or absence. This level will produce the results required to meet the needs of BC Hydro.

1.2 Background

Hayward Lake Recreation Area is an industrial and recreational area owned and managed by BC Hydro. BC Hydro's dual role has been documented in numerous reports, both internal (Hayward Lake Recreation Area Management Plan, 1997) and external (Kwantlen First Nation and Millennia Research Ltd. 1998). These reports document the process of recommendation-to-action as BC Hydro considered its options, as owner and steward of the land, regarding Hayward Lake. Selling surplus land for rural development was one of the options available to BC Hydro (Gurnsey, 1999). Another option was to welcome the previously unauthorized recreation on their private land by improving the site and upgrading the facilities. The latter became the challenge that BC Hydro accepted. Subsequent improvements to the site reduced the risk of personal injury to the public and increased the recreational use of the area. Consequently, this recreation area is heavily used by a large regional population.

2.0 Project Area

2.1 Project Area Description

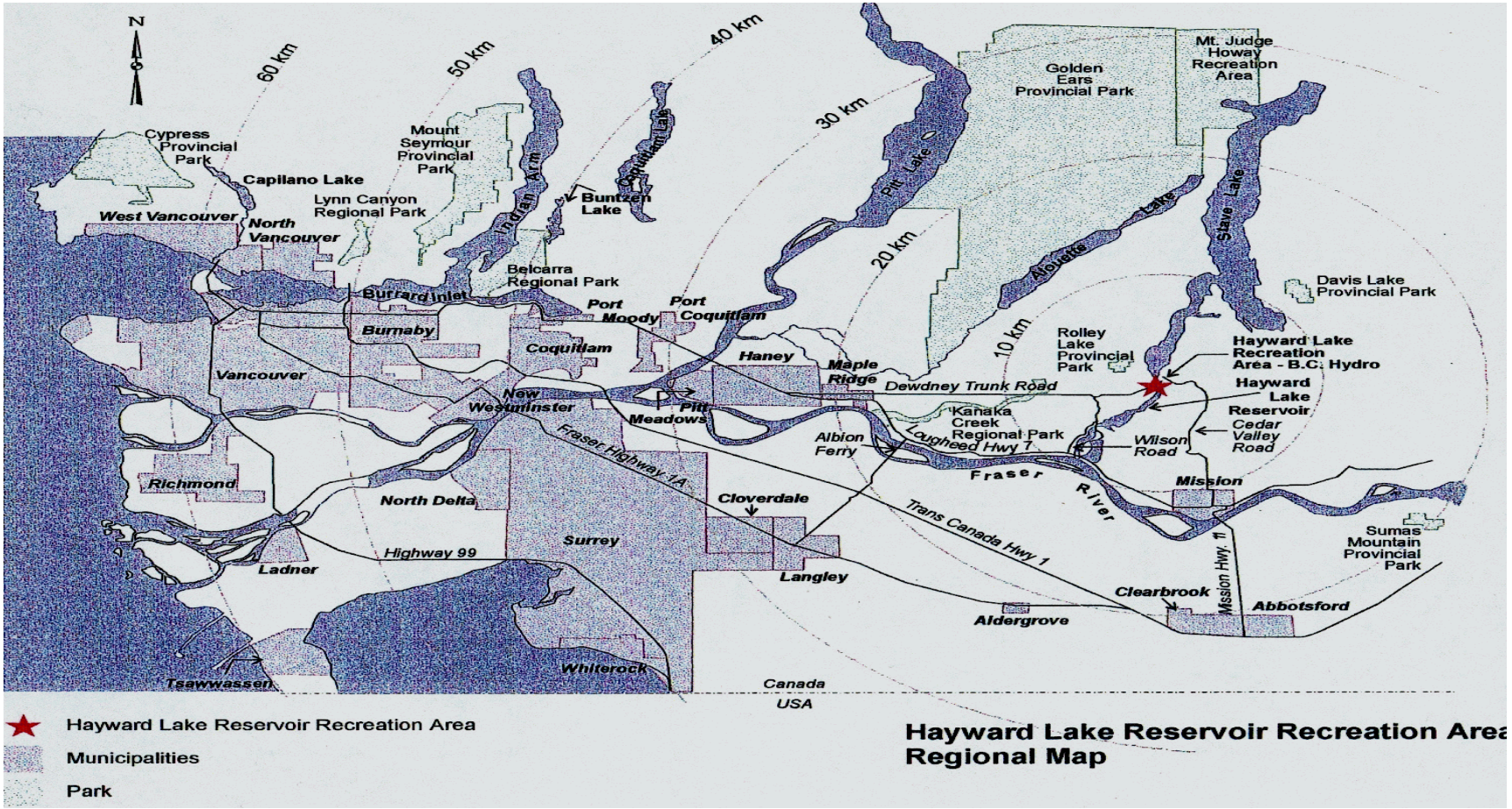
Hayward Lake Reservoir Recreation Area is located in the District of Mission, approximately 70 km east of Vancouver (Figure 1) and is accessed via the Lougheed Highway. Hayward Lake is the third in a series of man-made, hydroelectric reservoirs in the Stave River Valley that also include Stave and Alouette Lakes.

BC Hydro's private land surround Hayward Lake contains a 364 ha area designated as environmentally sensitive (Gartner Lee Ltd., 1994), and six documented First Nations archaeological sites (Kwantlen First Nations, Millennia Research Ltd., 1998). The entire site has been identified as potential parkland in the Greater Vancouver Regional District's "Major Issues" section of their Strategic Plan fro Creating Greater Vancouver's Green Zone (GVRD, 1992).

The study area is surrounded by numerous parks and recreation areas such as Rolley Lake Provincial Park and Stave Lake Recreation Area. Approximately three kilometres of the eastern shoreline of Hayward Lake abuts the District of Mission's Tree Farm Licence (TFL) #26. Hayward Lake Reservoir, a power-generation facility, has significant value to a variety of stakeholders.

Hayward Lake's recreation facilities include:

- Picnic area
- Pedestrian trail - 26 km in length
- Parking lot - 90 vehicles
- Boat launch - electric motors or non-motorized craft only
- Interpretive centre
- Interpretive signage throughout the recreation area



Map courtesy of BC Hydro

Figure 1. Area Map - Location of Hayward Lake Recreational Area

2.2 Ecology

Hayward Lake is situated in the Coastal Western Hemlock biogeoclimatic zone (Meidinger and Pojar, 1991). Forest vegetation includes immature Western hemlock (*Tsuga heterophylla*) and Western redcedar (*Thuja plicata*) in the understory. These two species, as well as mature Douglas-fir (*Pseudotsuga menziesii*), form the canopy layer. The study area is predominately second growth forest with isolated pockets of old growth.

BC Hydro's lakeside access roadbed has created several wetland areas by damming and segregating area run-off. A dismantled campsite area has been allowed to re-vegetate and has formed an open structured deciduous area. Both of these events have increased the area's habitat diversity.

Approximately ten year-round streams, surrounded with lush, riparian vegetation, flow into the lake.

Hayward Lake is situated in a valley. The steep valley sides rise approximately 500m above the lake's surface on the east and about 300m on the west (Griggs, 1976). This valley lies in a north-south direction. The entire area was modified during the Fraser Glaciation Period when the heights of land were rounded and the depressions were filled with glacial till, outwash and lacustrine deposits (Sigma Resource Consultants Ltd., 1974).

The Stave River, downstream of the Ruskin Dam located at the south end of Hayward Lake, is one of the most productive fish habitats in the lower mainland. Chum (*Oncorhynchus keta*), coho (*O. kisutch*), pink (*O. gorbuscha*) and chinook (*O. tshawytscha*) still spawn there. BC Hydro's stream restoration efforts include providing continuous flows during spawning and egg incubation periods to ensure the viability of these fish stocks.

Some of the wildlife species found in the area are Beaver (*Castor canadensis*), Mink (*Mustela vison*), Black-tailed Deer (*Odocoileus hemionus columbianus*), Black Bear (*Ursus americanus*), Cougar (*Puma concolor*) and American Bullfrog (*Rana catesbeiana*) (Varley, 1990). In addition, there are 94 species of birds that are known to frequent the area, either as transients, year-long residents or occasional visitors (BC Wildlife Watch, 1999).

2.3 Post Contact History

Before the first settlers arrived, the Kwantlen First Nation used the Stave River Valley's rich resources, such as the local forests and salmon rich river, to meet their essential needs.

In 1874, the Hudson's Bay Company established a post in the area where staves (hence the name Stave) were hewed to make barrels to transport salted salmon to eastern Canada (Grass, 1993). In 1910, the area was acquired by the BC Electric Company and two year later, the valley was logged, dammed and flooded. Power for the City of New Westminster has been generated there ever since.

BC Hydro eventually became the landowner of the site. In March 1997, BC Hydro approved the Hayward Lake Recreation Area Management Plan. The plan's purpose is to guide BC Hydro "in maintaining all aspects of recreation occurring on BC Hydro's Hayward Lake Reservoir Properties" (BC Hydro, 1997). Acting on this report, BC Hydro improved the site facilities by:

- Building a new power plant
- Converting the outdated power house into an interpretive centre
- Completing a lake perimeter trail
- Upgrading the beach and picnic areas.

3.0 Materials and Methods

3.1 Materials

The following materials were used for the vegetation and wildlife use survey:

- Aerial photographs SRS 5909-1 to SRS 5909-10
  Approximate scale 1:10,000, dated May 29, 1998
- Camera, Nikon FG and Pentax Zoom 70
- Film ASA 200
- Eslon Tape, 50 metre
- Clinometer, Suunto
- Compass, Azimuth
- Binoculars, Bushnell 10 X 50, and Nikon 9 X 25
- Data Collection form (Appendix A)

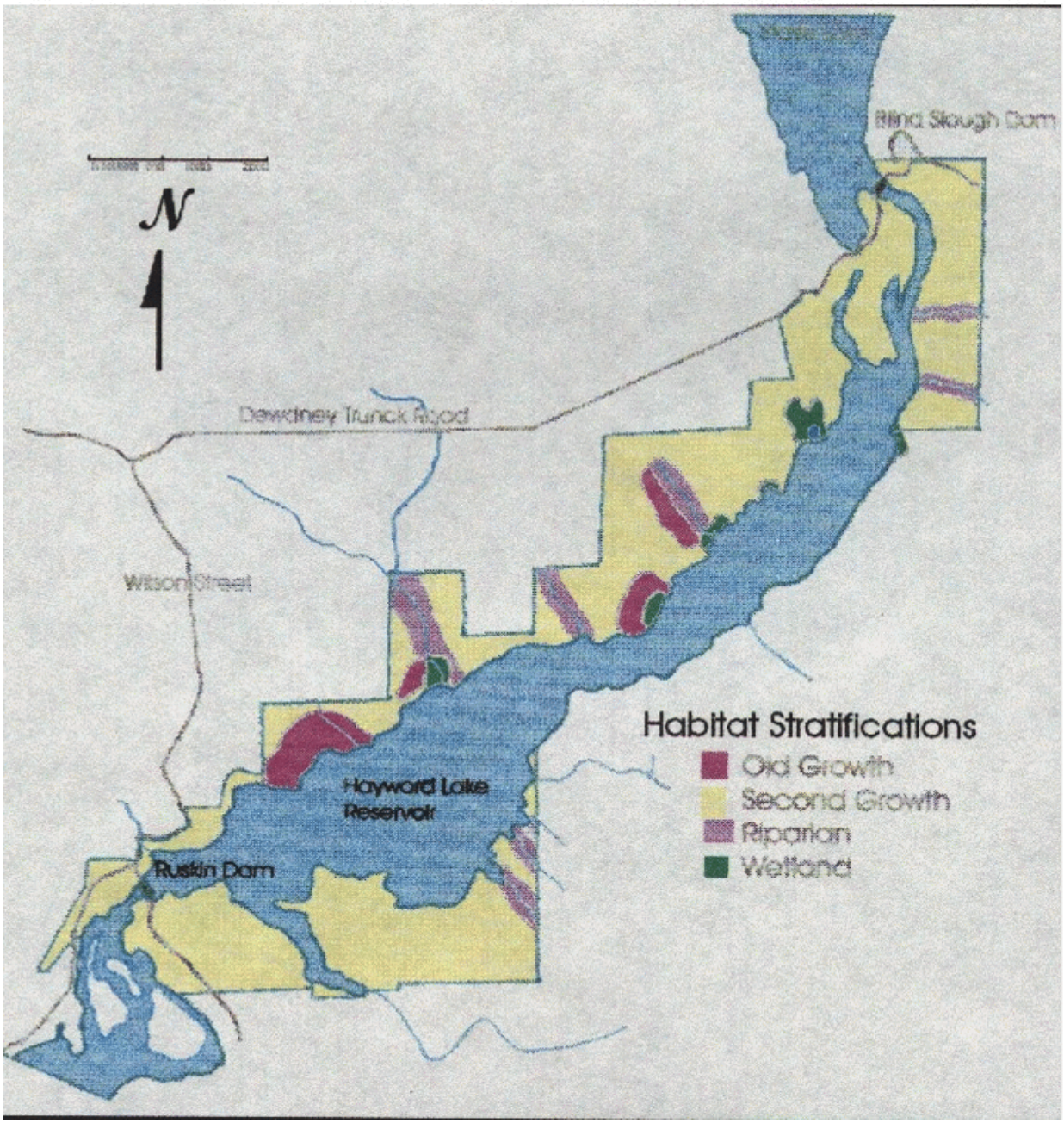
Pojar and MacKinnon's (1994) Plants of Coastal British Columbia was the guide used to identify vegetation. Field Guide to Birds: Western Region (Stokes and Stokes, 1996) was the guide for bird identification. The Mammals of British Columbia (McTaggart-Cowan and Guiguet, 1975) was used to confirm the species of mammals seen in the study area.

3.2 Methods

3.2.1 Habitat/Vegetation Stratification

Area stratification, based on habitat and vegetation type was completed using aerial photographs and maps. A field reconnaissance (walking the perimeter trail, canoeing the lake, and driving around the entire area) was performed to confirm the classifications. Four strata were identified and separated (Figure 2):

- Old Growth - areas displaying a complex structure, mature trees and no logging history
- Second Growth - areas displaying evidence of past logging activity
- Riparian - areas paralleling water courses (streams, creeks) and bounded by upland vegetation
- Wetland - semi-terrestrial areas having water as the dominant ecosystem feature



Map adapted from BC Hydro

Figure 2. Hayward Lake Reservoir Recreation Area Habitat Stratification Map

3.2.2 Vegetation Surveys

Once the area was stratified into four areas, random plots centres were identified. Four random plot centres in each of the strata were surveyed (Figure 3). Each plot centre was flagged and marked. From each centre, each vegetation layer was sampled as follows:

- Moss Layer - 2.5m radius for 0m - 0.5m vegetation heights
- Herb Layer - 5.64m radius for 0.5m - 1.0m vegetation heights
- Shrub Layer - 5.64m radius for 1.0m to 10.0m vegetation heights
- Tree Layer - 10.0m radius for greater than 10m heights.

A special data collection form, was developed in order to obtain sufficient and comparable information at each plot site. Details such as aspect, slope position, gradient, vegetation information, wildlife information, dates, etc. were collected at each site.

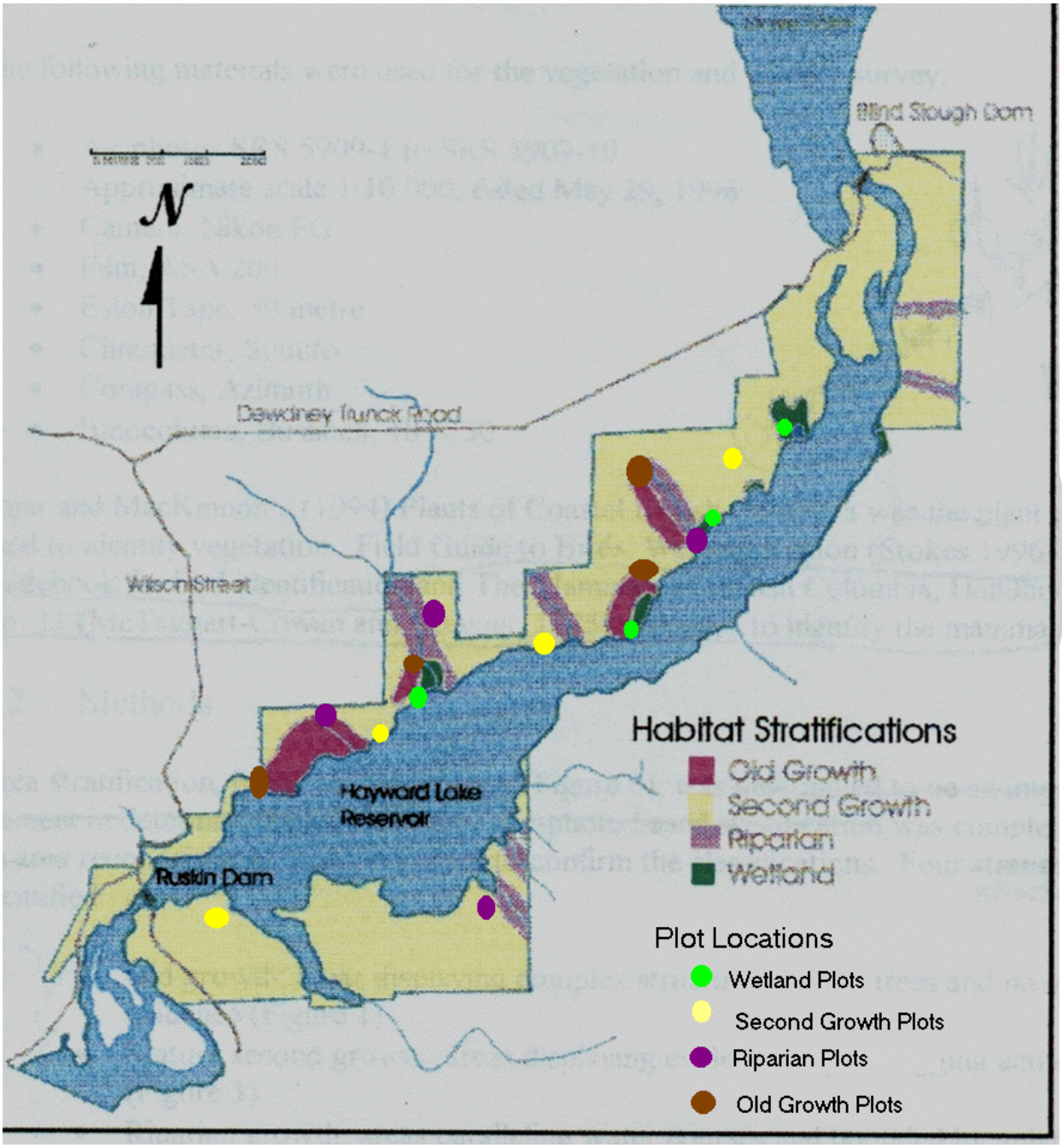
Hayward Lake was visited bi-weekly, on Wednesday mornings from October 1,1999 to March 29, 2000. At each plot site, the radius from the plot centre was measured with an Eslon tape to determine what plants would be counted and recorded. Vegetation height was also measured with the Eslon tape, with the exception of the trees, which were measured using a clinometer.

At each plot site, each layer, as listed above, was inventoried for the type of plants in each plot. The percentage of each type of plant present in its respective layer was estimated by the team.

3.2.3 Wildlife Surveys

A presence/not detected survey was completed for wildlife in each of the plots. While completing the vegetation inventory, each team member listened, watched or observed for signs or evidence of wildlife within the 10m plot radius. Bird calls, sightings of birds, deer browse, beaver browse, nests, woodpecker holes and scat were some of the evidence used to collect the inventory of animals present in the area.

Wildlife trees were counted in each plot within each strata. The definition from the Forest Practices Code was used to determine whether or not a tree was considered a wildlife tree. This definition states that any tree “dead or alive with special characteristics to support wildlife” is a wildlife tree.



Map adapted from BC Hydro

Figure 3. Plot Locations within Each Strata

4.0 Results and Discussion

4.1 Vegetation Structure and Composition

The following table shows the vegetation and percent cover in the four identified habitat types in the Hayward Lake Recreation Area, Mission, BC. The contents are arranged by vegetation layer:

Table 1. Vegetation and Percent Cover in Each of the Four Stratified Areas

	Old Growth (n=4)	%	Second Growth (n=4)	%	Riparian (n=4)	%	Wetland (n=4)	%
Tree Layer	Western hemlock Douglas-fir Bigleaf maple Red alder	10 10 25 25	Western redcedar Western hemlock Douglas-fir Sitka spruce Bigleaf maple Red alder Black cottonwood	5-40 50-55 40 5 60 5-20 10	Western redcedar Western hemlock Sitka spruce Bigleaf maple Red alder	5-20 5 40 2-30 20-55		
Shrub Layer	Vine maple Cascara Red elderberry Red huckleberry Salmonberry Thimbleberry Trailing blackberry	15 5 3 3 5 8 2	Vine maple Cascara Beaked hazelnut Red huckleberry Salmonberry Trailing blackberry Himalayan blackberry Hardhack	1 2 15 1 2 3 10 5	Vine maple Red elderberry Red huckleberry Salmonberry Trailing blackberry Himalayan blackberry Hardhack	8-25 3-5 1-5 2-5 2 5-10 15	Willows Salmonberry Hardhack Himalayan blackberry	80 5 30 5
Herb Layer	Bracken fern Sword fern Spiny wood fern Lady fern Licorice fern	1 70 1 5 1	Bracken fern Sword fern Spiny wood fern Maidenhair fern Licorice fern Vanilla leaf Tule Red clover Plantago Parentucellia Dandelion Burdock Pimpled kidney Siberian miner's lettuce Sorrel	1 5-60 1 1 2 1 5 30 20 5 10 5 1 1 5	Bracken fern Sword fern Spiny wood fern Lady fern Deer fern Licorice fern Fragile fern Creeping buttercup Horsetail Tall mannagrass Policeman's helmet	2-5 5 1-2 3 1 1 1 50 2 5 3	Tule Cattails Skunk cabbage English plantain Tall mannagrass	15 70 2 1 5
Moss Layer	Flat moss Lanky moss Electrified cat's tail	70 7 1	Oregon beaked moss Flat moss	1 5-10	Flat moss Lanky moss Streamside moss Curly hypnum moss Water starwort Mitrewort	1-5 5 1 2 1 10		

* Scientific names of all species are provided in Appendix B.

The species of plants found in the four strata were consistent with a Coastal Western hemlock (CWH) biogeoclimatic zone. Regeneration, in the understory, of Western redcedar and Western hemlock are indicative of a CWH zone. The shrubs found in each of the strata were also characteristic of the CWH biogeoclimatic zone. Vine maple, Cascara, Red huckleberry and others were found throughout the area. Sword fern and other ferns grew in all of the strata, except wetland areas - this is consistent with CWH biogeoclimatic zones as well. Creeping buttercup, Red clover and Himalayan blackberry were found in areas that had been disturbed, either by natural processes (slumping) or by man-made processes (development). These disturbed sites were either in riparian or second growth strata.

The total species richness for each stratum is as follows:

- Old growth = 19
- Second growth = 33
- Riparian = 30
- Wetland = 9

These figures indicate that there were more plant species found in the second growth stratum than the others. As this study was a winter vegetation survey and wildlife use, these figures are representative of the vegetation that would be found at this time of the year. Wetland had the least amount of plant species, primarily due to the amount of water in each of plots - water was between 60-85% of the area of each wetland plot.

4.2 Wildlife Use

The following table contains a list of the wildlife observed within Hayward Lake Reservoir Recreation Area.

Table 2. Wildlife Presence/Not Detected Within Stratified Areas

Common Name	Scientific Name	Old Growth	Second Growth	Riparian	Wetland
BIRDS					
American robin	*Turdus migratorius*			*	*
Bald eagle	*Haliaeetus leucocephalus*			*	
Belted kingfisher	*Ceryle alcyon*			*	*
Black capped chickadee	*Parus atricapiallus*		*	*	*
Bushtit	*Psaltriparus minimus*		*	*	
Canada goose	*Branta canadensis*		*		
Common raven	*Corvus corax*			*	
Dark eyed junco	*Junco hyemalis*			*	*
Glaucous-winged gull	*Larus glauscescems*		*	*	*
Golden-crowned kinglet	*Redulus satrapa*		*	*	
Great blue heron	*Ardea herodias*			*	*
Hooded merganser	*Lophodytes cucullatus*			*	*
Mallard	*Amas platyrhynchos*		*	*	*
Northwestern crow	*Corvus caurinus*		*		*
Red-breasted sapsucker	*Sphyrapicus ruber*	*		*	
Red-tailed hawk	*Buteo jamaicensis*		*		
Spotted towhee	*Pipilo maculatus*		*	*	
White-crowned sparrow	*Zomotrichia leucophrys*			*	*
Wood duck	*Aix sponsa*				*
Golden-crowned sparrow	*Zonotrichia atricapilla*				

Table 2. Wildlife Presence/Not Detected Within Stratified Areas

Common Name	Scientific Name	Old Growth	Second Growth	Riparian	Wetland
Common loon	*Gavia immer*				*
Red-winged blackbird	*Agelaius phoeniceus*				*
Lesser scaups	*Aythya affinis*				*
Barrow's goldeneye	*Bucephala islandica*				*
MAMMALS					
American Beaver	*Castor canadensis*				*
Black-tailed deer	*Odocoileus hemionus*		*	*	
Mole spp.	*Scapanus sp.*		*		
Douglas' squirrel	*Tamiasciurus douglasi mollipilosus*	*			
Total Species Diversity		2	11	16	16

The Hayward Lake Recreation Area hosts a wide variety of birds and mammals. Most of the animals and birds seen were in the riparian and wetland strata. These areas have more edible plants (eg. *Rubus ssp*.) and had more open spaces for which to see the animals. Birds were the most diverse group observed at Hayward Lake. Ducks, raptors, songbirds and herons were observed in the plots each time the team visited the area.

In addition to birds, evidence of Black-tailed deer (browse, tracks, scat) were seen in two strata (second growth and riparian) on a regular basis. Beavers were seen almost every time in the wetland plot at the North end of the lake.

The following table represents the average number of wildlife trees per plot at Hayward Lake Recreation Area.

Table 3. Average Number of Wildlife Trees per Plot

Old Growth	Second Growth	Riparian	Wetland
2	7	4	0

The aging deciduous trees are providing prime wildlife tree development opportunities as they die, which is why the average number of wildlife trees per strata is highest in the second growth strata. Wildlife trees observed in each of the plots were put to good use by a variety of birds. Sapsuckers, raptors and songbirds used the wildlife trees for foraging, roosting and perching. The variety of habitats in the area makes all the wildlife trees well utilized by the birds. The close proximity to food, water, nesting resources and the number of trees, allows for each bird and each species to have their own territory and space.

5.0 Conclusions

Hayward Lake Recreation Area is an ecologically diverse area. Four different habitat types were identified for this report, but many micro-ecosystems could be found within each of the four strata.

The vegetation is typical of a Coastal Western Hemlock biogeoclimatic zone and the trees, shrubs, herbs and mosses are typical of this zone. There were invasive species found in disturbed sites that are characteristic of the Lower Mainland and of the Coastal Western Hemlock zone.

Bird and mammal species are plentiful at this time of year and based on where the majority of the animals were found, rely heavily on the riparian and wetland habitats at Hayward Lake.

Wildlife trees were many, most of which were found in the second growth strata, due to the aging deciduous trees found there. These trees are an important feature in the ecosystem of Hayward Lake, as birds use the trees to roost, perch and forage for food.

6.0 Recommendations

This study was a winter vegetation and wildlife use survey. A year- long relative abundance wildlife study and vegetation inventory should be completed to obtain a thorough picture of the ecological base at Hayward Lake. This could be accomplished through a joint program with a post-secondary institutions, such as BCIT. This would provide BC Hydro with a detailed report of the data they require and would help to create a community partnership with benefits to both parties.

It is also recommended that a detailed wildlife tree analysis be completed and that all wildlife trees be mapped. This would provide BC Hydro with an opportunity to promote their continuing focus on environmental issues. This could also be a tourist opportunity for visitors to Hayward Lake. Specific trees could be mapped and indicated on the trail, so that visitors could see (from a distance) birds nesting, etc.

We recommend that wildlife/ecological values at Hayward Lake be protected.

References Cited

BC Hydro. 1989. BC Hydro Recreation Areas Map. Vancouver: BC Hydro.

BC Hydro. 1997. Hayward Lake Recreation Area Management Plan. Vancouver: BC Hydro. 57 p.

BC Wildlife Watch. 1999. Hayward Lake Reservoir Area Bird. [Web Page] **http://www3bc.sympatico.ca/driftwood/haywb1.htm** [Accessed 7 October 1999]

Gartner Lee Limited. 1994. District of Mission Environmentally Sensitive Areas Study: Draft Report. Burnaby: Gartner Lee Limited. 43 p.

Grass, A. 1993. Rolley Lake Provincial Park: Natural and Cultural History Theme Document. North Vancouver: BC Parks, South Coast Region.

Greater Vancouver Regional District (GVRD). 1992. Strategic Plan for Creating Great Vancouver's Green Zone: major Issues. Vancouver: GVRD.

Griggs, R. 1976. Land-Use Capabilities for Recreation at Hydro-Electric Reservoirs in British Columbia. Vancouver: University of British Columbia. 149 p.

Gurnsey, C. 1999/2000. BC Hydro, Manager, Community Interest, Power Supply Environment. Personal Communication. (604) 528-2452.

Kwantlen First Nation and Millenia Research Ltd. 1998. Report for the Hayward Lake Trail Archaeological Inventory and Impact Assessment Project. 16 p.

McTaggart-Cowan, I. and C.J. Guiguet. 1975. The Mammals of British Columbia: British Columbia Provincial Museum Handbook No. 11. Province of British Columbia Ministry of the Provincial Secretary and Travel Industry. 414 p.

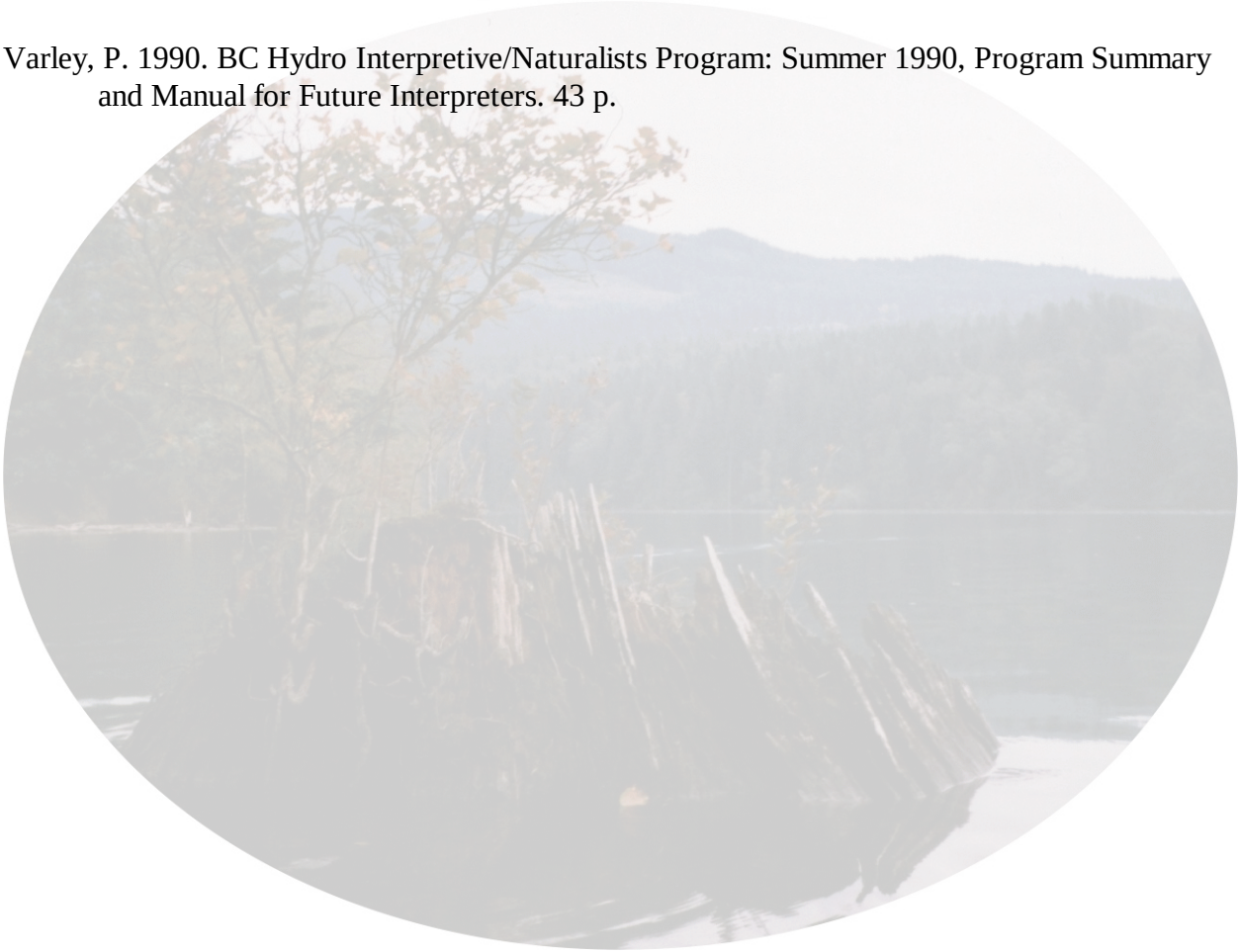
Meidinger, D. and J. Pojar. 1991. Ecosystems of British Columbia. BC Ministry of Forests. Victoria. 330 p.

Pojar, J. and A. MacKinnon. 1994. Plants of Coastal British Columbia. Vancouver. Lone Pine Publishing. 528 p.

Sigma Resource Consultants Ltd. 1974. Hayward Lake Recreation Proposal. 58 p.

Stokes, D. and L. Stokes. 1996. Field Guide to Birds: Western Region. Canada. Little, Brown and Company (Canada) Limited. 520 p.

Varley, P. 1990. BC Hydro Interpretive/Naturalists Program: Summer 1990, Program Summary and Manual for Future Interpreters. 43 p.



APPENDICES

APPENDIX A
Data Form

Vegetation and Habitat Inventory of Hayward Lake Reservoir Recreation Area

VEGETATION AND HABITAT FORM				**Date**	
Present/Not Detected Intensity					
Project Name					
Technicians					
Project Area	**Study Area**			**Site Location**	
Plot #					
Aspect	**Slope Gradient**			**Slope Position**	
FOLIAGE COVER INFORMATION					
Main Canopy Height (m)					
Layer	**Plot Size**				
Moss	**(0-0.5m)**	**% Cover**	**Species Composition**		
Herb/shrub (0-1m)					
High Shrub (1-10m)					
Tree Canop (>10m)					
Wildlife Trees					
Species	**Height (r**	**Type**	**Decay Class**	**Evidence of Use**	
Evidance of use: Other					
Tracks	Pellets	Nests	Browsing		
Comments					

Appendix B
List of Scientific Plant Names

List of Scientific Plant Names

COMMON NAME	SCIENTIFIC NAME
Western redcedar	*Thuja plicata*
Western hemlock	*Tsuga heterophylla*
Douglas-fir	*Pseudotsuga menziesii*
Sitka spruce	*Picea sitchensis*
Bigleaf maple	*Acer macrophyllum*
Red alder	*Alnus rubra*
Black cottonwood	*Populus balsamifera trichocarpa*
Vine maple	*Acer circinatum*
Cascara	*Rhamnus purshiana*
Beaked hazelnut	*Corylus cornuta*
Red elderberry	*Sambucus racemosa*
Red huckleberry	*Vaccinium parvifolium*
Salmonberry	*Rubus spectabilis*
Thimbleberry	*Rubus parviflorus*
Trailing blackberry	*Rubus ursinus*
Himalayan blackberry	*Rubus discolor*
Hardhack	*Spirea douglasii*
Bracken fern	*Pteridium aquilinum*
Sword fern	*Polystichum munitum*
Spiny wood fern	*Dryopteris expansa*
Lady fern	*Athyrium fillix-femina*
Deer fern	*Blechnum spicant*
Maidenhair fern	*Adiantum pedatum*
Licorice fern	*Polypodium glycyrrihiza*
Fragile fern	*Cystopteris fragilis*
Vanilla leaf	*Achlys triphylla*
Oregon beaked moss	*Kindbergia oregana*
Flat moss	*Plagiothecium undulatum*
Tule	*Scirpus lacustris*
Mannagrass	*Glycoria elata*
Cattails	*Typha latifolia*
Skunk cabbage	*Lysichitum americanum*
Plantain	*Plantago lancolata*
Lanky moss	*Rhytidiadelphus loreus*
Electrified cats's tail moss	*Rhytidiadelphus friquetrus*
Streamside moss	
Curly hypnum moss	

Water starwort	*Scouleria aquatica*
Mitrewort	*Hypnum subimponens*
Creeping buttercup	*Callitriche heterophylla*
Horsetail	*Mitella pentandra*
Policeman's helmet	*Ranunculus repens*
Red clover	*Equisetum ssp.*
Plantago	*Impatiens glandulifea*
Parentocellia	*Trifolium pratense*
Dandelion	*Plantago*
Burdock	*Parentucellia viscosa*
Canary reed grass	*Taraxacum officinale*
Pimpled kidney	*Arctium arundinacea*
Siberian miner's lettuce	*Phalaris arundinacea*
Sorrel	*Nephrome resupinatum*
	Claytonia sibirica
	Rumex actosella

Completed Data Forms