

AQUATIC VEGETATION SURVEY OF THE MAJOR PARKS,
GARDENS AND OTHER TOURIST ATTRACTIONS OF
SOUTHERN VANCOUVER ISLAND AND THE
LOWER FRASER VALLEY, 1988

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TABLE 1
THE PARKS AND GARDENS SURVEYED, LOCATIONS AND SURVEY DATES

Beacon Hill Park	Victoria	August 25, 1988
Royal British Columbia Museum	Victoria	August 25, 1988
Empress Hotel	Victoria	August 25, 1988
Iroquois Park	Sydney	August 25, 1988
Crystal Gardens	Victoria	August 26, 1988
Royal Roads Military College	Colwood	August 26, 1988
Fable Cottage	Saanich	August 26, 1988
Butchart Gardens	Saanich	August 29, 1988
Reifel Bird Sanctuary	Ladner	August 30, 1988
Fantasy Gardens	Richmond	August 30, 1988
Richmond Nature Park	Richmond	August 30, 1988
Jerico Beach	Vancouver	August 30, 1988
UBC Botanical Gardens	Vancouver	August 30, 1988
Vanier Park	Vancouver	August 30, 1988
Stanley Park	Vancouver	August 31, 1988
Devonian Park	Vancouver	August 31, 1988
Century Gardens	Burnaby	August 31, 1988
Deer Lake Park	Burnaby	August 31, 1988
Friendship Gardens	New Westminster	August 31, 1988
Central Park	Burnaby	August 31, 1988
John Hendy Park	Vancouver	August 31, 1988
Queen Elizabeth Park	Vancouver	September 1, 1988
VanDusen Botanical Gardens	Vancouver	September 1, 1988
Sardis Park	Sardis	September 1, 1988
Minter Gardens	Chilliwack	September 1, 1988
Westminster Abbey	Mission	September 2, 1988
Dr. Sun Yat-Sen Garden	Vancouver	October 24, 1988
Minoru Park	Richmond	October 27, 1988
Memorial Park	Vancouver	October 27, 1988

TABLE 1 (Continued)

Forest Lawn Cemetery	Burnaby	October 27, 1988
LaFarge Lake Park	Coquitlam	October 27, 1988
Mundy Park	Coquitlam	October 27, 1988
Como Lake Park	Coquitlam	October 27, 1988
Sendall Gardens	Langley	October 28, 1988
Aldergrove Lake Park	Langley	October 28, 1988
Burnaby Lake Park	Burnaby	October 28, 1988
False Creek Park	Vancouver	October 28, 1988
Diefenbaker Park	Tsawwassen	October 28, 1988
Centennial Park	Tsawwassen	October 28, 1988
John Dean Park	Saanich	November 6, 1988

TABLE 2
THE PRESENCE OF SPECIES OF MYRIOPHYLLUM IN THE PARKS AND GARDENS

Species	Park and Garden Pools
<u>Myriophyllum spicatum</u> (Eurasian water milfoil)	Minter Gardens Pool, (P45) Queen Elizabeth Park Pond, (P7) Queen Elizabeth Park Pond, (P8) Sardis Park Pond, (P15) Fantasy Gardens Pond, (P37) VanDusen Gardens Ponds, (P14) Sun Yat-Sen Garden, (P107) VanDusen Gardens Pond (P70)
<u>Myriophyllum heterophyllum</u>	Queen Elizabeth Park Pond, (P7) Queen Elizabeth Park Pond, (P10) Queen Elizabeth Park Pond, (P34)
<u>Myriophyllum hippuroides</u>	Jerico Beach Park Pond, (P32)
<u>Myriophyllum aquaticum ?</u>	Vancouver Public Aquarium, Rufus Gibbs Hall, Freshwater Tanks
<u>Myriophyllum aquaticum</u>	Minoru Park Ditch, (S83)

INTRODUCTION

Tourism is a major industry on southern Vancouver Island and in the lower Fraser Valley. The climate is benign and conducive to the development of Parks and Gardens which cater to tourism. Most Parks and Gardens include creeks and ponds as part of their design and often feature aquatic plants. Aquatic weeds, such as water milfoil, could cause substantial problems in these ponds. Many of these Park and Garden ponds have previously been visited as a part of the Ministry of Environment water milfoil surveys but they had never been systematically surveyed and compared in one season and in one report. The surveys reported here (Table 1), took place in the autumn of 1988 and the results are compared with such previous data as exists. Some changes have occurred and Eurasian water milfoil, as well as other native nuisance species, have been quick to exploit these new habitats (Table 2).

Each Park or Garden is discussed in a separate section below in alphabetical order by region. Topics covered include: the location of the site; an examination of the various ponds included; a listing of the aquatic plants found in 1988; a listing of previously found aquatic plants where applicable; a general description of the site. There also may be a discussion of the changes in vegetation, reasons for problems, predictions of future trends, and management recommendations, where these are applicable. All of the lakes and ponds are included in the Aquatic Vegetation Data Base compiled by the Water Management Branch and as such will have an identification number assigned. This number is the key to extracting useful information about each body of water and is appended to the name of the lake or pond each time the pond is referenced. Due to the nature of these sites, specimens are rarely able to be collected and saved or examined closely for identification. Most common plants are identified to species "in situ", but, where closer examination is required for a positive identification, the specimens are identified only to the genus level.

Aquatic plants may be reported from a lake one year and absent the next. This does not necessarily mean they have permanently disappeared from the site. Conditions may simply not have been conducive to growth in any given year or competition may have been overwhelming at a critical part of the season. It is also possible that the plant is or was present but was uncommon and overlooked or else the survey was carried out at the wrong time of the year while the plant was dormant. Only if a species does not reappear for several years in a row may it be presumed to have been eliminated. Many species have dormant periods when only roots or seeds may be present on the site and these may be difficult or impossible to find in this kind of survey.

An obvious trend had emerged from conducting this repeat survey. Most sites were previously surveyed in 1982 but a few had not been visited since 1978; the mean resurvey time was 7 years. For 17 of these urban sites, which had at least 5 species during the previous survey, the mean number of species found in 1988 and in the previous survey was calculated. These numbers are 8.9 species in prior surveys and 5.6 species in 1988 for a difference of 3.3 species in 7 years or a loss of 0.5 species per year per lake. In these urban sites this loss may be attributed to increasing eutrophication, increased heavy waterfowl use and competitive inhibition by introduced "weedy" species such as Myriophyllum spicatum and Nymphaea sp.

The appendix contains a series of outline sketches of many of the ponds surveyed. Each pond is labelled with its identification number. This number, the shape of the pond in the sketch and its relationship to other nearby ponds, will help one to distinguish between ponds in sites where there are several ponds in close proximity.

VANCOUVER ISLAND SITES

BEACON HILL PARK

Beacon Hill Park is a well established public park in Victoria with 7 small, shallow ponds which are connected by a system of surface streams and buried pipes. Water is circulated by pumps. All the ponds are continuously and heavily grazed by waterfowl. The water bodies include Fountain Lake (P13), Arbor Lake (P12), Goodacre Lake (P11), Rose Lake (P18), Deer Lake (P19), Queen's Lake (P20), Willow Lake (P75) and a decorative fountain pond at the service building (P76).

Surveys in 1982, 1986 and 1988 all indicated no aquatic plants in Rose Lake (P18), Deer Lake (P19), Queen's Lake (P20), Willow Lake (P75) or the Service Building Fountain Pool (P76). In 1988 the surface stream between Fountain Lake (P13) and Goodacre Lake (P11), which had several wide slow reaches formed by weirs, had dense beds of Elodea canadensis. In Fountain Lake (P13) the aquatic vegetation coverage is almost 100% and densities are very high. The proportion of Elodea canadensis to Nymphaea spp. is about 50:50. The lack of any appreciable open water probably accounts for the virtual absence of waterfowl in this pond in marked contrast to the very high waterfowl densities in the other ponds. Due, in part, to this high waterfowl loading, nutrient levels in the ponds are expected to be high, algal growths are vigorous, turbidity levels are high, visibility is very low and the ponds could be classed as eutrophic, at the least.

SPECIES LIST: FOUNTAIN LAKE (P13)

Species	1982	1986	1988
<u>Potamogeton pusillus</u>		x	
<u>Elodea canadensis</u>		x	x
<u>Nymphaea</u> spp.	x	x	x

SPECIES LIST: ARBOR LAKE (P12)

Species	1982	1986	1988
<u>Potamogeton pusillus</u>		x	

SPECIES LIST: GOODACRE LAKE (P11)

Species	1982	1986	1988
<u>Potamogeton pusillus</u>		x	
<u>Ceratophyllum demersum</u>		x	
<u>Spirodela polyrhiza</u>		x	
<u>Lemna minor</u> L.		x	
<u>Elodea canadensis</u>		x	x

BUTCHART GARDENS

These world famous gardens were established in an abandoned quarry near Brentwood over 80 years ago. The gardens cover 14 ha of a larger estate and are divided into several distinct portions including the Japanese, Italian, Rose and Sunken gardens. Ponds, streams and fountains are found throughout the gardens.

SPECIES LIST: HAVASU LAKE (P80), PARKING LOT

Species	1982	1988
<u>Nymphaea</u> sp.	x	x
<u>Potamogeton</u> <u>perfoliatus</u>	x	
<u>Iris</u> sp.		x

SPECIES LIST: JAPANESE GARDEN POOLS (P89)

Species	1982	1988
<u>Nymphaea</u> sp.	x	x
<u>Alisma</u> <u>plantago-aquatica</u>	x	x

Crane Pond (P87) and the Dolphin fountain (P88) do not have any plants. The Star pond (P86) and the Snail pond (P84) have only Nymphaea sp. There was no change in these four ponds from 1982. The Single Jet Fountain pond (P90) was not examined closely in 1982 and only Typha latifolia was recorded at that time. In 1988 additional species were recorded due to a close

inspection being carried out with the help of Butchart Garden staff. The additional species were Nymphaea sp., Myosotis laxa, Ceratophyllum demersum and Potamogeton pusillus. Similarly the Ross Fountain Pool (P81) was examined more closely in 1988 and in addition to the previously recorded Nymphaea sp., Iris pseudacorus and Lemna minor were found. Several ponds, called the Delivery Pond (P91), and the Upper Pond (P92), are used for water storage and are not in the public display area. They contain Typha latifolia, Chara sp., Ceratophyllum demersum and a green algal bloom. In 1982 the Italian garden pool (P85) contained only Nymphaea sp. but in 1988 additional species were found including Cyperus sp., Menyanthes trifoliata, Scirpus sp., Iris sp., Sagittaria sp. and a blue flowered Pontedaria sp.

In 1982 the Sunken Garden Lake (P82) and Sunken Garden Pool (P83) had only Nymphaea sp. and Lemna minor. In 1988 a Potamogeton, tentatively identified as P. pusillus was also found in the Sunken Garden Lake (P82) and a small Sparganium sp. was present in the Sunken Garden Pool (P83). One small pond (P93) is not in the public area but is an overflow and pumping pond on the stream leaving the Japanese Gardens. There are no plants growing here.

CRYSTAL GARDENS

The conservatory garden has a pool and stream system (P66) and a decorative fountain pond (P65). They both have substantial populations of large carp, koi, in them and no plants except for a tub of Cyperus alternifolius in the fountain pond. Teal and flamingoes are also present in the pool and stream system. The fountain pond (P65) previously had Myriophyllum aquaticum and a blue-flowered Nymphaea sp.

EMPRESS HOTEL

There is a small pond on the Empress Hotel grounds (P64). It is not well kept up and appears to be drained from time to time. In 1982 it contained Lemna minor, Nymphaea spp. and Potamogeton pusillus. In 1986 it was drained and dry, and in 1988 was again drained and dry as major construction and renovations were occurring at the Empress Hotel.

FABLE COTTAGE

This is a major tourist attraction on Cordova Bay north of Victoria. While there are grounds with gardens and a stream with pools, the water is a relatively minor part of the garden. The very narrow small streams do not have plants. The small pond fed by the stream has only a small Nymphaea plant. The Willow pond is bare and rocky, the Wishing Well is bare concrete with no plants, and the small pond in front of the Cottage contains some Nymphaea sp. and what is possibly a species of Pontederia. Unless the water gardens are substantially expanded in the future, this garden is not worth resurveying.

IROQUOIS PARK

This small park in Sidney is opposite the Washington State ferry terminal. The upper pond (P77) and lower pond (P62) are connected by a stream which has water cress, Rorippa nasturtium-aquaticum growing in it. Pumps recirculate the water which enters the upper pool by a waterfall. In 1987 someone introduced the water hyacinth, Eichhornia crassipes, to the lower pool but this subtropical species did not survive the winter.

SPECIES LIST: UPPER POND (P77)

Species	1982	1988
<u>Typha latifolia</u>	x	x
<u>Eleocharis</u> sp.	x	x
<u>Nymphaea</u> sp.	x	x
<u>Elodea canadensis</u>		x
<u>Potamogeton pusillus</u>		x

SPECIES LIST: LOWER POND (P62)

Species	1982	1988
<u>Eichhornia crassipes</u>	x	
<u>Nymphaea</u>	x	x
<u>Alisma</u> sp. ?		x
<u>Elodea canadensis</u>		x
<u>Potamogeton pusillus</u>		x
<u>Eleocharis</u> sp.		x
<u>Rorippa nasturtium-aquaticum</u>		x

JOHN DEAN PARK

This community park is on top of a hill in North Saanich. Formerly a private estate, it has a man-made pool fed by a stream from a swampy area. This pool (P33) is small and shallow and surrounded by a forest of large trees. It is a sheltered but shady site receiving sunlight only at high sun angles. Much of the surface is covered by Nuphar polysepalum. Those species seen in prior surveys but not recorded for 1988 may well still be present. The 1988 survey was carried out very late in the season and just after a long rainy period when water levels were quite high.

SPECIES LIST: JOHN DEAN PARK POND (P33)

Species	Prior to 1983	1988
<u>Nuphar polysepalum</u>	x	x
<u>Ranunculus flammula</u>	x	x
<u>Ranunculus aquatilis</u>	x	
<u>Oenanthe sarmentosa</u>	x	
<u>Elodea canadensis</u>	x	x
<u>Myosotis scorpioides</u>	x	x
<u>Callitriche heterophylla</u>	x	
<u>Rorippa nasturtium-aquaticum</u>	x	x
<u>Fontinalis antipyretica</u> L.	x	x
<u>Chara</u> L.	x	x

ROYAL BRITISH COLUMBIA MUSEUM

At the Archives building of the Museum there is a shallow, concrete pool (P63) in the native planting area. The pool is not planted and is apparently cleaned regularly. No plants have ever been observed to grow here. This pool need not be checked during subsequent surveys.

ROYAL ROADS MILITARY COLLEGE

This site is on the shore of Esquimalt Lagoon in Colwood. Formerly Hatley Park, a private castle and gardens, it is now a Royal Military College and research area. Much of the pond and stream system is maintained and fenced to keep deer out. Fish ladders permit cutthroat trout to reach the upper pool (P27). It is open to the public and is a popular and pleasant site; guided tours are available. Local camera clubs and movie and television studios make use of the site. There is a decorative fountain in front of the main building but no plants are found in it. The decorative pool in front of the Castle contains Nymphaea sp.. The stream system begins in a shallow reflective pool (P78) in front of and beneath the library building. No aquatic plants were in evidence during the visit. The stream leaves this pool by two routes and enters the Upper Pond (P29); no plants are found in the stream but two small wide spots or pools in the streams just before they enter the upper pond contain Nymphaea sp. and Sagittaria sp. The Upper Pond (P29) is in a fairly formal Japanese garden and has rock walls, paved paths, bridges and decks on pilings. The Middle (P30) and Lower (P31) Ponds are quite undeveloped with natural shorelines, heavily vegetated and with limited access. These ponds are quite eutrophic, experience algal blooms, have large numbers of waterfowl, and the inflow to the Middle Pond (P30), via a fish ladder, smells like sewage.

The bottom of the Upper Pond (P29) is covered in a very heavy algal mat which is mostly green but in places a bright purple alga is visible. It is spring fed and little piles of sand can be seen where the inflowing water comes in through the bottom. Cutthroat trout are clearly visible in this pond.

SPECIES LIST: UPPER POND (P29)

Species	Prior records	1982	1988
<u>Nitella</u> sp.	x		
<u>Callitriche heterophylla</u>	x		x
<u>Sparganium</u> sp.	x		
<u>Potamogeton natans</u>	x	x	x
<u>Lemna minor</u>		x	
<u>Hippuris vulgaris</u>			x
<u>Potamogeton foliosus</u>			x
<u>Potamogeton amplifolius</u>			x

SPECIES LIST: MIDDLE POND (P30)

Species	Prior records	1982	1988
<u>Sparganium angustifolium</u>	x		
<u>Callitriche heterophylla</u>	x		
<u>Ceratophyllum demersum</u>	x	x	
<u>Oenanthe sarmentosa</u>	x	x	
<u>Myosotis laxa</u>	x	x	x
<u>Alisma plantago-aquatica</u>	x	x	
<u>Lemna minor</u>	x	x	x
<u>Spirodela polyrhiza</u>	x	x	x
<u>Typha latifolia</u>	x	x	x
<u>Rorippa nasturtium-aquaticum</u>		x	x
<u>Iris pseudacorus</u>		x	x
<u>Ranunculus aquatilis</u>		x	
<u>Potamogeton natans</u>		x	
<u>Potamogeton foliosus</u>		x	x
<u>Corex</u> sp.			x
<u>Potamogeton amplifolius</u>			x
<u>Cyperus</u> sp.	x	x	x

The Middle Pond (P30) has a lot of floating algal mats near the inlet. Access to the shoreline and visibility into the water is poor and some plants may have been missed.

SPECIES LIST: LOWER POND (P31)

Species	Prior records	1982	1988
<u>Myosotis laxa</u>	x		x
<u>Sparganium angustifolium</u>	x		
<u>Ranunculus aquatilis</u>	x	x	x
<u>Ceratophyllum demersum</u>	x	x	x
<u>Lemna minor</u>	x	x	x
<u>Spirodela polyrhiza</u>	x	x	x
<u>Potamogeton natans</u>	x	x	x
<u>Potamogeton foliosus</u>		x	x
<u>Rorippa nasturtium-aquaticum</u>		x	x
<u>Callitriche heterophylla</u>		x	x
<u>Cyperus</u> sp.	x	x	x
<u>Chara</u> sp.			x

FRASER VALLEY SITES

ALDERGROVE LAKE PARK

This is a fairly wild park in Langley along the U.S. border. The lake (P108) is a man-made, concrete-lined shallow bowl meant for swimming. At the time of the survey the lake was posted as unfit for swimming since water quality could not be guaranteed. However the lake was dry. No future surveys are recommended for this site.

BURNABY LAKE PARK

This park surrounds Burnaby Lake (L138) and is mostly undeveloped wetland surrounded by industrial lands and traffic arteries. The west end of the park has a complex of sports facilities including playing fields and a pavilion for rowing. The rowing course on Burnaby Lake must be kept open by weed harvesting and dredging since the lake is shallow, warm, eutrophic, subject to runoff from surrounding urban and industrial areas and completely covered by Nymphaea sp. except where these plants are controlled. Water quality is poor and the lake is full of garbage and debris. Sulphates, chlorides, phosphorus and nitrogen levels in the water are high as a result of man's activities.

The water level was low at the time of survey and access to the shallow marginal beds of Nymphaea was not possible. Thus the actual margins of the lake were not surveyed adequately and some marginal species found in previous surveys were not recorded. This may account for part of the great decrease in species numbers seen on the survey but it appears that Burnaby Lake is following the trend noted in most urban lakes recently, that of increased eutrophication, high resident waterfowl use and decreased species diversity with dominance by a few aggressive weed species. The same trend is documented in Beaver Lake and Stanley Park where Nymphaea is again dominant.

SPECIES LIST: BURNABY LAKE (L148)

Species	Prior to 1978	1988
<u>Nymphaea</u>	x	x
<u>Iris pseudacorus</u>	x	x
<u>Typha latifolia</u>	x	x
<u>Potentilla palustris</u>	x	x
<u>Lemna minor</u>	x	x
<u>Callitriche heterophylla</u>	x	x
<u>Rorippa nasturtium-aquaticum</u>	x	x
<u>Sparganium angustifolium</u>	x	
<u>Utricularia minor</u>	x	
<u>Nuphar polysepalum</u>	x	
<u>Polygonum amphibium</u>	x	
<u>Scheuchzeria palustris</u>	x	
<u>Oenanthe sarmentosa</u>	x	
<u>Dulichium arundinaceum</u>	x	
<u>Callitriche verna</u>	x	
<u>Callitriche stagnalis</u>	x	
<u>Elodea canadensis</u>	x	
<u>Polygonum hydropiper</u>	x	
<u>Menyanthes trifoliata</u>	x	
<u>Veronica anagallis-aquatica</u>	x	
<u>Lysimachia thyrsiflora</u>	x	
<u>Alisma plantago-aquatica</u>	x	
<u>Potamogeton crispus</u>	x	
<u>Spirodela polyrhiza</u>	x	
<u>Equisetum fluviatile</u>	x	
<u>Ludwigia palustris</u>	x	

CENTENNIAL PARK

This park in Beach Grove, Tsawassen, contains a small pond (P5) which has long been known to have Myriophyllum spicatum. This weed is still present and occupies essentially 100% of the pond's surface area and volume; only a little Lemna minor was seen on this survey. It is possible that some of these former species are still present but were not seen in 1988 due to the late survey time.

SPECIES LIST: CENTENNIAL PARK POND (P5)

Species	Prior to 1980	1988
<u>Myriophyllum spicatum</u>	x	x
<u>Lemna minor</u>	x	x
<u>Eleocharis palustris</u>	x	x
<u>Zannichellia palustris</u>	x	
<u>Nymphaea</u> sp.	x	
<u>Potamogeton pectinatus</u>	x	
<u>Callitriche stagnalis</u>	x	
<u>Potamogeton crispus</u>	x	
<u>Elodea canadensis</u>	x	

CENTRAL PARK

Central Park is in Burnaby adjacent to Boundary road which is the border with Vancouver. There are two large ponds in this park, an upper pond (P73), the most northerly, which flows down a stream, through a small pool, and then via a stream to the lower pond (P74), which is the most southerly pond along Imperial Avenue and west of the golf course. These are shallow ponds frequented by ducks and have very little vegetation. The upper pond (P73) has Elodea canadensis and the lower pond (P74) has Callitriche heterophylla, Eleocharis sp. and Potentilla palustris. The small pool is barren.

COMO LAKE PARK

This small park in Coquitlam surrounds Como Lake (L708). The park and lakeshore are open and covered for the most part, by grass. A chip trail runs around the shallow lake which contains a little Typha latifolia and Menyanthes trifoliata as marginals, and floating Nymphaea sp. There is a lot of Brasenia schreberi in the lake and many fragments of Brasenia ripped up by the waterfowl; geese were prevalent.

DEER LAKE PARK

This park contains Deer Lake (L147), Heritage Village and Century Gardens. In Century Gardens there are two small ponds (P99) with Nymphaea sp. and Typha latifolia. Deer Lake itself contains mostly Nymphaea sp. but there is also some Potentilla palustris, Typha latifolia, Eleocharis sp., Iris pseudacorus, Equisetum fluviatile, Ceratophyllum demersum, Elodea canadensis and Potamogeton zosteriformis. Previous surveys up to 1977, done from a boat and covering the whole lake, produced a more extensive species listing.

SPECIES LIST: DEER LAKE (L147)

Species	Prior to 1978	1988
<u>Sparganium angustifolium</u>	x	
<u>Najas flexilis</u>	x	
<u>Oenanthe sarmentosa</u>	x	
<u>Callitriche verna</u>	x	
<u>Veronica scutellata</u>	x	
<u>Lysimachia thyrsiflora</u>	x	
<u>Potamogeton foliosus</u>	x	
<u>Nuphar polysepalum</u>	x	
<u>Nymphaea</u> sp.	x	x
<u>Typha latifolia</u>	x	x
<u>Potentilla palustris</u>	x	x
<u>Iris pseudacorus</u>	x	x
<u>Equisetum fluviatile</u>	x	x
<u>Ceratophyllum demersum</u>	x	x
<u>Elodea canadensis</u>		x
<u>Potamogeton zosteriformis</u>		x
<u>Eleocharis</u> sp.		x

DEVONIAN PARK

This small park is on the north side of Georgia Street, the west end, adjoining Stanley Park. It is mostly grass but contains a pond (P96) which drains into Coal Harbour. This pond contains Callitriche heterophylla and Nymphaea sp. and is, like all ponds in the area, frequented by ducks.

DIEFENBAKER PARK

This park is in southern Tsawwassen almost at the U.S. border. There is a small lake (P111) fed by a stream coming from a waterfall. The lake contains Elodea canadensis, Lemna minor, Typha latifolia, Alisma plantago-aquatica, Scirpus lacustris, and Potamogeton gramineus. One fragment of Myriophyllum spicatum was also found here and was removed. It is not known whether or not this species is established and rooted in the lake or if this was just a single chance fragment. A further survey in July 1989 should answer this question.

FALSE CREEK PARK

The pond in this new park, which fronts on False Creek, is fed by a stream arising on a hill nearly opposite the foot of Laurel Street. The pond itself (P112) is still new and bare but the feeder creek has a little Rorippa nasturtium-aquaticum and Callitriche heterophylla. It is anticipated that as the pond matures and plants are introduced that a flora will develop in spite of the fact that ducks have already moved in.

FANTASY GARDENS

This garden was opened in 1980 as Bota Gardens and was surveyed in 1981 and 1982. It subsequently changed hands and was expanded with the addition of the Biblical Gardens and a European Village shopping and crafts complex. Some of the ponds are concrete but the main pond system is plastic-lined and cobble-bottomed. Many common species indicative of eutrophic conditions in the Fraser Valley have been found here and though some may have been introduced by the waterfowl which frequent these ponds, others were likely inadvertently introduced with deliberate plantings of lilies.

The ponds are very shallow and become enriched by runoff from the surrounding gardens. Since the site is intensively maintained, aquatic weed species could be kept under control but Myriophyllum spicatum is present.

In addition to the main pond (P37) there is a shallow, cobbled pool in the Biblical Garden, a castle moat of bare concrete and a clock tower pool of bare concrete in the village, but not in the garden; none of these have any plants. The Japanese garden pool contains only Nymphaea sp. and the 2 small ponds on Little Mountain contain Nymphaea sp., Elodea canadensis, and Myriophyllum spicatum. The main pond (P37) contains only Nymphaea sp. and Typha latifolia but the stream at the far end of this pond has Lemna minor, Elodea canadensis, Sagittaria sp., Callitriche sp., Myriophyllum spicatum and Potamogeton zosteriformis.

SPECIES LIST: FANTASY GARDENS POND (P37),
PLUS ASSOCIATED CREEK

Species	Previous Records	1982	1988
<u>Callitriche heterophylla</u>	x	x	
<u>Nymphaea</u> sp.	x	x	x
<u>Sagittaria</u> sp.	x	x	x*
<u>Calla palustris</u>		x	
<u>Elodea canadensis</u>		x	x*
<u>Typha latifolia</u>		x	x
<u>Lemna minor</u>		x	x*
<u>Potamogeton crispus</u>		x	
<u>Potamogeton pusillus</u>		x	
<u>Ranunculus asiaticus</u>		x	
<u>Myriophyllum spicatum</u>		x	x*
<u>Potamogeton zosteriformis</u>			x*

* Only in stream portion, not in main pond

FOREST LAWN CEMETERY

This old cemetery in Burnaby has 3 ponds connected by a stream. The lowermost pond (P115) along the western borders of the Cemetery is fed by underground pipes from the other ponds and overflows down a surface drainage into a ravine which ultimately drains into Deer Lake (L147). This lower pond (P115) is quite deep and shaded, and has very little growing in it. The species found are Lemna minor, Riccia fluitans and Nymphaea sp.

The middle pond (P116) is small and shallow and fed by a surface stream from the upper pond. It contains a little Elodea canadensis, Nymphaea sp., and Lemna minor but a great quantity of Riccia fluitans and Egeria densa.

The upper pond (P117) is long and narrow and divided into 2 basins by a shallow sill. The upper basin has Riccia fluitans, Lemna minor, Nymphaea sp., Elodea canadensis and Scirpus lacustris. The lower basin has Lemna minor, Nymphaea sp., Elodea canadensis and Egeria densa.

FRIENDSHIP GARDENS

This small park is a Japanese garden presented to New Westminster by their sister city in Japan. It is situated adjacent to the City Hall and consists of several streams flowing down through the park with a series of ponds (P99) along each stream. They eventually both end in a common Pool at the Royal Avenue access. The plants found in this shady, tree-covered stream system include Lemna minor, Callitriche heterophylla and Potamogeton pusillus.

JERICO BEACH PARK

Jerico Beach Pond (P32) is fairly natural and uncultivated. It is shallow and muddy, heavily used by ducks and has a dense Typha latifolia and Scirpus lacustris fringe which makes it difficult to get near the shore in most places. The water level was quite low, down at least 50 cm from the high water mark, leaving extensive mud flats on which mats of the small compact terrestrial form of Myriophyllum hippuroides were growing. Other plants seen include Polygonum amphibium and Potamogeton crispus in the water.

SPECIES LIST: JERICO BEACH POND (P32)

Species	Prior Records (1979)	1988
<u>Scirpus lacustris</u>	x	x
<u>Typha latifolia</u>	x	x
<u>Myriophyllum hippuroides</u>	x	x
<u>Polygonum amphibium</u>	x	x
<u>Potamogeton crispus</u>		x
<u>Potamogeton natans</u>	x	
<u>Callitriche heterophylla</u>	x	
<u>Potamogeton pusillus</u>	x	
<u>Potamogeton epihydrus</u>	x	
<u>Potamogeton pectinatus</u>	x	

JOHN HENDY PARK

Trout Lake (L150) is found in this Park. A survey of the plants made by walking around the shore found only Typha latifolia, Iris pseudacorus, Lemna minor, Nuphar polysepalum and Myosotis laxa. A more extensive list of plants has been recorded from previous surveys prior to 1978.

SPECIES LIST: TROUT LAKE (L150)

Species	Prior Surveys	1988
<u>Sparganium angustifolium</u>	x	
<u>Menyanthes trifoliata</u>	x	
<u>Potentilla palustris</u>	x	
<u>Polygonum amphibium</u>	x	
<u>Sium suave</u>	x	
<u>Ranunculus flammula</u>	x	
<u>Polygonum hydropiper</u>	x	
<u>Oenanthe sarmentosa</u>	x	
<u>Lysimachia thyrsiflora</u>	x	
<u>Nuphar polysepalum</u>	x	x
<u>Iris pseudacorus</u>	x	x
<u>Lemna minor</u>	x	x
<u>Typha latifolia</u>	x	x
<u>Myosotis laxa</u>	x	x

LAFARGE LAKE PARK

This park is in Coquitlam north of the shopping center on the road to the Westwood racetrack. It is the site of an old gravel pit operation and Lafarge Lake (P113) is an old gravel pit. The lake is still relatively new and has no suitable habitat yet; it is mostly barren with only a little Typha latifolia around the margins. It will be some time before this lake and park mature and heal the scars of the former land use.

MEMORIAL PARK

This small Vancouver community park has a pond (P52) which was previously visited in 1980. It is, like most similar ponds, visited by waterfowl which keep down the quantity and variety of most aquatic plants. Usually only emergent marginal species can survive such heavy waterfowl use.

SPECIES LIST: MEMORIAL PARK POND (P52)

Species	1980	1988
<u>Iris pseudacorus</u>	x	x
<u>Potamogeton crispus</u>	x	
<u>Lemna minor</u>	x	
<u>Elodea canadensis</u>	x	

MINORU PARK

This is a large developed park in Richmond. The southern portion is a sports complex while the northern portion has gardens and ponds in the interior of the block but not generally visible from the roads. There is a hospital and other buildings around the margins of the park. Minoru Park Lake (P114) is a 2-lobed shallow lake with a footbridge across the narrow portion. This narrow portion is a wide stream with a slight elevation difference between the upper northern basin and lower southern basin of the lake. The plants found include Typha latifolia, Alisma gramineum, Nymphaea sp., Callitriche heterophylla and Polygonum hydropiper.

A drainage ditch (S83) south of the pond contained Typha latifolia, Alisma plantago-aquatica and large quantities of Myriophyllum aquaticum.

MINTER GARDENS

Minter Gardens near Chilliwack was first visited in 1982 when construction was still in progress in some areas. Only two ponds were reported on in 1982 but by 1988 these were 10 separate pools to survey. While waterfowl were not prevalent on either visit the garden is in an area frequented by ducks and host to a resident Canada Goose population. Many nearby bodies of water have populations of Myriophyllum spicatum so it is not too surprising that this aquatic weed is already established in Minter Gardens.

There is a small bare concrete decorative pool (P106) with no plants situated at the entrance gates. A small pool (P105) in the Alpine Garden section contains only Chara sp. The duck pond (P22) in the childrens zoo area is quite dirty due to waterfowl activities and no plants were seen. During the 1982 visit this pond was underdeveloped and held Typha latifolia, Rorippa nasturtium-aquaticum, Callitriche heterophylla and Ricciocarpus natans. The concrete-lined decorative pond (P104) which receives drainage

from (P103), drains to (P45). The main lake (P45) is a shallow natural bottom pond with the largest species list in the gardens; the drainage from several garden stream systems ends up here.

SPECIES LIST: MINTER GARDENS MAIN POND (P45)

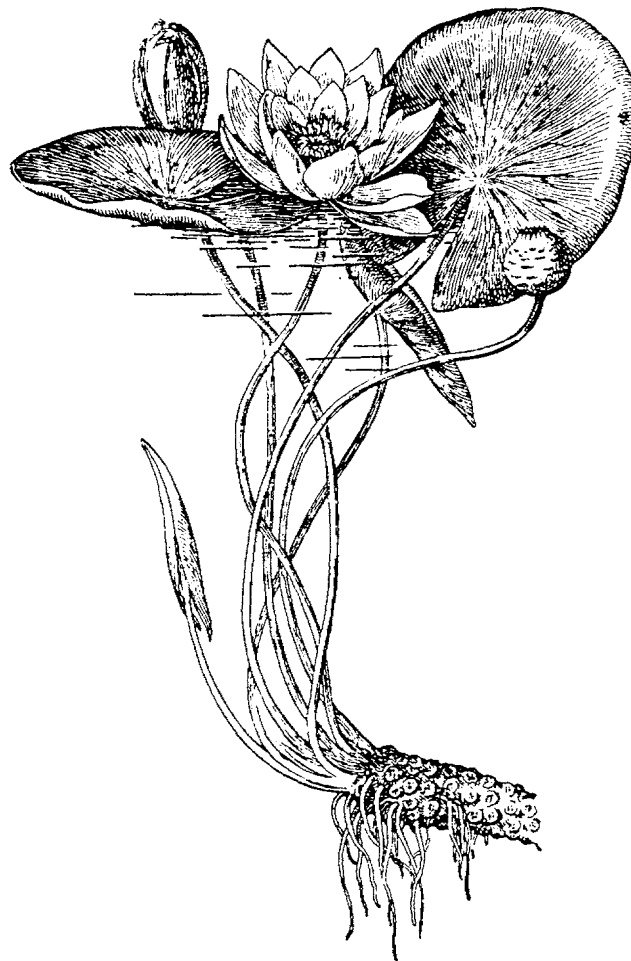
Species	1982	1988
<u>Sparganium</u>		x
<u>Typha latifolia</u>		x
<u>Nymphaea</u>	x	x
<u>Rorippa nasturtium-aquaticum</u>		x
<u>Potamogeton pusillus</u>		x
<u>Elodea canadensis</u>		x
<u>Sagittaria</u> sp.	x	x
<u>Iris pseudacorus</u>	x	x
<u>Chara</u> sp.	x	x
<u>Myriophyllum spicatum</u>	x	x
<u>Carex</u> sp.	x	

There is an interconnected system of pools and streams (P103). Pools 1 and 2 are on one stream and pools 3, 4, and 5 on another. Pool 4 is the Mill Pond with the waterwheel and is quite deep. It has a dense bed of an unidentified Potamogeton sp. The streams join and then run into another pond (P104), which contains Chara sp., Scirpus lacustris and Potamogeton crispus.

There is no natural stream system or ponds in the gardens and water is pumped from a well on the property to supply the streams and ponds.

SPECIES LIST: MINTER GARDENS POOLS/STREAMS (P103)

Species	(P103)	Pool 1	Pool 2	Pool 3	Pool 4	Pool 5
<u>Callitriche heterophylla</u>	x			x		
<u>Chara</u> sp.	x		x	x		
<u>Potamogeton</u>	x				x	
<u>Typha latifolia</u>	x		x			
<u>Nymphaea</u> sp.	x					
<u>Rorippa nasturtium-aquaticum</u>	x		x			



MUNDY PARK

This park in Coquitlam is heavily forested and is a wet peat bog habitat. There are two lakes, Mundy Lake (L115) and Lost Lake (L116), and a small pond (P36). These were previously surveyed in 1981.

SPECIES LIST: MUNDY PARK POND (P36)

Species	1981	1988
<u>Typha latifolia</u>	x	x
<u>Potamogeton natans</u>	x	x
<u>Lemna minor</u>	x	x
<u>Chara</u>		x
<u>Callitriche heterophylla</u>		x
<u>Potamogeton pusillus</u>	x	
<u>Brasenia schreberi</u>	x	
<u>Eleocharis palustris</u>	x	
<u>Sparganium angustifolium</u>	x	
<u>Rorippa nasturtium-aquaticum</u>	x	

SPECIES LIST: MUNDY LAKE (L115)

Species	1981	1988
<u>Brasenia schreberi</u>	x	x
<u>Nuphar polysepalum</u>	x	x
<u>Potamogeton natans</u>	x	x
<u>Menyanthes trifoliata</u>	x	x
<u>Dulichium arundinaceum</u>	x	x
<u>Nymphaea sp.</u>		x
<u>Scirpus subterminalis</u>	x	x

SPECIES LIST: LOST LAKE (L116)

Species	1981	1988
<u>Menyanthes trifoliata</u>	x	x
<u>Dulichium arundinaceum</u>	x	x
<u>Nuphar polysepalum</u>	x	x
<u>Sparganium angustifolium</u>	x	
<u>Callitriche heterophylla</u>	x	

QUEEN ELIZABETH PARK

This park is on a hill in south Vancouver near 33rd and Cambie. The Bloedel Conservatory is situated on the top and has a large pool (P67) inside. There are large carp living in this pool and no plants were seen in the 1988 survey. In 1982 Nymphaea sp., Myriophyllum aquaticum, Eichhornia crassipes and Pistia stratiotes were growing in this pool.

The top of the hill is an old quarry which has been landscaped and contains several pools, streams and a waterfall. These pools (P68) are small, shallow and clean and contain only Nymphaea sp. and Callitriche heterophylla, the same species as were found in 1982.

Below the golf course at the base of the hill there are a pair of ponds. The long narrow upper pond (P7) contains many species of aquatic plants and has been surveyed and mapped regularly to document the ongoing competition between Myriophyllum heterophyllum and M. spicatum. The round lower pond (P8) which receives drainage from the upper pond is almost completely covered by Myriophyllum spicatum.

SPECIES LIST: QUEEN ELIZABETH PARK (P7)

Species	Prior Records	1982	1988
<u>Myriophyllum heterophyllum</u>	x	x	x
<u>Myriophyllum spicatum</u>	x	x	x
<u>Callitriche heterophylla</u>	x	x	x
<u>Lemna minor</u>	x	x	
<u>Nymphaea</u> sp.	x	x	x
<u>Alisma plantago-aquatica</u>	x	x	x
<u>Potamogeton crispus</u>	x	x	x
<u>Myosotis laxa</u>		x	
<u>Elodea canadensis</u>	x		x
<u>Callitriche stagnalis</u>	x		
<u>Sparganium emersum</u>	x		
<u>Potamogeton foliosus</u>	x		x

SPECIES LIST: QUEEN ELIZABETH PARK (P8)

Species	Prior Records	1982	1988
<u>Myriophyllum spicatum</u>	x	x	x
<u>Alisma plantago-aquatica</u>	x	x	
<u>Lemna minor</u>	x	x	
<u>Myosotis laxa</u>		x	
<u>Elodea canadensis</u>	x		x
<u>Callitriche heterophylla</u>	x		
<u>Utricularia minor</u>	x		
<u>Sparganium emersum</u>	x		
<u>Myriophyllum heterophyllum</u>	x		
<u>Potamogeton foliosus</u>	x		
<u>Potamogeton crispus</u>	x		

West of ponds (P7) and (P8) there are 2 more ponds and one small pool. The pool (P69) is at roadside and fed by a small stream and waterfalls. It contains only Callitriche heterophylla and Rorippa nasturtium-aquaticum. Still further west there is an upper pond (P10) above the park road and a lower pond (P34) below the road.

SPECIES LIST: QUEEN ELIZABETH PARK (P10)

Species	Prior Records	1982	1988
<u>Elodea canadensis</u>	x		
<u>Callitriche stagnalis</u>	x		
<u>Callitriche heterophylla</u>	x	x	x
<u>Myriophyllum heterophyllum</u>	x	x	x
<u>Nymphaea</u> sp.	x	x	x

SPECIES LIST: QUEEN ELIZABETH PARK (P34)

Species	Prior Records	1982	1988
<u>Hypericum anagalloides</u>	x		
<u>Potamogeton crispus</u>	x		
<u>Nymphaea</u> sp.	x	x	x
<u>Elodea canadensis</u>	x	x	x
<u>Myriophyllum heterophyllum</u>	x	x	x
<u>Callitriche heterophylla</u>	x	x	x
<u>Rorippa nasturtium-aquaticum</u>			x

Reifel Bird Sanctuary

This sanctuary for migratory waterfowl is situated on the western tip of Westham Island in Ladner. The refuge area has about 850 acres of Fraser Estuary marsh land used by resident and migratory birds. The water courses present are mostly shallow, muddy sloughs and ditches heavily used by waterfowl. While there are extensive marsh and wetland vegetation areas conditions for the growth of aquatics are not very good and only Potamogeton pectinatus and Typha latifolia were seen. It is recommended that this area not be surveyed on subsequent occasions.

Richmond Nature Park

This park has a duck pond (P97) which is very shallow and muddy and has a high concentration of ducks. Only Lemna minor and Callitriche heterophylla were found growing here. It is recommended that this pond not be revisited at subsequent checks of park and garden ponds. This park is near the junction of No. 5 Road and Westminster Highway, SW of the Highway 99 intersection.

SARDIS PARK POND

This local community park just off Vedder Road is mainly used by the local residents and is mostly in a natural state, but closely surrounded by residences. It contains quite a few aquatic plants including Myriophyllum spicatum. The other species are Limosella aquatica, Nymphaea sp., Potamogeton pusillus, Typha latifolia, Elodea canadensis, Najas flexilis, Potamogeton pectinatus, Eleocharis sp., Myosotis laxa, Scirpus lacustris and Potamogeton zosteriformis. A previous record indicates that Potamogeton crispus has also been found here.

SENDALL GARDENS

These gardens were featured in an article on B.C. and Alberta gardens by Western Living magazine in May 1982. The gardens appear to have once been private but are now operated by Langley City, Parks and Recreation. The 2 ponds are not formal planted ponds and the upstream one (P109) is fenced and filled with waterfowl. No plants are found in the upstream pond (P109) but the downstream pond (P110) has a little Callitriche heterophylla. No revisit is recommended for this site.

STANLEY PARK

Stanley Park, established almost 100 years ago, is popular and heavily used by residents and visitors. The park contains about 1000 acres and the Vancouver Aquarium is on the grounds. The duck ponds in the zoo area (P79) and the streams and ponds which feed them contain only Iris sp. and occasionally Callitriche heterophylla due to the heavy grazing pressure by waterfowl. The railway ponds (P54) were not surveyed in 1988.

In the freshwater display tanks of the aquarium, many species of aquatic plants are used for background, shelter, breeding and aesthetics. Most of these are tropical or subtropical and do not constitute a problem here in British Columbia. On a previous visit Myriophyllum spicatum was being used extensively in these tanks but this practice has now been discontinued. In 1982 Elodea densa, Vallisneria americana, Cabomba sp. and Myriophyllum aquaticum were identified in these tanks in the Rufus Gibbs and Amazon Halls. These species are still in use and in addition Elodea canadensis and Salvinia natans were identified in 1988. In the Amazon Hall there is a pool (P71) with several tropical species. Salvinia natans was identified and other species were tentatively identified as Ceratopteris, Cabomba sp. and Vallisneria sp.

Beaver Lake (L129) is a shallow bog lake with intensive waterfowl use and appears to be in the later stages of filling in. In 1982 a noticeable increase in Nymphaea sp. coverage, to about 80% of the surface area, over

previous visits was noted. In 1988 this coverage was up to about 95%. Only a narrow stream corridor of open water was noted and water levels were down such that most of the lake was a mud flat with insufficient water for ducks to swim. Menyanthes trifoliata is locally abundant, Nuphar polysepalum is present but scarce and the other species found are all marginal emergents including Typha latifolia, Iris pseudacorus, Potentilla palustris and Equisetum fluviatile. Fish (carp?) were observed in the muddy water. Old herbarium records for this lake indicate greater historical diversity which has apparently succumbed to heavy waterfowl use and eutrophication.

Lost Lagoon (P46) was apparently once open to the sea at one end. It also suffers from very heavy waterfowl pressure. It contains only the marginal Typha latifolia, Scirpus lacustris and Iris pseudacorus. Previous records indicate that Ruppia maritima, Montia fontana and Oenanthe sarmentosa at least, were once found here but have now been eliminated.

SPECIES LIST: BEAVER LAKE (L129), STANLEY PARK

Species	Prior Records	1982	1988
<u>Myriophyllum hippuroides</u>	x		
<u>Lemna minor</u>	x		
<u>Montia fontana</u>	x		
<u>Veronica scutellata</u>	x		
<u>Oenanthe sarmentosa</u>	x		
<u>Brasenia schreberi</u>	x		
<u>Ranunculus flammula</u>	x		
<u>Utricularia minor</u>	x		
<u>Utricularia gibba</u>	x		
<u>Dulichium arundinaceum</u>	x	x	
<u>Nuphar polysepalum</u>	x	x	x
<u>Nymphaea</u> sp.	x	x	x
<u>Menyanthes trifoliata</u>	x	x	x
<u>Iris pseudacorus</u>	x	x	x
<u>Potentilla palustris</u>	x	x	x
<u>Typha latifolia</u>	x	x	x
<u>Equisetum fluviatile</u>			x

DR. SUN YAT-SEN CLASSICAL CHINESE GARDEN

This relatively new formal Chinese garden is located at 578 Carrall Street in Vancouver, north of East Pender and adjacent to the False Creek lands. It is a walled garden with a large pool (P107) in the centre as its focus. This pool is a milky colour with a lot of particulate matter and visibility is very poor. There are Nymphaea spp. floating on the surface and a little emergent Sagittaria spp. Submerged plants include a little Ceratophyllum demersum and Potamogeton crispus and a lot of Myriophyllum spicatum.

THE UBC BOTANICAL GARDENS

The UBC Botanical Garden is formed of many different teaching, research and decorative plots distributed throughout the campus. The main sites are the Nitobe Memorial Garden near the Asian Center and International House, and the main gardens south and east of the stadium at 16th Ave. and S.W. Marine Drive. The Asian Centre has a shallow concrete reflecting pool all around the perimeter but there are no plants found in this pool.

The Japanese Nitobe Memorial Garden was opened in 1960 and contains an artificial concrete-lined pond (P23) which contains many large herbivorous carp. Nymphaea sp., Callitriche heterophylla, Iris pseudacorus and a yellow flowered Nymphoides? sp. were found here in 1982; these are still the only species present in 1988.

A small pond in the Alpine portion of the main garden contained Liriope minor, Typha minima and Fauria crista-galli in 1982 and is dominated by a yellow flowered Nymphoides? sp. in 1988. The long, narrow main pond (P98) alongside the Evolutionary Garden contained Potamogeton natans, Typha latifolia, Eleocharis sp., Scirpus lacustris, Callitriche heterophylla and Nymphaea sp.

J.K. Henry Lake (P21) is a shallow boggy pond in the B.C. Native Plant Garden. Some non-native plants have been deliberately introduced here and become naturalized. Notable examples are 2 aquatic ferns from the southwestern U.S., Azolla filiculoides and Pilularia americana; this latter has spread aggressively into the shallow marginal areas. The Myriophyllum verticillatum and Azolla filiculoides, prevalent during the 1982 survey were not seen in 1988.

SPECIES LIST: J.K. HENRY LAKE (P21), U.B.C. BOTANICAL GARDENS

Species	1982	1988
<u>Scirpus lacustris</u>	x	x
<u>Menyanthes trifoliata</u>	x	x
<u>Potamogeton natans</u>	x	x
<u>Equisetum fluviatile</u>	x	x
<u>Myriophyllum verticillatum</u>	x	
<u>Azolla filiculoides</u>	x	
<u>Eleocharis palustris</u>	x	x
<u>Typha latifolia</u>	x	x
<u>Callitriche heterophylla</u>	x	
<u>Iris pseudacorus</u>	x	x
<u>Utricularia minor</u>	x	x
<u>Carex sp.</u>		x
<u>Pilularia americana</u>		x
<u>Lemna minor</u>		x
<u>Elodea canadensis</u>		x
<u>Sagittaria cuneata</u>		x
<u>Sparganium angustifolium</u>		x
<u>Alisma plantago-aquatica</u>		x
<u>Potamogeton amplifolius</u>		x
<u>Utricularia vulgaris</u>		x

VAN DUSEN BOTANICAL GARDEN

This garden was opened in 1975 on the site of the old Shaughnessy Golf Course in Vancouver at 37th and Oak, and is operated by the Vancouver Board of Parks and Recreation and the Vancouver Botanical Gardens Association. It is a large, 22.5 ha, garden which is still under development in some areas. The gardens have been surveyed before and have had problems with Myriophyllum spicatum; none was seen in September 1982 but it was evident again in 1988. There are two small isolated pools: (P101) behind MacMillan Bloedel Place, which was dry in 1988, and (P100) in the Rock Garden, which had only Nymphaea sp. There are also three separate systems of interconnected ponds and streams. The main system (P14) which is the most extensive, the condominium pond (P70) behind MacMillan Bloedel Place and abutting the Condominium Complex, and the Maze pond and stream system (P102) in the south west corner of the gardens. Each of the separate ponds within each system has been given a number and surveyed separately.

SPECIES LIST: VAN DUSEN POND (P102), MAZE PONDS AND STREAM

Species	(P102)	Pool 11	Pool 12
<u>Potamogeton crispus</u>	x	x	x
<u>Potamogeton pusillus</u>	x		x
<u>Nymphaea</u> sp.	x	x	x
<u>Eleocharis</u> sp.	x		x

SPECIES LIST: VAN DUSEN POND (P70), MAZE PONDS AND STREAM

Species	Pool 9	Pool 8	(P70)
<u>Callitriche heterophylla</u>		x	x
<u>Lemna minor</u>		x	x
<u>Potamogeton crispus</u>		x	x
<u>Nymphaea</u> sp.		x	x
<u>Eleocharis</u> sp.		x	x
<u>Scirpus subterminalis</u>		x	x
<u>Nymphaea</u> sp. (yellow)		x	x
<u>Myriophyllum spicatum</u>		x	x

SPECIES LIST: VAN DUSEN POND (P14), MAIN POND/STREAM SYSTEM

Species	Pool 1	Pool 2	Pool 3	Pool 4	Pool 5	Stream 6	Pool 7	(P14)
<u>Alisma plantago-aquatica</u>	x		x	x	x ✓	x ✓	✓	x ✓ o
<u>Callitriche heterophylla</u>			x ✓	x ✓	x ✓	x ✓		x ✓ o
<u>Myosotis laxa</u>		✓	✓			✓	✓	✓ o
<u>Nymphaea sp.</u>	x ✓	x ✓	x ✓	x	x ✓		x ✓	x ✓ o
<u>Nelumbo sp.</u>		✓						✓ o
<u>Potamogeton crispus</u>	x ✓	✓	✓	x ✓	x ✓		x ✓	x ✓ o
<u>Menyanthes trifoliata</u>	x	x ✓	x					x ✓ o
<u>Typha latifolia</u>	x ✓	x ✓	✓		x ✓		✓	x ✓ o
<u>Sagittaria latifolia</u>	✓	✓						✓ o
<u>Scirpus lacustris</u>	x ✓	x	✓					x ✓ o
<u>Polygonum amphibium</u>	✓							✓ o
<u>Eleocharis palustris</u>			✓					✓ o
<u>Lemna minor</u>	x	x	x ✓	x ✓		x		x ✓ o
<u>Potamogeton foliosus</u>				✓				✓ o
<u>Elodea canadensis</u>					x ✓			x ✓ o
<u>Potamogeton praelongus</u>								o
<u>Myriophyllum spicatum</u>	x	x	x					x o
<u>Ranunculus flammula</u>								o
<u>Polygonum hydropiper</u>								o
<u>Veronica americana</u>								o
<u>Mimulus guttatus</u>								o
<u>Montia fontana</u>								o
<u>Eleocharis acicularis</u>								o
<u>Iris pseudacorus</u>	x ✓	✓	x			x		x ✓
<u>Ceratophyllum demersum</u>	x	x ✓	x					x ✓
<u>Potentilla palustris</u>		✓						✓
<u>Acorus calamus</u>	✓							✓
<u>Alisma gramineum</u>				x				x
<u>Nitella sp.</u>	✓							✓
<u>Scirpus subterminalis</u>					✓		✓	✓
<u>Nymphoides sp. (yellow)</u>	x				x			x
<u>Potamogeton pectinatus</u>					x			x

x = 1988; ✓ = 1982; o = prior records

VANIER PARK

This park on the south side of English Bay in Vancouver contains the Vancouver Maritime Museum, the Vancouver Museum and the H.R. MacMillan Planetarium. On the grounds north of the Vancouver Museum there are two shallow ponds. The upper pond (P94) contains a little Nymphaea spp. and the lower pond (P95) mats of the submerged Limosella aquatica.

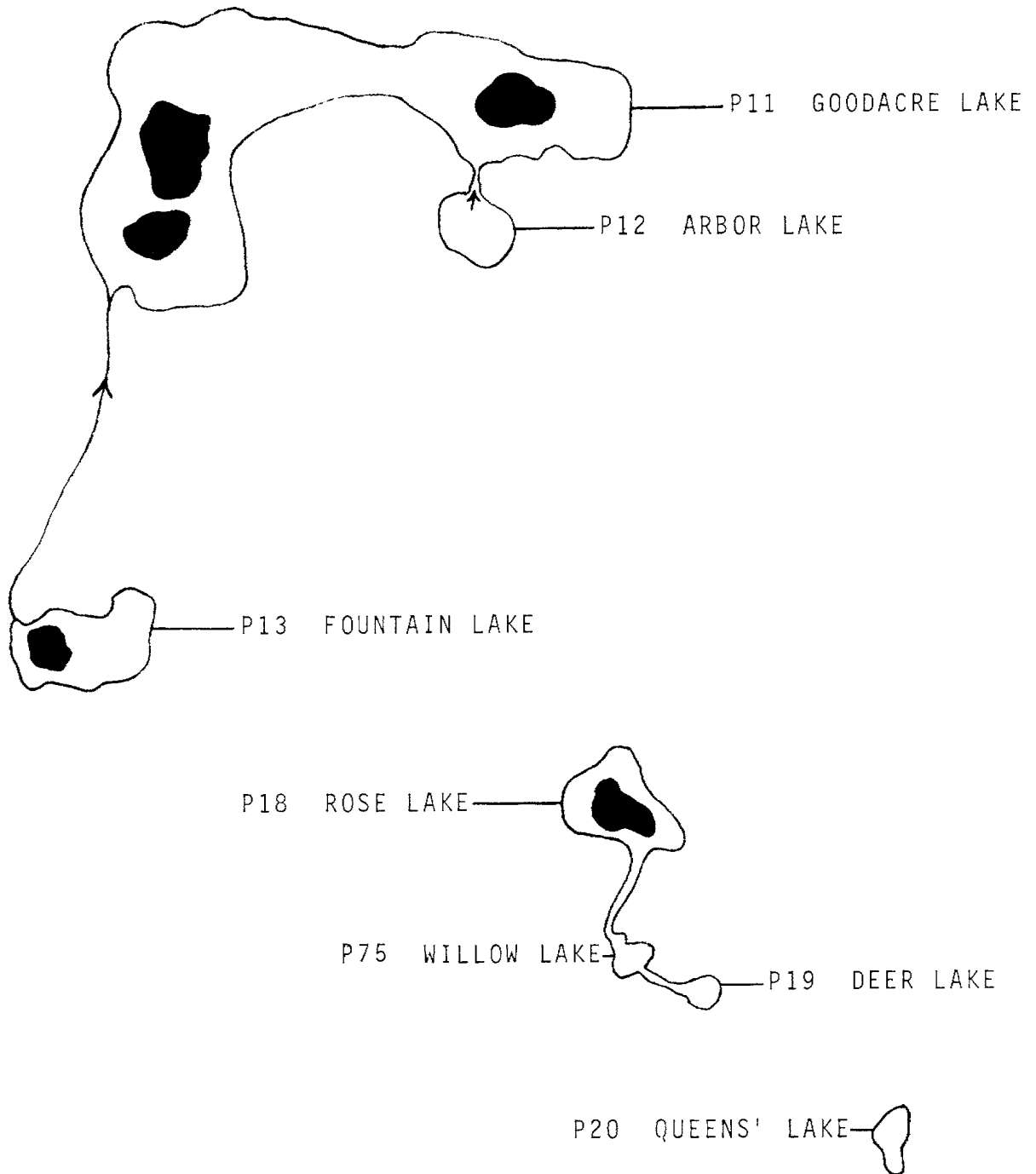
WESTMINSTER ABBEY

This monastery is situated just east of Mission, north of the Fraser River. Visitors are welcome on the grounds and within parts of the Abbey with a guide. Mary Lake (P27) is found on the grounds just downhill to the west of the Abbey parking lot. It appears to be an artificial pond formed by an earthen dam across a valley. Typha latifolia, Eleocharis sp. and Potamogeton pusillus were found here in 1988. A previous visit in 1978 found only Callitriche sp. and Potamogeton epihydrus.

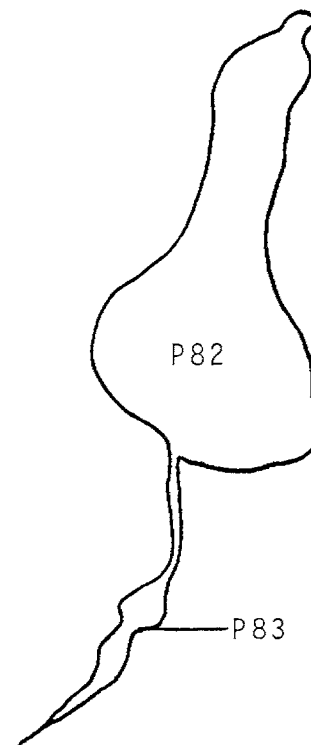
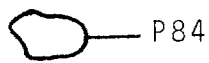
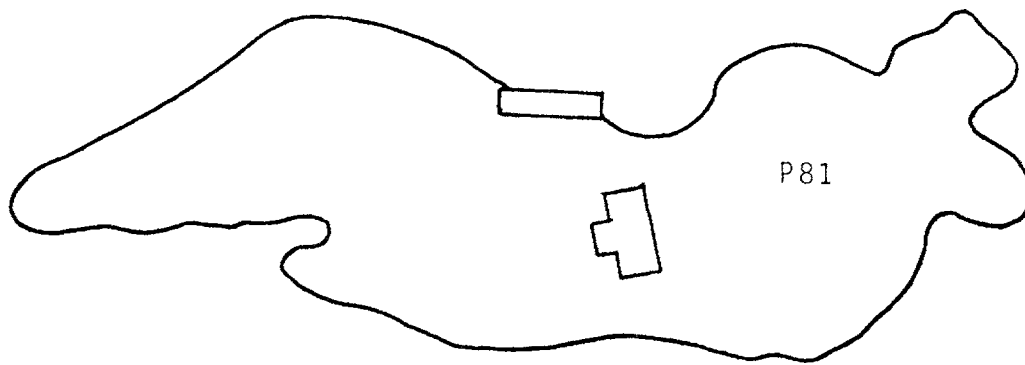
APPENDIX

Outline Sketches of Many of the Ponds

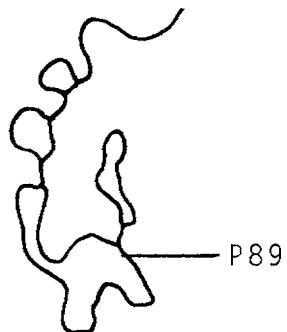
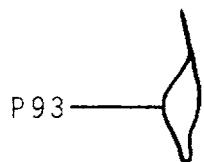
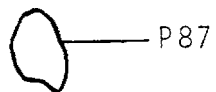
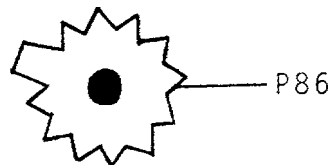
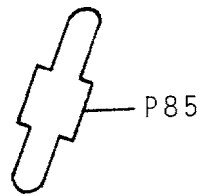
BEACON HILL PARK



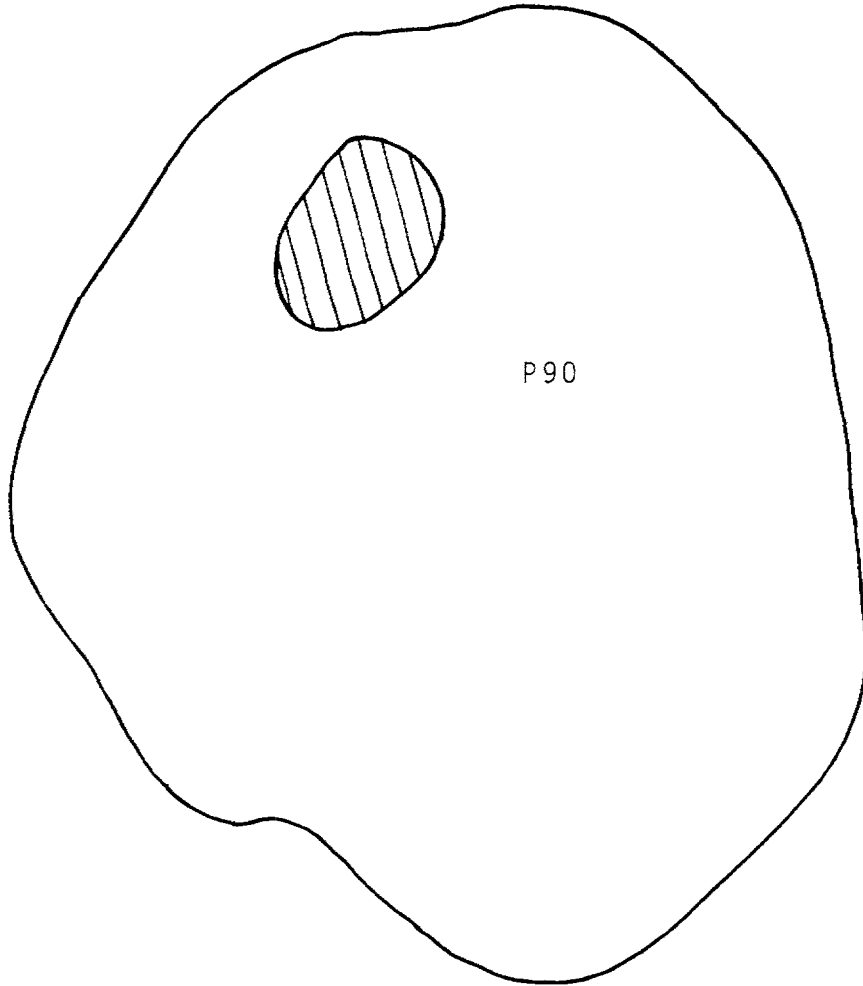
BUTCHART GARDENS



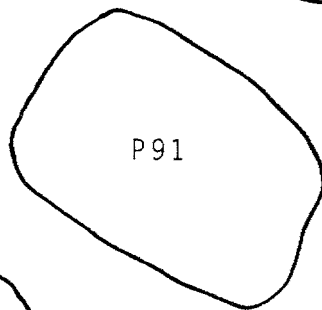
BUTCHART GARDENS



BUTCHART GARDENS



P90

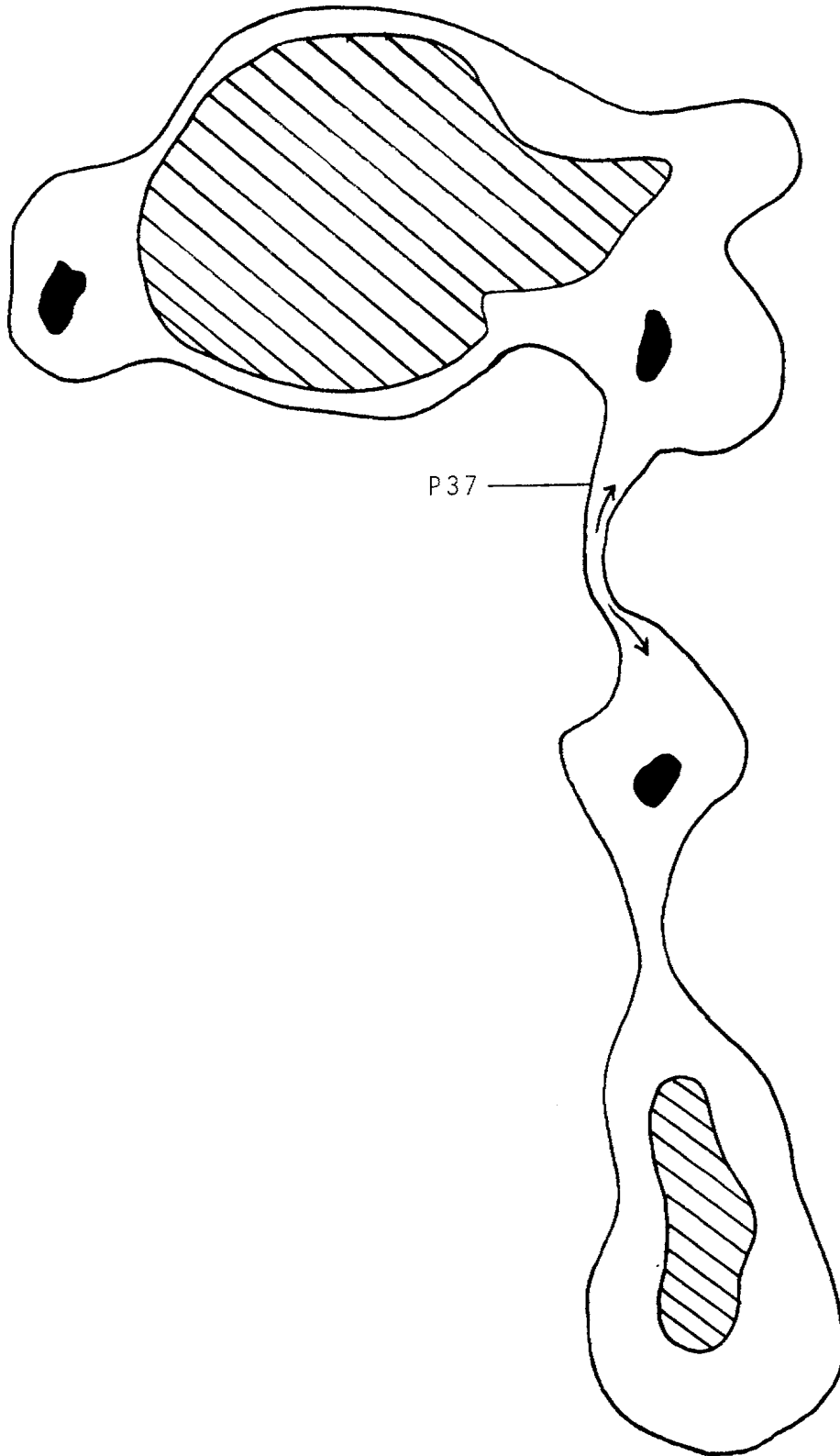


P91

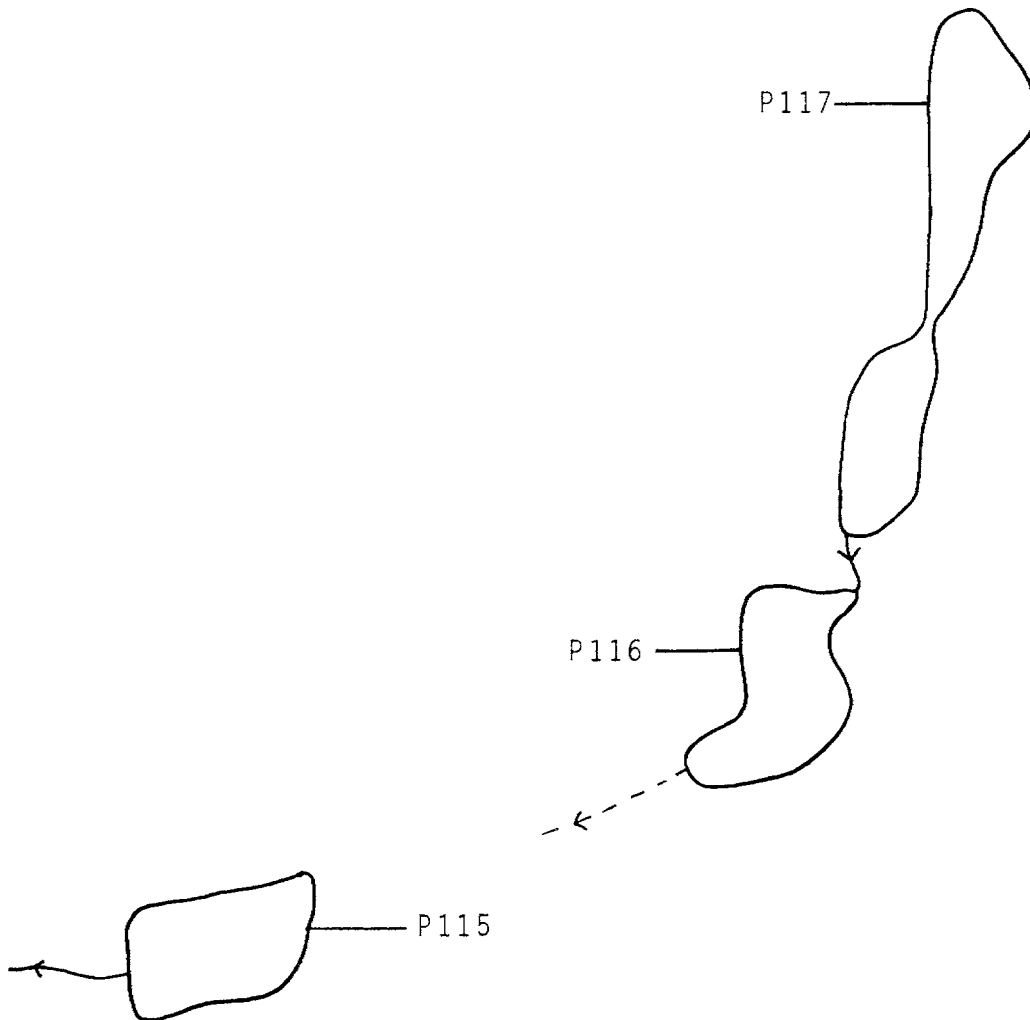


P92

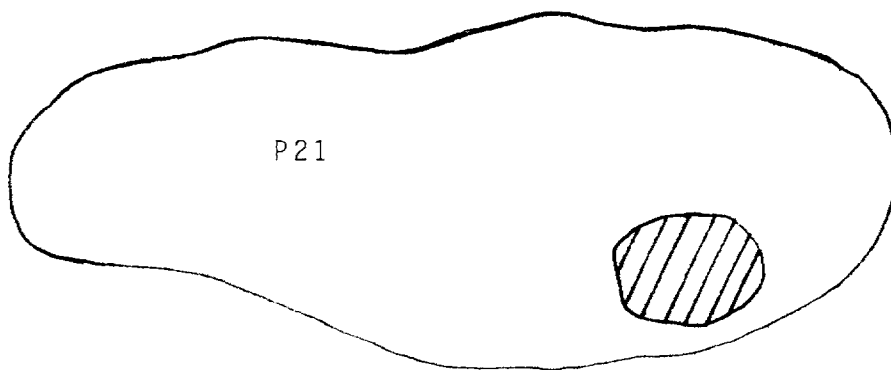
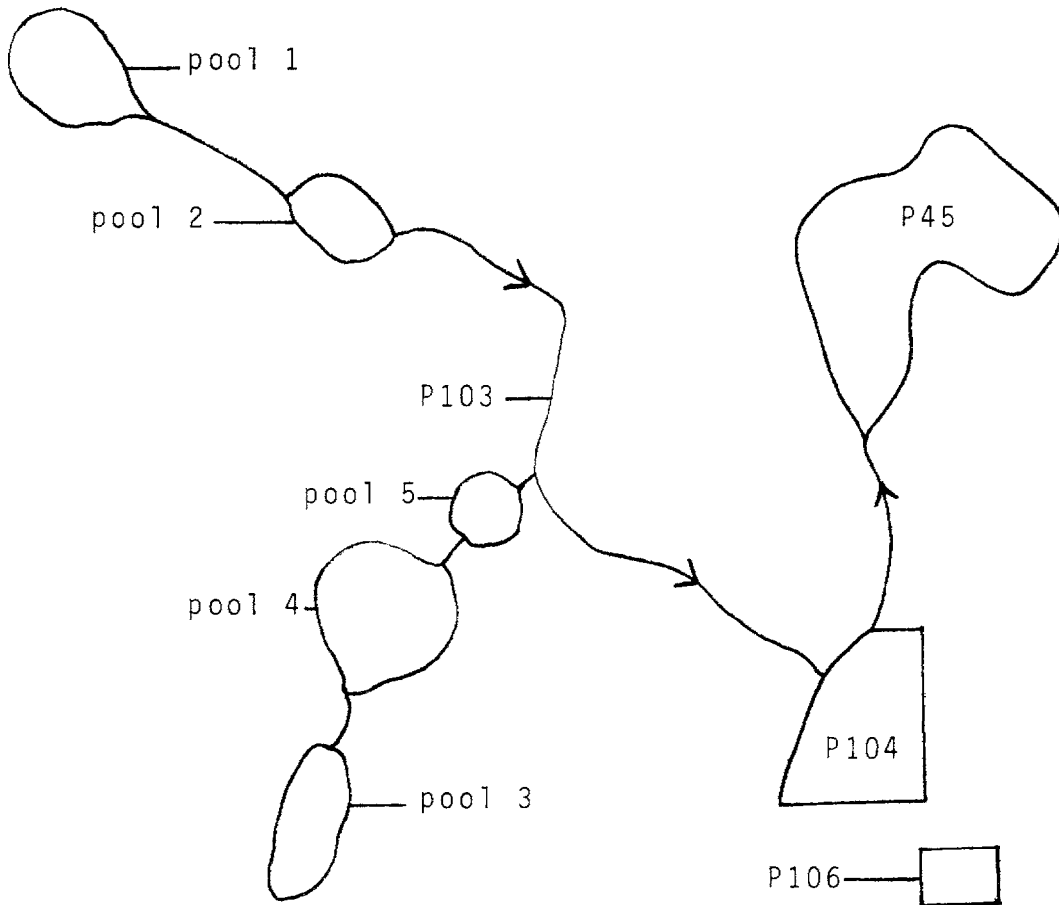
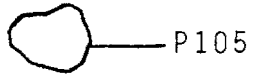
FANTASY GARDENS



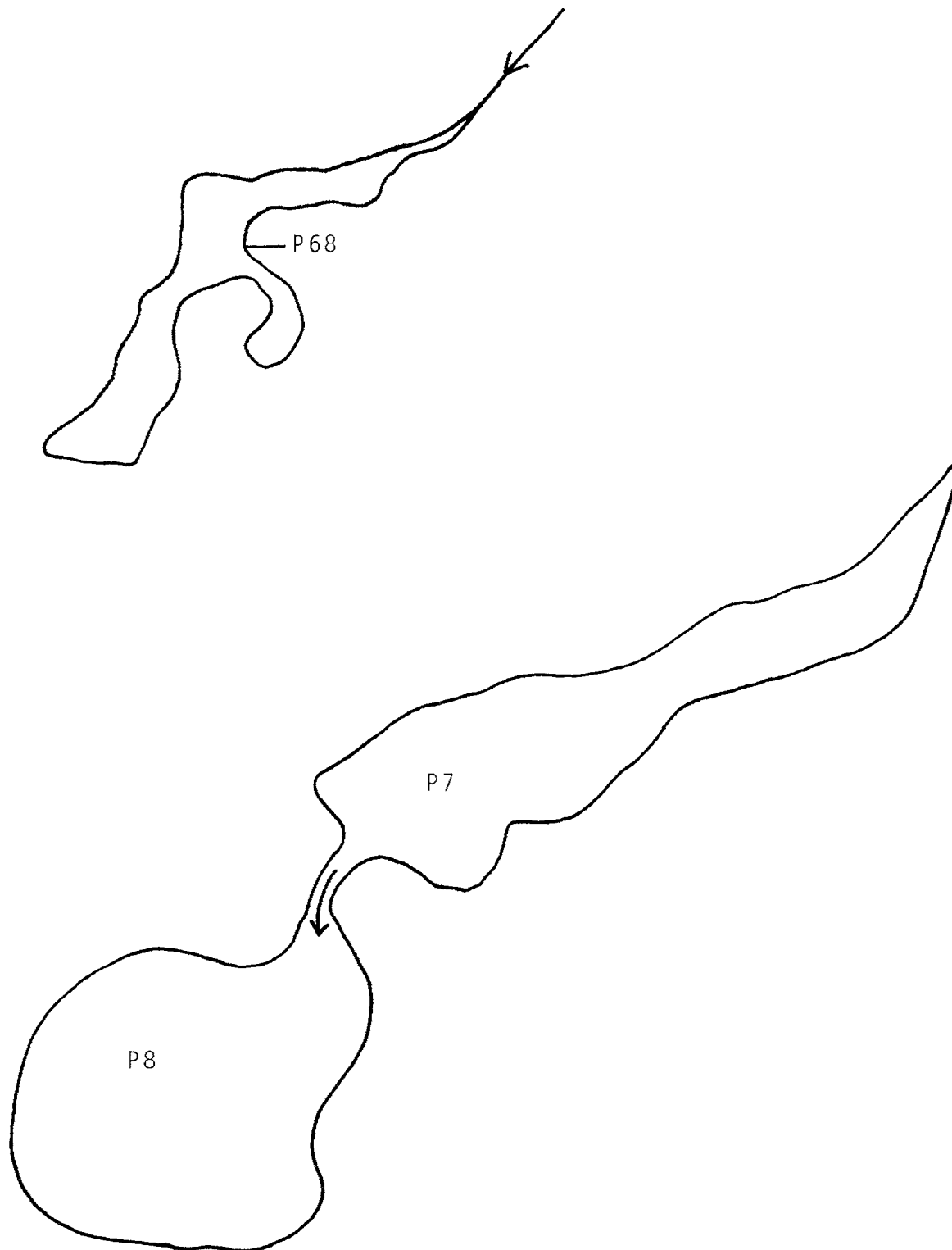
FOREST LAWN CEMETERY



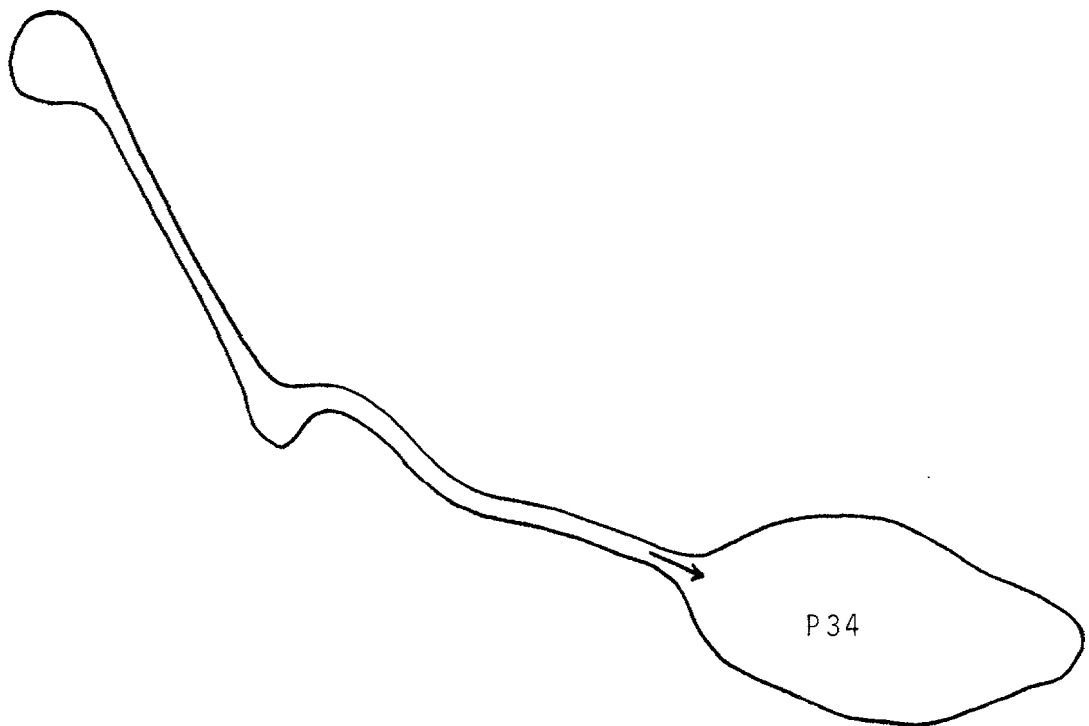
MINTER GARDENS



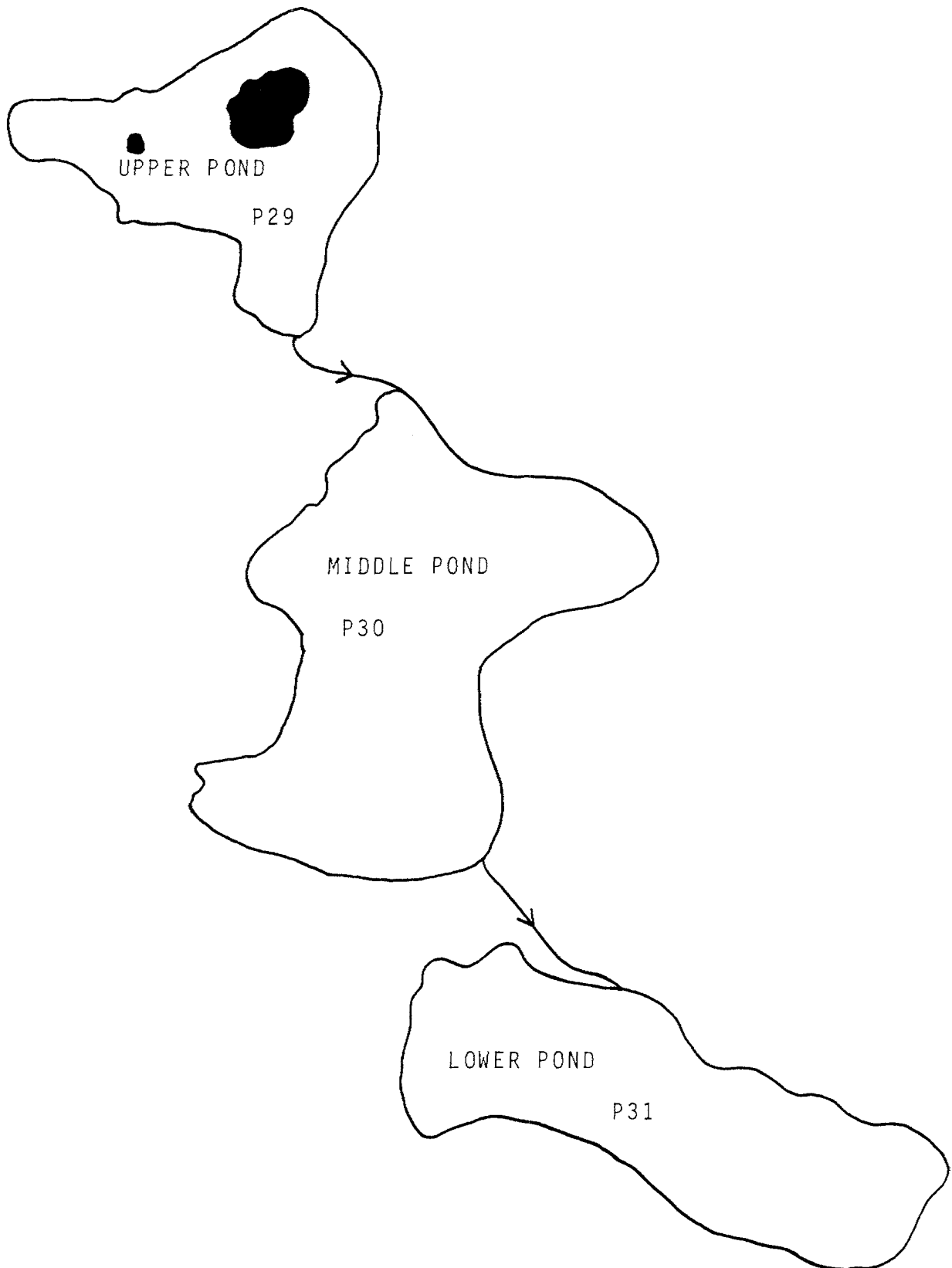
QUEEN ELIZABETH PARK



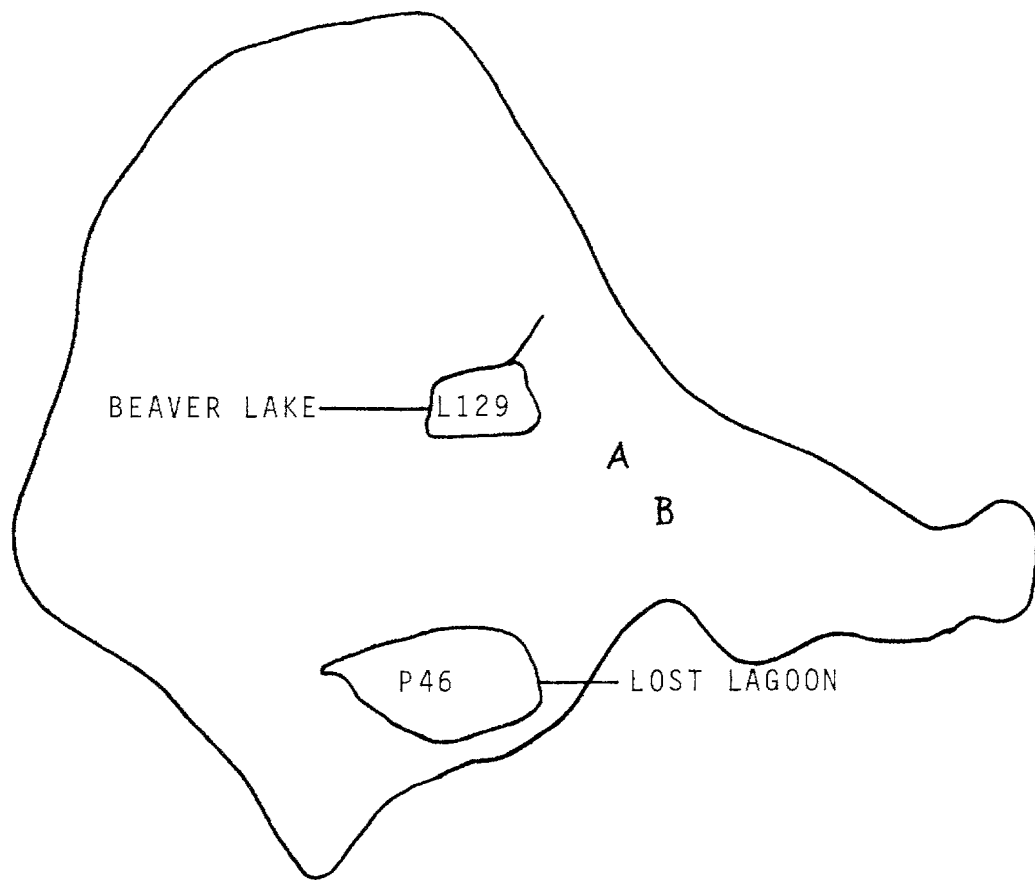
QUEEN ELIZABETH PARK



ROYAL ROADS MILITARY COLLEGE



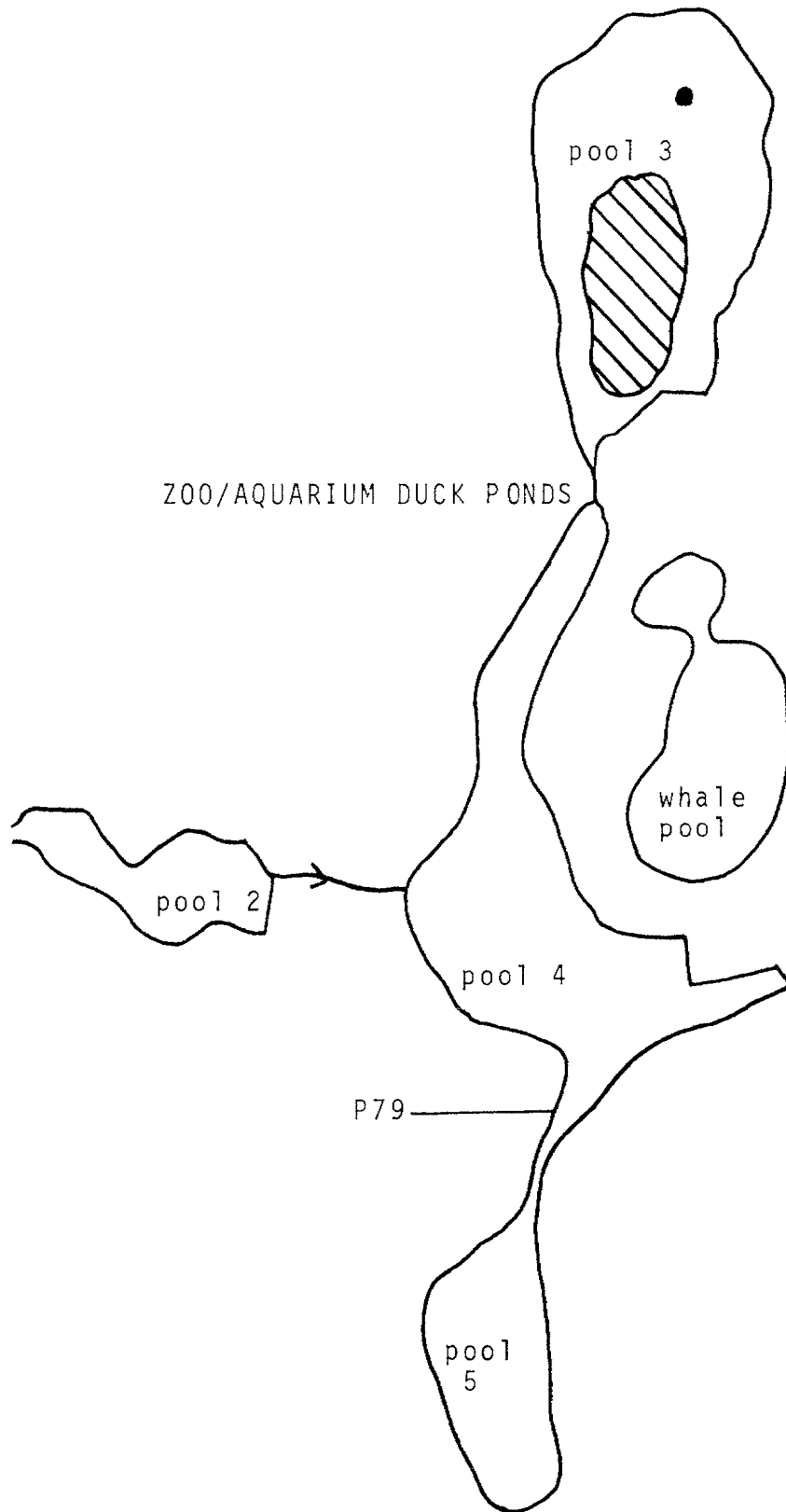
STANLEY PARK



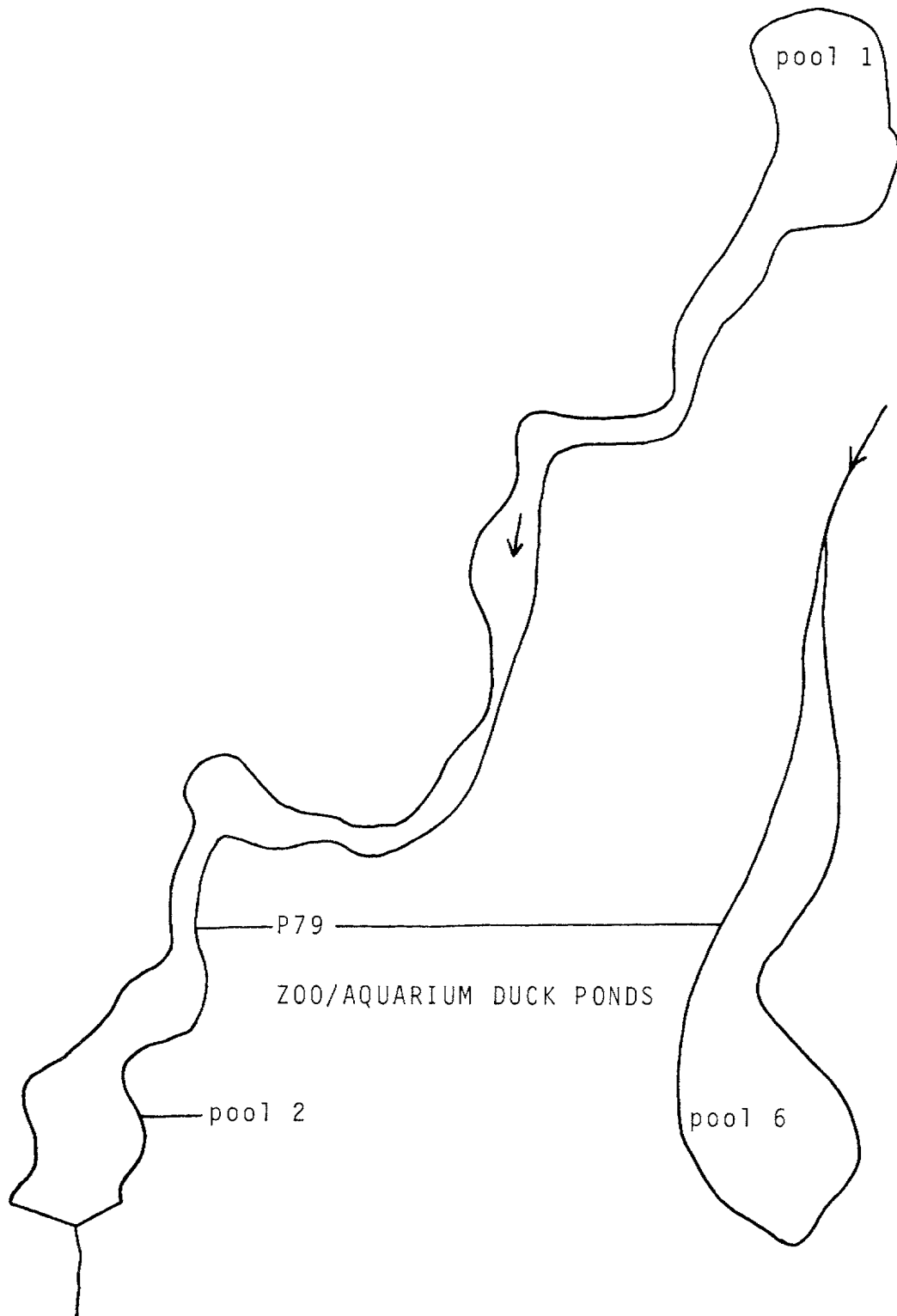
A- Railway Ponds

B- Duck pond complex in Zoo area

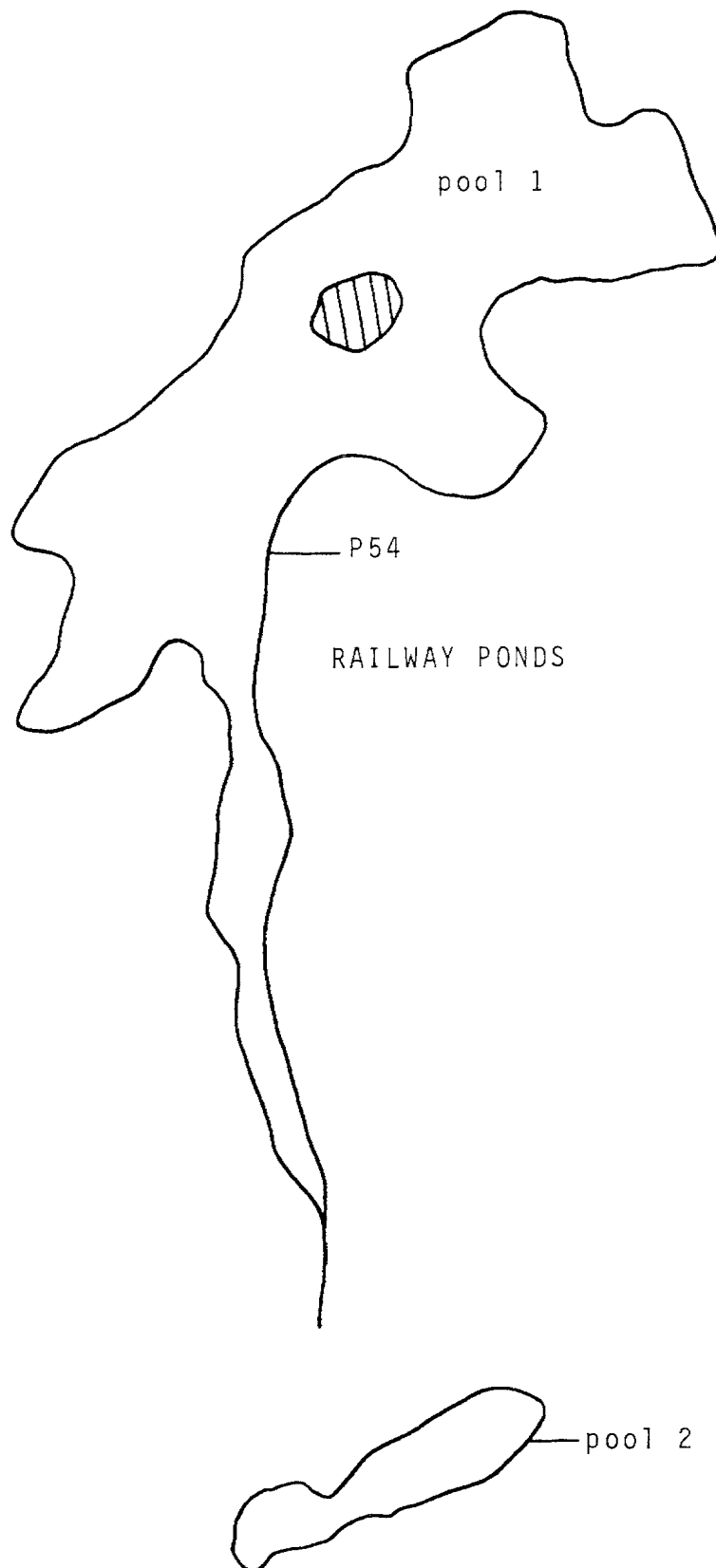
STANLEY PARK



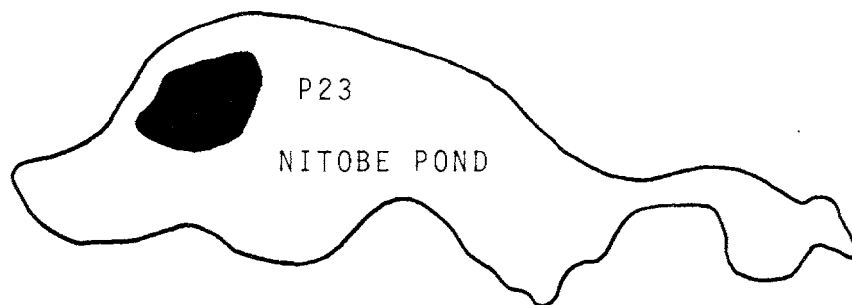
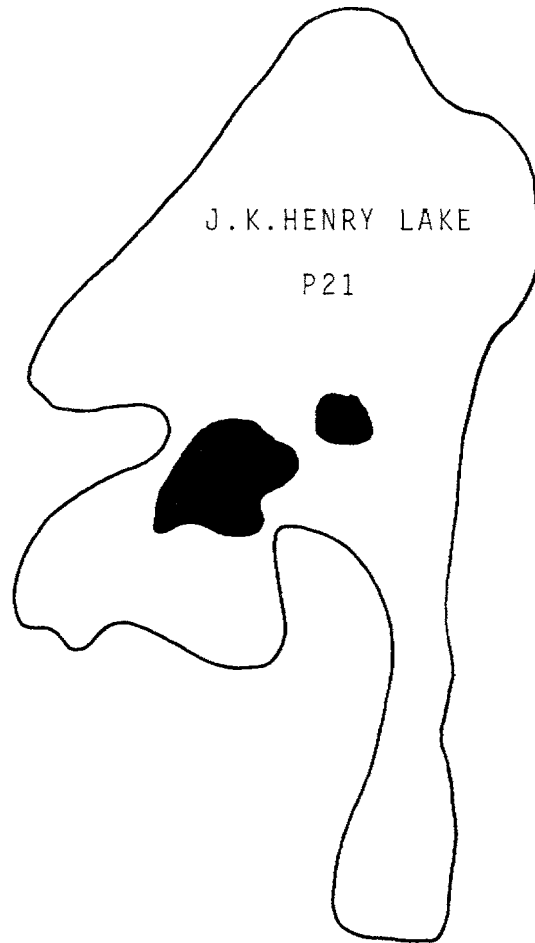
STANLEY PARK



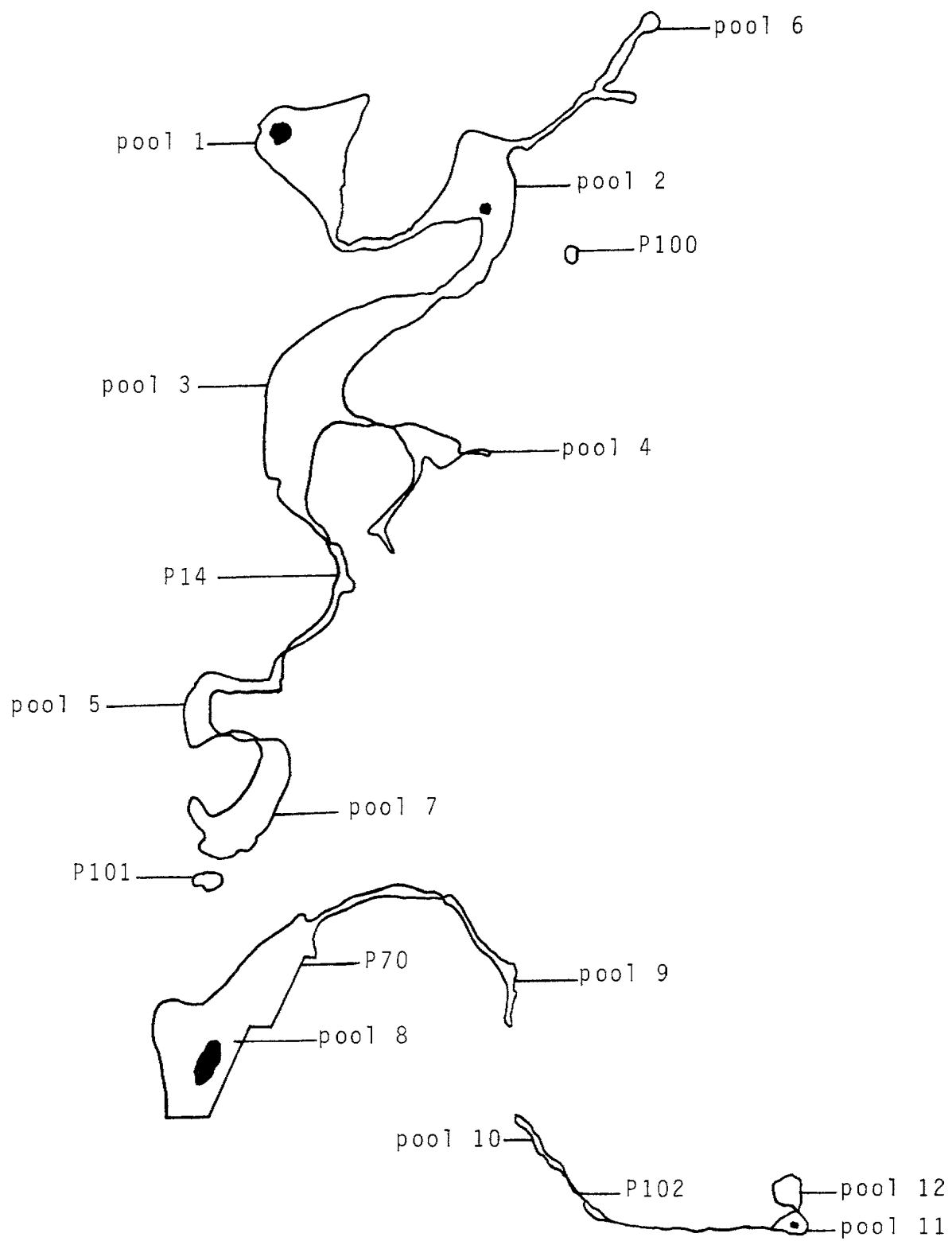
STANLEY PARK



U.B.C. BOTANICAL GARDENS



VANDUSEN GARDENS



VANDUSEN GARDENS

