



# Swan Lake Christmas Hill Nature Sanctuary From the Ground Up



A Brief Guide  
and History





*The greatest gift we are given  
is the world into which we are born.*

*If we are to survive,  
we must learn to recognize that gift,  
to respect it,  
to care for it,  
and to teach our children  
to do the same.*

*This is why the  
Swan Lake Christmas Hill Nature Sanctuary  
exists.*

*This is the nature of our work.*

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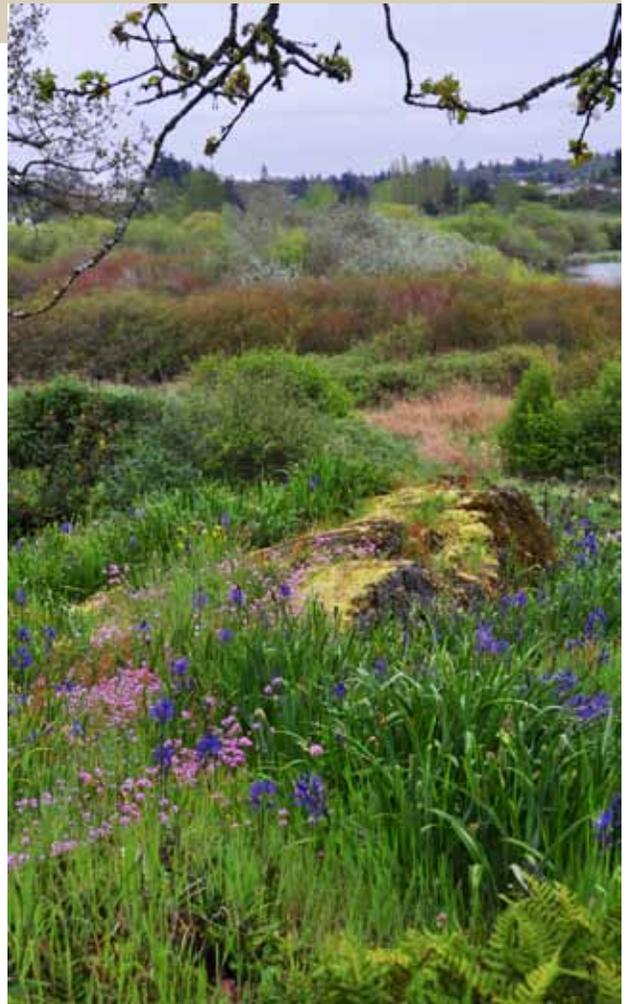


## Introduction

The Swan Lake Christmas Hill Nature Sanctuary is a large area, with multiple entrances. An estimated 60,000 visitors walk the trails every year, and many do so without any contact with the Nature House facility or the staff within. This guide book is designed to provide background information that will allow you, as a Nature Sanctuary volunteer, to engage with visitors in a meaningful way.

The Nature Sanctuary was created from the ground up in many ways, and many times over, beginning with the last glacial period around 15,000 years ago, through many thousand years of aboriginal settlement, followed by 165 years of agriculture, and finally culminating in the stewardship, facility development and educational activities that have taken place (in a relative blink of an eye) during the last 40 years.

It is hoped this guide and brief history will provide a more complete perspective to volunteers and visitors alike, and enhance the appreciation of the land and waters we have inherited, and for which we are responsible.



## Swan Lake Christmas Hill Nature Sanctuary Society

The Nature Sanctuary is governed by a charitable organization, which has managed the Nature Sanctuary on behalf of Saanich Municipality under the terms of a Land Management Agreement since 1975. The Nature Sanctuary Society employs a dedicated staff to operate the facility, and with the assistance of a committed group of community volunteers, has been very successful at achieving its goals.

The vision, mission and core value statements are as follows:

***Vision:*** *To be the leader in the stewardship of healthy, diverse ecosystems that bring people and nature together.*

***Mission:*** *To foster the community's understanding and appreciation of nature through direct experiences inspiring personal action.*

***Core Values:***

***Collaboration***

- *Collaboration is essential to realizing our mission. Working together allows us to accomplish what cannot be achieved alone.*



Christmas Hill

***Core Values (cont.):***

*Commitment*

- *Commitment to fostering the community's understanding of our work is fundamental to the sanctuary's success and to our relationships. Through this perseverance, we honour the ecosystems we steward, each other, and ourselves.*

*Excellence*

- *Through dynamic pursuit of development, education, innovation, skills, and understanding, we can better accomplish our vision and be the leader in stewardship bringing people and nature together.*

*Inspiration*

- *Enjoyment inspires all our actions and decision-making. We demonstrate joy, compassion, and a non-judgmental manner in all that we do. We believe in the influence of community to motivate action.*

*Respect*

- *We respect the land we steward, the ecosystems within it, and the people who care for it. Integrity forms the basis of our personal and professional practice. We take individual and shared responsibility for our actions, striving to follow best practices in all that we do.*

*Stewardship*

- *We believe varied, vigorous ecosystems are essential to a healthy and diverse urban nature sanctuary.*

These statements provide the foundation for all of the activities undertaken at the Nature Sanctuary, designed to enhance and increase the connection between people and the natural world around us.



Swan Lake

## The Nature Sanctuary at a glance

The Nature Sanctuary is comprised of two physically and ecologically distinct areas – the low wetland area surrounding Swan Lake, and the rocky oak-forested hilltop of Christmas Hill. The two areas are joined by a connecting corridor trail along the Nelthorpe Road allowance, crossing McKenzie Avenue at a pedestrian-controlled crosswalk. Portions of the corridor trail are on the roadside, and are identified by signs with a hiker symbol and arrow to indicate the direction.

All of the Nature Sanctuary lands are owned by Saanich, except for the two parcels identified on the map (Swan Lake map, below) as Nature Trust BC Lands, covering 2.4 ha (6 acres). All of the lands are managed by the Swan Lake Christmas Hill Nature Sanctuary Society under the terms of a Land Management Agreement between the Society and the Municipality of Saanich.

### 1) Swan Lake

#### a) Map



The Swan Lake portion of the Nature Sanctuary is bordered on the west by the Pat Bay Highway, on the east by Saanich Road, on the north by Ralph Street, Sevenoaks and Nelthorpe, and on the south by the Lochside Regional Trail. On the east side of Saanich Road, the vegetated area under the Lochside trestle is also part of the Sanctuary lands. Blenkinsop Creek flows through this area on its way to Swan Lake.

## b) Statistics

The Nature Sanctuary land surrounding the lake covers 43.4 hectares (107 acres), in addition to the 9.4 hectare (23 acre) lake. In the winter flooding stage, the lake can cover up to 32.4 hectares (80 acres) of the low-lying lands around the lake.

In summary:

- lake surface area – 9.4 ha (23 acres)
- winter flood lake area – 32.4 ha (80 acres)
- land area excluding lake – 43.4 ha (107 acres)
- land area including lake – 53 ha (131 acres)

The main loop trail around the lake area is 2 ½ km. long, with about 16 commonly used access points around the perimeter. There are three main floating sections providing ample access to the lake waters – the north wharf, called Founders Wharf (43 metres); the floating walkway (250 metres); and the south wharf (50 metres).

Swan Lake is a shallow lake, with a maximum depth of approximately 16 feet at the summer level. There is not a well-defined bottom, due to a layer of what is referred to as “a loose flocculent ooze” that is almost liquid to a depth of 3 feet or so.

The elevation of the lake at its summer low is 12 metres above sea level. The legal definition of the flood plain is set at 14.45 metres elevation, described as the 100-year flood level – a variation of 2.45 metres, or 8 vertical feet between summer and winter levels. Some parts of the trail would be flooded and closed to foot traffic at a level of 0.8 metres above summer level, which often occurs for a few weeks each winter. At the 14.45 metre flood level, some damage would likely be sustained to some of the fixed bridges around the trails.

The watershed, or rain catchment area feeding Swan Lake covers 1,180 hectares, approximately 125 times the size of the lake (by comparison, the Elk/Beaver Lake watershed is about three times the surface area of the lake). A large percentage of the watershed is cleared for agricultural, residential, commercial or roads/parking lots. This explains the immediate and severe flooding that Swan Lake can experience following a heavy rain event. [see **Watershed Map, Appendix 1**]

## c) Key points of interest

The **Nature House** provides an important first step in exploring the Nature Sanctuary. The displays are designed to enhance one’s senses and awareness of one’s surroundings, and thus can enhance the outdoor experience. Maps help orient the visitor to the grounds, and a reading room provides resources for looking up and identifying plants and animals on the site. Naturalist staff members are often available to assist with questions. An interactive touch-screen computer program created for Swan Lake provides a focused array of plant, bird, animal and historical facts about the Nature Sanctuary. A variety of live animal displays are on hand to capture the children’s attention. Grain (flatted oats) is available for the feeding of ducks from the boardwalk.



Nature House



Native Plant Garden

Adjacent to and surrounding the Nature House is the **Native Plant Garden**, containing a variety of native wildflowers, ferns, shrubs and trees. This area shines in the spring when the Easter lilies, camas lilies, shooting stars, trilliums, and many others are in bloom. It also provides a good demonstration of how to incorporate native plants in your own back yard, and displays a functioning micro-irrigation system.

The closest access to the lake waters is from the **Founders Wharf** just below the Nature House. This wharf replaced an aging wooden structure in June, 2010 and provided a template for the eventual replacement of the entire existing cedar floating system with



Founders' Wharf

more durable materials and design. The wharf was dedicated to the founding organizations and members, and the bench pays tribute to the dedicated staff members who developed and guided the Sanctuary through its formative years.



Layritz Pond

The 250-metre **floating walkway** extends west through the willows below the Nature House and across one end of the lake. This route first crosses a pond that was created in 1948 when the local Layritz Nursery excavated peat for their nursery business. Reportedly, Saanich put a stop to that practice, and proceeded to fill the resulting hole with garbage, including derelict cars (the inspiration behind the lake restoration display in the Nature House). An aeration system has been installed and air is bubbled through this pond in the

spring and summer to prevent successful breeding of the Culex mosquito (responsible for the spread of the West Nile Virus).

The walkway continues west, providing the most impressive exposure to the lake and shoreline. This area often provides views of great blue herons, basking western painted turtles, a variety of water birds and occasional river otters.



Floating Walkway

The trail west from the floating walkway winds along **Swan Creek**, the outflow stream from the lake. The creek passes under the Pat Bay Highway just beyond the footbridge that crosses the creek. From there the creek meanders under McKenzie Avenue, Glanford Avenue and Carey Road, and flows into the Colquitz River near Marigold Road. (The Colquitz River system drains Elk and Beaver Lakes, Quicks Bottom, Panama Flats, Blenkinsop Lake and Swan Lake, and empties into Portage Inlet around Tillicum and Cuthbert Holmes Parks.)



Bridge over Swan Creek outflow



Heritage cottonwood tree

As the trail winds southward from Swan Creek, below the fire hall, police station and Municipal Hall, it passes through an area of large **cottonwood trees**. One large specimen, on the right hand side of the trail is a designated Heritage Tree, noted for its impressive stature.

As the trail turns along the south side of the lake, it crosses an old **concrete foundation**, along with remnants of an old rock wall, a reminder of the agricultural history of the Swan Lake area.



Concrete foundation and rock wall

Further along the south side, a left turn will take you to the **South Wharf**, with great views of the lake shoreline and Nature House across the water.



On the South Wharf, looking north

At the top of the hill above the south wharf, across the Lochside Trail on Saanich Road, is the former site of the **Swan Lake Hotel**, a resort popular in the the late 1800's (see history section below).



View of the Nature House from the South Wharf



Large Boulders below Lochside Trail

Heading towards Saanich Road, the trail passes between the **Lochside Trail** above and a large pond below, across a tumble of large rocks. These rocks were placed here in the early 1900's when the railway track (now the Lochside Trail) was put in place. It's likely the excavation of fill created the pond during the construction of the rail bed.

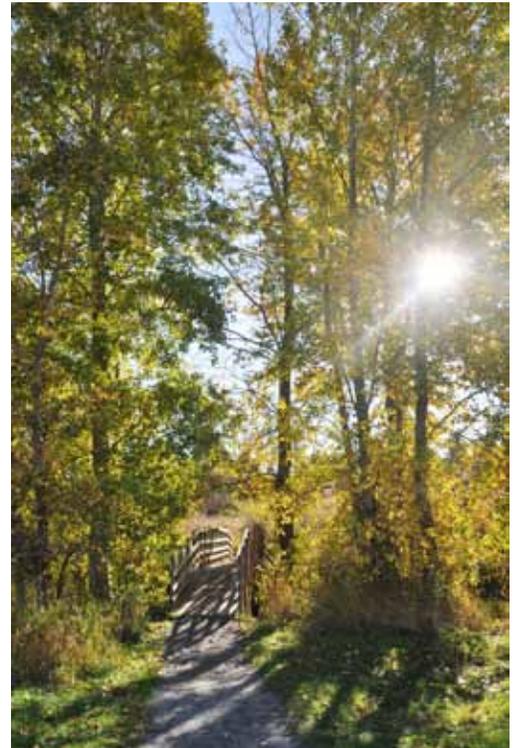
*The Lochside Trail travels over a picturesque former rail bed. Beginning in 1917, this Canadian Northern Pacific Railway (CNPR) route hosted a daily 74-passenger General Electric gas car that transported passengers and freight between*

*Victoria and a steamship dock at Patricia Bay, with connecting service to the Lower Mainland. The fare was 3 cents per mile one way, or 5 cents return.*

*Passenger service continued until the 1920s, when stiff competition from motor cars, buses and other railways forced the CNPR into bankruptcy. The Canadian National Railway took over, operating freight trains on the line until the 1930s. Freight continued to rumble along a spur line past Swan Lake until 1990.*

*(Excerpt from The Lochside Regional Trail Official Guide)*

As you emerge uphill from pond-side, the trail skirts Saanich Road and crosses **Blenkinsop Creek**, the inflow stream to Swan Lake, via a footbridge. Much of the creek between Blenkinsop Lake and Swan Lake has been diverted into underground culverts, to accommodate roads and urban and commercial development. It flows above ground downstream from the old winery building on Quadra Street. Blenkinsop Creek flows under the Lochside Trestle on the east side of



Footbridge over Blenkinsop Creek (inflow stream)

Saanich Road, meandering through a field that was the focus of intense ecological restoration (1999 to 2002), resulting in a well-established and vegetated wetland.

Upslope from the inflow stream, the house to the right, on Saanich Road, was the **Pendray farm house**. The Pendray family operated the Swan Lake Dairy Farm, beginning in 1917, encompassing a large portion of the lands now included in the Nature Sanctuary, extending from just below the Nature House on the north side, to Swan Street on the south side (see history section below).



The Pendray farmhouse



Looking South from the Hedgerow Trail Bridge

Continuing upslope, the trail winds through a remnant of a rocky oak/ arbutus stand, then turns left to follow a trail through a long **hedgerow** along the undeveloped Ralph Street road allowance. This area is subject to occasional winter flooding, with foot traffic diverted up to Nelthorpe and along the road. A foot bridge toward the west end of the hedgerow trail crosses a stream and wetland area, where a long-term program of habitat improvement has been carried out, focusing on removal of exotic grasses (giant manna grass and reed canary grass) and enlargement of the waterway.

The hedgerow trail comes to an end at a **trail junction** just below the parking lot, where the **Nelthorpe Corridor Trail to Christmas Hill** heads to the north, towards and across McKenzie Avenue.



Junction of Swan Lake & Christmas Hill Trails

## 2) Christmas Hill

### a) Map



The Christmas Hill portion of the Nature Sanctuary is bordered on the west by a community greenway trail linking Rainbow Street with Rogers Avenue and Rogers Elementary School, and on the south, east and north by mixed residential lands.

### b) Statistics

The Nature Sanctuary lands on Christmas Hill covers 14.5 hectares (36 acres), including two portions of the Nelthorpe Corridor Trail. The elevation at the summit of the hill is 109 metres, a climb of 97 metres from the lake surface. There are two official entrances to the hill trails (Nelthorpe Corridor on the south and off the community greenway trail on the west) and two unofficial entrances (top of Rainbow on the south, and off Woodhall Drive on the east side). Christmas Hill is notable for being one of the few Garry oak-forested hilltops in the Victoria area with no road access (compare Mount Doug and Mount Tolmie, for example).

Access to the hilltop area is provided by 1.7 kilometres of trail, including some significant stone stairways. From the trail entry points, there are two main trail loops on the hill. An inner loop takes the visitor to the summit for a stunning 360-degree view of the area, and then to a south-facing lake viewpoint. An outer loop trail (in part named Byron's trail, in memory of the young man who painstakingly placed hundreds of large stone steps in place) skirts the hill on the east, north and west sides before exiting to the community greenway trail, or climbing the west side stairway back to the hilltop.

No formal parking is provided around the hill area, other than on-street parking where appropriate, mostly on Nicholson Street. Visitors are encouraged to use the Swan Lake parking lot, and access the hilltop via the connecting corridor trail. A round trip from the parking lot accessing the summit and lake viewpoint via the inner loop trail, for example, is 2.5 kilometres, approximately the same distance as the loop trail around the lake.

### c) Key points of interest

Christmas Hill is a significant example of the endangered Garry oak ecosystem, described in more detail in the ecosystem section below. A great deal of time and effort has been, and continues to be, invested in protecting Christmas Hill's ecosystem over the years, focusing on control and removal of Scotch broom, Himalayan blackberry, daphne and others.

A walk around the trails of Christmas Hill is a restorative experience, with a feeling of isolation from the urban areas and highways so close by. The **wildflower bloom** in the spring is a special treat, with easter lilies, shooting stars, buttercups and camas lilies carpeting the hillsides.

Plan to visit Christmas Hill numerous times during March and April to see the range of wildflower displays.



Camas under Garry Oak

Photo: C. Carson



Christmas Hill Stone Stairway



Looking east From Christmas Hill summit, Mount Doug on the left

The open bedrock at and around the summit provides a **panoramic view** of the city to the south, Mount Doug to the east, the Saanich Peninsula to the north, and the Sooke hills to the west.

The bedrock to the north of the summit displays a dramatic example of **glacial grooves**, a testament to the forces that created the landscape millennia ago (see geological history below).

The 'saddle' between the summit and the lake viewpoint is home to a **vernal (seasonal) pond**, formed by a large basin in the bedrock. This area is



Glacial grooves at the summit



Vernal pond, between the summit and lake viewpoint

fenced and protected, as it contains rare specimens of wildflowers found only in these special conditions. Because of the standing water in the spring, the Camas lilies found in the pond are often weeks behind those on the dry hillside areas.

The **lake viewpoint** gives a commanding view of Swan Lake and city beyond, as well as another fine example of the glacial shaping of the bedrock.



Looking south from the lake viewpoint

### 3) Nature Sanctuary programs/activities

The Nature Sanctuary offers a wide variety of nature education services to members of the community and school groups from the Greater Victoria area, year-round. Program activities are centered largely around the Nature House and environs, with some programs travelling to schools and the community.

Our programs focus on the natural history and ecology of Southern Vancouver Island and are designed to be engaging, accessible and fun. The aim of the programs is to create a deeper public understanding of the living lands and waters of our community to ensure public support for their proper use and care.

A committed staff of four permanent part-time staff, aided by volunteers, develops and delivers programs to between 18,000 and 20,000 participants every year, from pre-schoolers to seniors.



Discovering



Watching



Learning



Being

### 4) Rules and Regulations, Bylaws

Some regulations governing activities and behaviors arise from Board policy, and some are under municipal bylaw authority, as summarized below:

#### Saanich Bylaws

- no dogs
- no camping
- no bicycles on trails

#### Board Policy

- no fishing
- no smoking
- no boating

Any observed activities in contravention of these rules should be documented, and reported to Nature Sanctuary staff as promptly as possible.

It is not your role as volunteer to enforce these rules and regulations, but depending on your comfort level, and your assessment of the situation, you may elect to approach an individual with a dog, for instance, and explain the rules and the rationale behind them. A cooperative individual may comply and the problem will be solved. However, remember that your safety is the first consideration, and at the first sign of hostility or aggression, you must dis-engage and walk away. If this occurs and the infraction continues, you are encouraged to contact the Nature House staff immediately and report the incident, who can pass the information on to Saanich Pound. It helps if you can report the dog breed, colour, size, location and direction of travel.

#### i) Saanich Bylaws

##### (1) Dog Bylaw (Regulation Of Animals Bylaw No. 8556)

13.1 No person shall suffer or permit any dog owned or harboured by him/her or in his/her charge to be on lands known as Swan Lake Christmas Hill Nature Sanctuary lands, as shown outlined in heavy dark lines on the map attached hereto as Schedule "C", at any time. [see Appendix 2]



## (2) Bike Bylaw (Parks Management and Control Bylaw, 1997, No. 7753)

f) No person shall ride a bicycle in the Swan Lake Christmas Hill Nature Sanctuary except in a parking lot or on a paved roadway.

Saanich's **Parks Management and Control Bylaw** also applies to the Nature Sanctuary in a general sense, covering a wide range of activities and situations – camping, cleaning vehicles, damaging signs or facilities, damaging trees, shrubs or flowers, endangering other park visitors, and so on. If common sense dictates that an activity is not appropriate in a park, you can assume it is covered by the Parks Bylaw, and Sanctuary staff can take action once it is brought to their attention.



The regulations prohibiting recreational boating, fishing and swimming on the lake are not directly supported by the Parks Bylaw, but are part of the Board's policy for land use, given the potential for these activities to negatively impact wildlife in the Nature Sanctuary. Again, reporting infractions to the Nature Sanctuary staff is the most appropriate action for you to take.



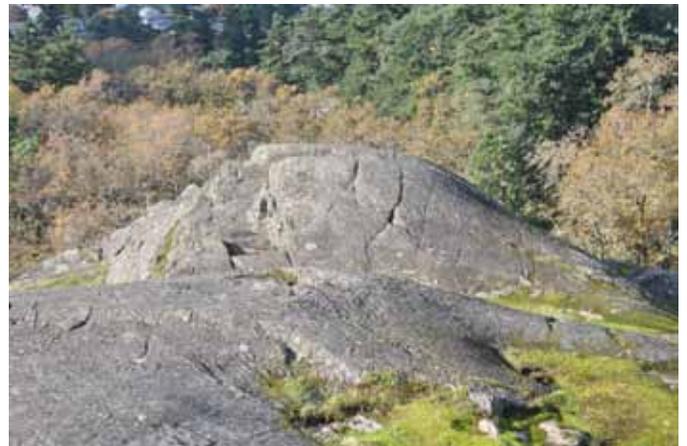
## History

### 1) Geological History

The glacial history of Victoria is a fascinating story, and its effects are still visible throughout the landscapes of Victoria, vividly illustrated on rocky hilltops like Christmas Hill and the deep marine clay beds underlying Swan Lake. The massive changes in land levels, sea levels and ice sheets on a local level is beautifully documented in the article "*Living With the Shapes Glaciers Carved Us*", written by William Stavdal [**highly recommended reading - see Appendix 3**]

#### a) Christmas Hill

Christmas Hill's present form was shaped by at least four glacial periods in the last million years. It displays the typical shape of an ice-scoured hilltop – as glacial ice moved slowly southward, it tended to rise up the northern slope of a hill, then plucked loose rock from the south slope, resulting in a typical profile: north end rising smoothly, south end dropping abruptly in broken steps. Shallow and wide grooves in the bedrock, most obvious on the top of the north-facing slope, are evidence of loose rocks being slowly and deliberately pushed southwards. These shapes are well defined both on the main summit and on the lower lake viewpoint.



A typical profile resulting from glacial action - gentle slope on the north side, broken and steep on the south side.

## **b) Swan Lake**

The changes to the land around Swan Lake were even more dramatic. At the maximum extent of the glaciers, so much water was locked up in ice that the sea level dropped 100 metres (330 feet), leaving only a narrow 30 metre-deep channel between Victoria and the Olympic Peninsula. As the glaciers grew and moved south, they covered Victoria with ice to a depth of up to 1,066 metres (3,500 feet) for thousands of years. Under the weight of the massive ice sheet, the bedrock at Victoria subsided 167 metres (550 feet). Then in a relatively short period of time, the climate warmed and the ice melted and receded, releasing water back to the oceans.

Around 13,000 years ago, the oceans stood 91 metres (300 feet) below present level, but the land lay 167 metres (550 feet) below present day. That means Victoria's current shoreline was 76 metres (250 feet) below the ocean waves. At Swan Lake the ocean depth would have been around 64 metres (210 feet), and Christmas Hill would have been an island, jutting a mere 33-metres above the waves. Mount Doug would have been a 150-metre high island off to the northeast, and Mt. Tolmie to the east would have stood as a solitary island about 47 metres above the waves.

During this period, large quantities of 'rock flour', or finely ground rock dust was washed off the land by glacier-fed rivers, and deposited under the ocean. The Swan Lake basin is covered by a layer of this pure, blue-grey marine clay, up to 15 metres deep, under the surface layer of peat. This clay layer is full of well-preserved marine shells from this period.

As the bedrock continued to rebound after the departure of the glaciers, the ocean shore receded, and the basin that had been scoured out of the bedrock became, once again, a fresh water lake, probably about 8,000 years ago.

## **2) Human History – pre-contact**

First Nations people have lived in coastal B.C. areas for at least 8,000 to 9,000 years, though the oldest documented archaeological sites in the Victoria area are about 4,150 years old.

Grant Keddie, Royal BC Museum archaeologist, describes Swan Lake as an important hunting and gathering area for the Songhees people. Over the years, a number of arrow heads and spear tips have been found in the fields and hillsides surrounding the lake, indicating a high level of hunting.

Over a hundred species of plants were known and used by the Songhees for food, medicines and for numerous items used in food gathering and preparation, shelter and ceremony. Important food plants include the camas lily, wild onion, western crab apple, chocolate lily bulbs, Oregon grape, salmonberry, elderberry, Pacific blackberry, red huckleberry, thimbleberry and fern rhizomes. A variety of cat-tails and swamp rushes were harvested from the lake shore and used in weaving shelters, mats, baskets and clothing.

The lake and streams would have provided a variety of fish, including salmon, rainbow trout, steelhead trout and perch, caught by trolling, jigging, spearing and the placement of wooden basket traps.

All varieties of large birds were hunted and their eggs collected, especially in the winter and during the spring migrations when bird populations soared. Remains of food found in ancient villages show that species of ducks and seagulls represent a large number of the birds consumed. Scoters, grebes, geese, swans, sandhill cranes, loons and cormorants, grouse, pigeons and predator birds such as eagles and hawks were all consumed. Pole nets would have been used extensively at Swan Lake to catch waterfowl – a net stretched between two tall poles would be suddenly raised into the flight path of ducks as they swoop toward the lake in the evening. Bird parts were used for many things, often related to spiritual or ceremonial use. Women plucked waterfowl and mixed the down with twisted pieces of goose skin and stinging nettle fibre twine to make a textile used for shirts and robes. Bird down was stored in a bag

made of a swanskin. Feathers were used on masks, headdresses, clothing and many small ritual objects. Bird skulls, beaks and wings were carried as charms associated with special spirit powers.

Deer would have been plentiful around the lake area, providing an important source of food. Clothing was made from deer hides, and a variety of tools were made from the antlers, including wedges, tool hafts, harpoon, spear and arrow points, awls, chisels, needles, blanket pins, combs, scrapers and fish hook barbs.

The rocky Garry oak-forested slopes of Christmas Hill would likely have been used by the Songhees for the cultivation of the camas bulb, an important part of the First Nations people's diet. They practiced a wide variety of cultivation techniques, including prescribed burning to preserve the open landscape favoured by the Camas lily. It is thought that predominance and persistence of Garry oak ecosystems across much of Greater Victoria prior to European settlement was a direct result of centuries of burning and harvesting camas bulbs.

### 3) Human History – European settlers

#### a) 'Purchase' of Land from First Nations

The Songhees people included a tribal group called the Sahsum, or Kosampson. Their village was centred around Craigflower Park and Admirals Road. By 1843 the Kosampson moved to the village of Kala on Esquimalt Harbour, which became part of the Esquimalt Indian Reserve in 1853.

In 1850, title to the territory deemed to be owned by the Kosampson people was sold to the Hudson's Bay Company:

*Know all men, we, the chiefs and people of the Kosampson Tribe, who have signed our names and made our marks to this deed on the thirtieth day of April, one thousand eight hundred and fifty, do consent to surrender, entirely and for ever, to James Douglas, the agent of the Hudson's Bay Company in Vancouver Island, that is to say, for the Governor, Deputy Governor, and Committee of the same, the whole of the lands situate and lying between the Island of the Dead, in the Arm or Inlet of Camoson, and the head of the said Inlet, embracing the lands on the west side and north of that line to Esquimalt, beyond the Inlet three miles of the Colquitz Valley, and the land on the east side of the arm, enclosing Christmas Hill and Lake and the lands west of those objects.*

*The condition of our understanding of this sale is this, that our Village Site and enclosed Fields are to be kept for our own use, for the use of our children, and for those who may follow after us, and the lands shall be properly surveyed hereafter. It is understood however that the land itself, with these small exceptions, becomes the Entire property of the white people forever; it is also understood that we are at liberty to hunt over the unoccupied lands, and to carry on our fisheries as formerly.*

*We have received, as payment, Fifty-two pounds ten shillings sterling. In token whereof, we have signed our names and made our marks, at Fort Victoria, on the thirtieth day of April, one thousand eight hundred and fifty.*

*Signed by Hookeowitz and 20 others, by X mark*

(Note: Island of the Dead referred to above is also known as Halkett Island, and lies just to the east of the Selkirk Trestle crossing. The Songhees used the island as a surface and sub-surface burial site until about 1867.)

## **b) Origin of names – Swan Lake & Christmas Hill**

The origin of Swan Lake's name is not clear. It is listed as such on a map of Victoria in 1885. There is speculation that the lake was named after James Gilchrist Swan, an American journalist, reservation schoolteacher, lawyer, judge, school superintendent, railroad promoter, natural historian, and ethnographer. Though based in Port Townsend, Swan visited Victoria on occasion in the early 1880's.

The more popular belief is that that name refers to the Trumpeter swans that would have visited the lake regularly.

Similarly, there are many conflicting reports about the origin of the name Christmas Hill. During the late 1800's and early 1900's the hill was variously called (and cited on maps as) Lake Hill and Christmas Hill.

One source (Saanich Municipality) indicates Christmas Hill was named after HBC Factor Joseph William McKay discovered it on Christmas Day in the early 1840s.

Numerous sources recount the legend of Christmas Hill. Purportedly, on Christmas Eve in 1855, a large bird, which was thought to be Thunderbird by the Lekwungen peoples of the time, swooped down and carried away a small Lekwungen child from the Fort Victoria area. Men from the Fort apparently searched until the child was found playing happily on Lake Hill (as Christmas Hill was called then) on December 25. Because of this Christmas miracle, the Hill's name was changed.

The names Swan Lake and Christmas Hill were finally officially confirmed by the Geographic Board of Canada on May 1, 1934.

## **c) Hudson Bay sheep farm – murder on Christmas Hill**

On November 5, 1852, Peter Brown, a shepherd of the Hudson's Bay Company, was murdered on Christmas Hill. The suspects were a "leading Cowichan brave and the son of a Nanaimo chief" who had stayed with him the night before. Sir James Douglas, then Governor, led the chase himself, sailing to the Cowichan River aboard the HMS Beaver. Here, following a frightening confrontation with over 200 members of the Cowichan tribe, Douglas was able to apprehend the first suspect. They proceeded north to Nanaimo, where they gave chase to the second suspect, apprehending him at what was subsequently known as Chase River (just south of Nanaimo). The two suspects were tried in Nanaimo harbour aboard the HMS Beaver, in the first trial by jury to take place on Vancouver Island. Both were declared guilty, and were sentenced to hang on Protection Island, at a place that became known as Gallows Point.

## **d) Farming History**

Swan Lake and Christmas Hill have a long history of farming, beginning with a sheep farm on the west slopes of Christmas Hill established by Kenneth McKenzie in 1857, and continuing through to the closing of the Pendray dairy farm at Swan Lake in 1978.

An 1885 map of the area shows three land owners, with 100 to 150 acres each:

- John Caspar Von Allman, from the summit of Christmas Hill north
- Kenneth McKenzie, from the summit south to the middle of Swan Lake
- James Stockend, south from the middle of the lake.

Little is known about the Von Allman farm, other than a suggestion that it was largely fruit orchards. Vanalman Avenue, just west of the Pat Bay Highway, was named after him.



James Gilchrist Swan (1818-1900) and  
Haida Johnny Kit Elswa, Victoria B.C., 1883

**(i) McKenzie Farm – Christmas Hill to the middle of the lake**

Kenneth McKenzie and his family arrived in Victoria in 1853 as an employee of the Hudson’s Bay Company. While he was developing the Craigflower area, he established a sheep station on Christmas Hill, and subsequently purchased the lands extending from the summit of Christmas Hill to the middle of the lake. In 1866 he moved his family to a newly-built home on the west slope of Christmas Hill, and continued to tend to his sheep, cattle and horses, and raise vegetables until his death in April, 1874. In April, 1884, the property was subdivided into 110 lots of 5 acres each, and sold for \$110/acre. Kenneth’s daughters, Agnes and Wilhelmina, lived in the farmhouse until their deaths in 1928 and 1929, respectively.

**(ii) Rogers Farm – Christmas Hill**

George Rogers Senior came to Victoria in 1886, and worked as a tenant farmer. He leased, and later purchased, in 1903, the Von Allman farm on the north side of the hill. At first it was known as the Alderlea Farm, but because another farmer claimed prior use of the name, Rogers renamed his farm Chesterlea. George Junior took over his father’s duties, and in 1925 he constructed his family house on Rogers Avenue. At this time the dairy farm was 91 hectares (225 acres).

Bruce Hutchison, in a eulogy for George, characterized him thus:

*Because he loved the land and the woods he would not sell them and would not desolate them. In every field, though it increased the labour of harvest and reduced the yield, he left the best oak trees and sometimes he would stop his team to look at them. The white lilies of the woods he left untouched so that they multiplied and the children played amongst them in the springtime.*

A portion of the Rogers farm is now occupied by Rogers Elementary School. A large portion of the farm was sold to Saanich for the Nature Sanctuary, and a small part of the farm was subdivided for residential development. The Rogers family role in this area is commemorated in the nearby road names – Rogers Avenue, Lily Avenue (George Senior’s wife), Genevieve Road (George Junior’s wife) and Chesterlea Road.

**(iii) Pendray Dairy Farm**

One of the first major parcels of land around the lake that was purchased for the Nature Sanctuary was the 12 hectare (30 acre) Pendray farm, on the east side of the lake. Joel Pendray began operating the dairy farm here in 1917. Joel’s son Tom continued after Joel’s death in 1954. His was the last dairy in Victoria to sell raw (unpasteurized) milk. The farm was in operation until March, 1978, when the land was turned over to the Nature Sanctuary.



The Pendray farm field between Saanich Road and the lake, looking north; the red roof on the right is the dairy barn. At the extreme left is the nature house. Photo taken February, 1976

#### (iv) Girling farm – Ralph Street

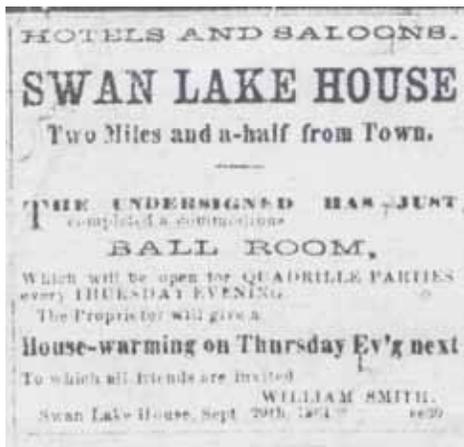
In October, 1912, the Girling family established a small hobby farm at Swan Lake, between Ralph Street and the lake, bordered by Lancaster Road to the west. Anne Alice Girling, one of the daughters, had studied photography in England before they came to Victoria, and left a treasure of photographs at Swan Lake and Christmas Hill in the early 1900's. Thankfully, her collection has been preserved and stored at the Saanich Archives.



Beatrice Girling boating on Swan Lake, early 1900's  
Photo courtesy of Saanich Archives 2008-025-005

#### e) Swan Lake Hotel

The Swan Lake Hotel was located on the south side of the lake in 1864, on Saanich Road opposite Falmouth, directly above the south wharf. An ad in the Victoria Colonist on October 1, 1864 read as follows:



Victoria Colonist, October 1, 1864

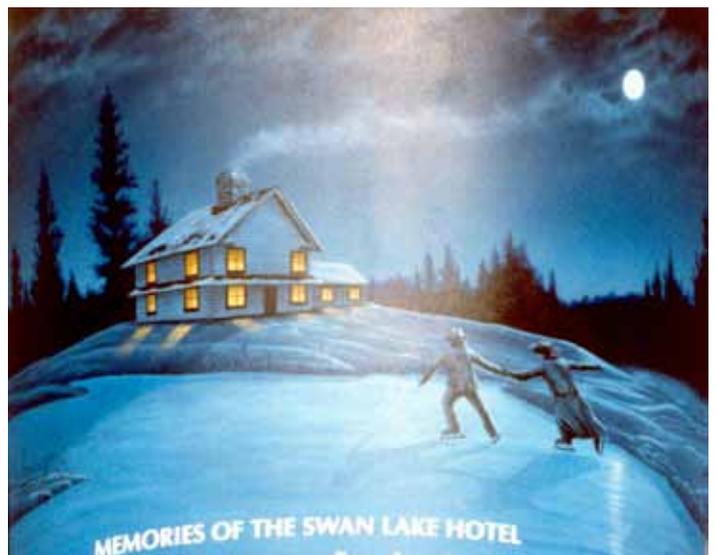
*Swan Lake House – two miles and a half from Town. The undersigned has just completed a Commodious Ball Room which will be open for Quadrille Parties every Thursday evening. The proprietor will give a House-warming on Thursday Ev'g Next, To which all friends are invited. WILLIAM SMITH, Swan Lake House, Sept. 29, 1864*

The hotel was reputed to be excellent for fishing, spring and summer, and perfect for ice skating in the winter. Clearly, this was Saanich's first year-round recreational resort!

In January, 1894, the prosperous hotel burned to the ground. As it was a popular and successful resort, it was quickly rebuilt. It tragically burnt to the ground again in October, 1897, with the occupants barely escaping with their lives.

The story from the Colonist October 23, 1897:

*The unfortunate Swan Lake hotel is again a mass of charred ruins, the second time it has been burned in the past three years. The fire took place at 4 o'clock yesterday morning, and Mrs. Merryfield, who occupied the building, states that she has no idea how the fire originated, as she barely managed to escape with her life. The building was owned by Mrs. Sills, but was rented by Jonathan Merryfield, who is at present on the Skagway trail on his way to Klondyke, Mrs. Merryfield being left in charge of the place. The house was insured for \$1,000 and the contents*



*for a similar amount. The Swan Lake hotel was burned once before in January 1894. Victoria Klondykers seem to be unfortunate of late, for Mr. Behnsen's and Mr. McRae's houses have been robbed, and now the Swan Lake Hotel is burned while Mr. Merryfield is out hunting for gold in the north.*

Unfortunately the hotel was never rebuilt after the 1897 mishap.

#### **f) Other Historical Notes**

James Baker of the Victoria Ice Company and Baker's Brick Yard harvested ice from Swan Lake between 1889 and the early 1900's. The ice was packed in sawdust to keep it frozen, and would be sold throughout the year to households for kitchen ice-boxes.

#### **g) Lake Pollution and Eutrophication**

When the ocean waters receded from the Swan Lake area approximately 8,000 years ago, the basin scoured out of the bedrock formed a fresh water lake. The lake is thought at that time to have an area of about 34 hectares, almost four times its present size. Like all lakes, Swan Lake has gone through a process called eutrophication, which includes addition of nutrients and filling in with sediments. By the mid 1800's, the lake (based on old maps) was visibly larger than it is now, though much of the original lake was replaced by flat marshy fields, covered with hardhack, willow and red-osier dogwood.

As the city expanded, the lake went through a period that has been referred to as "rampaging cultural eutrophication", greatly accelerating the natural process. Three "cultural" sources of nutrients were added to the inflow from the watershed – fertilizers from the Blenkinsop Valley and Swan Lake farms, effluent from a sewage treatment plant at Quadra and McKenzie which served almost 500 homes, and two wineries, which between them discharged more than 2,000 kilograms of sludge from the fermentation process into the inflow stream each year. Tom Pendray, Swan Lake Dairy Farm, used to pump water from the lake to water his garden. At times his sidewalks were stained red from the berry and grape residue in the lake water!



Growers Wine Co. on Quadra Street, one of the two wineries in the neighbourhood contributing to Swan Lake's "rampaging cultural eutrophication" Photo courtesy of Saanich Archives 1985-006-001d

This gross overloading of nutrients in the shallow warm lake led, of course, to problems. These conditions supported huge amounts of plant and plankton growth, and Swan Lake was thick with algae during the summer months. As all this material died and was broken down by bacteria, large amounts

of oxygen were consumed, and the lower levels of Swan Lake became devoid of oxygen. The warm temperatures and lack of oxygen made survival impossible for cold-water fishes such as trout. Large fish kills were reported as early as 1952.

Pumpkin-seed sunfish (introduced) and Three-spined stickleback (native) abound in Swan Lake – they can tolerate warm waters, and therefore can survive in the upper waters of the lake where oxygen is supplied by photosynthesis in algae.

The other problem associated with an abundance of growth is the production of methane and hydrogen sulfide gases by anoxic (without oxygen) bacteria. The lake, stratified into various levels by variations in water temperature during the summer, would “turn over” in the fall, bringing these foul-smelling gases to the surface. This was an annual occurrence for nearly twenty years, giving Swan Lake the reputation of a large cesspool, shunned by anyone with a sense of smell.

Conditions began to improve immensely after early 1975, when the entire area was connected to the sewer system, at least diverting, if not solving, the problem. The lake is still green and thick with plankton in the summer, and always will be, because of its location and size. Oxygen levels are still low in the deeper waters of the lake, but trout coming up from the Colquitz river are able to survive much of the year round now. And that heavy sulfur smell hasn’t blanketed the neighbourhood since around 1975.

#### 4) Nature Sanctuary History

##### a) Saanich land acquisition

The Swan Lake Christmas Hill Nature Sanctuary Society was formed and officially incorporated under the BC Society Act on June 16, 1975.

The Sanctuary’s story actually began over a decade earlier. In the early ‘60’s, the Municipality of Saanich began acquiring lands around Swan Lake and Christmas Hill with the aim of retaining the area in its natural state, for the use and enjoyment of the public. (Records indicate that much of the property around the lake had been purchased by 1973, for approximately \$230,000!)



Saanich Planning Department’s Nature Sanctuary proposal, 1973

By 1973, the Municipality felt that it was time to start opening and operating the site. An imaginative proposal was produced and published by Saanich’s Planning Department, which called for extensive development work, on what would be a beautiful sanctuary, which would preserve the unique ecological assets of the site and provide excellent educational facilities.

The 1973 proposal also advocated completion of acquisition of lands around the lake, the upper parts of Christmas Hill, and a connecting corridor of land between the two sites, along the route of Nelthorpe Street. Thanks to substantial investments of funds by the National Second Century Fund of B.C. (which later became, and still remains, the Nature Trust of British Columbia) and the provincial Greenbelt Fund, the remaining lands around

the lake were bought. Only a relatively small number of lots around the edge remained out of public control. Both the organizations mentioned leased their purchases to the Municipality of Saanich on long-term leases at nominal rents, on condition that the land be used for a nature sanctuary. By 1980, the Municipality had also secured sufficient land to assure the availability of the connecting corridor to

Christmas Hill. More than half of the land required on the hill had also been bought. Between 1965 and 1978, approximately \$650,000 was spent on buying land around Swan Lake for the proposed Nature Sanctuary.

### **b) Nature Sanctuary Society**

After consultation with local naturalists, school districts, the University of Victoria and the Regional and Provincial Governments, the Municipality decided to assist with the formation of a Society under the Societies Act of B.C., to develop and operate the site. It was named the “Swan Lake Christmas Hill Nature Centre Society” and was duly incorporated in June of 1975. Many of the organizations consulted along the way became members of the Board, and sent representatives to serve on the Board, making the Sanctuary truly a community effort.

Since its humble beginnings in 1975, the Society has enjoyed a close relationship with the Victoria Natural History Society. The VNHS is a member of the Nature Sanctuary Society, and sends a representative to serve on the board. In this way, the VNHS maintains direct input into the decisions that have shaped the Sanctuary over the past 40 years. The VNHS also provides an annual grant of \$4,000 toward the maintenance of a safe trail system and the control of invasive exotic plants. In 2015, the VNHS made a very generous donation to assist with the replacement of the aging floating boardwalk system.

### **c) Site development and habitat restoration**

The Society hired its first staff in the summer of 1975 to carry out an extensive survey of the lands and the lake, and to produce the first site development plans. In the fall of 1975, under a Federal Labour Grant, the first site development projects were undertaken, with the construction of the first section of trail and floating boardwalk, the initial efforts at tree planting, and the beginnings of the Sanctuary’s education program.

As the Society did not have a building in which to base its operations, the site crew was given a back corner office space on the main floor of the Municipal Hall. This was probably the first time that dripping, muddy chest waders were worn regularly in the offices there (and probably the last time!).

In the spring of 1976, the crew was ushered out of the Municipal Hall and into a somewhat derelict 1912-vintage farmhouse on Ralph Street (originally built and owned by the Girling Family), complete



The Girling family farm house, built in 1912, served as Nature Sanctuary offices in 1976/77 Photo: P. McCloy



The Herda house, on the site of the current nature house, served as nature house from 1977 to 1988 Photo: G. Sirk

with a pond in the dirt basement during the winter when the lake waters rose. This building served until 1977, when the residence at the end of Swan Lake Road - the current Nature House site - came available. The bedrooms were converted to offices, the dining room and living room transformed into the display

area/classroom, and the one bathroom (with one toilet) had to meet the needs of staff and classes of children. Though this house was often bursting at the seams, it served as the headquarters for staff and program activities for 10 years.

In the meantime, with the assistance and support of Saanich Municipality, the Society's member organizations, and countless devoted community members, the trail facilities were developed, trees and shrubs were planted, and the education programs began to flourish. Residents of Saanich began to appreciate the real value of this 'undiscovered' gem in the midst of a quickly growing urban area.



Laying down the first cedar chip trails, July, 1976

Photo: T. Shepard

The loop trail around the lake was the first priority for site development. The north wharf below the Nature House was built and installed in 1976, followed by the floating walkway across the lake and finally the south wharf.



Building the first floating walkway across the lake, July 1978

Photo: D. Small

The floating boardwalk offered an unprecedented level of access to the lake waters, a facility unique in the Capital Region. It quickly became the focus of many of the education programs, providing opportunities for bird-watching and lake water studies.

In 1986 the Society began developing plans for the new Nature House facility. Though the temporary Nature House was physically sound, it occupied the most logical site for the new facility, with its southern exposure and commanding view of the lake. The decision was made to remove the house, and use the original foundation for the new building. Beginning

with a \$100,000 grant from the Municipality of Saanich, the Society mounted a fund raising campaign, and by the spring of 1988 had raised another \$400,000 from the community and the Provincial Government, to build and furnish the Nature House and provide some of the displays. The facility was officially opened in September of 1988.

In the meantime, work began on the Christmas Hill trail, including the connecting corridor trail from the Swan Lake parking lot to the loop trail on the hilltop. Construction of the trail began in 1987, and was completed and officially opened in October of 1992.



The new Nature House was completed and officially opened in September, 1988

#### **d) Education programs**

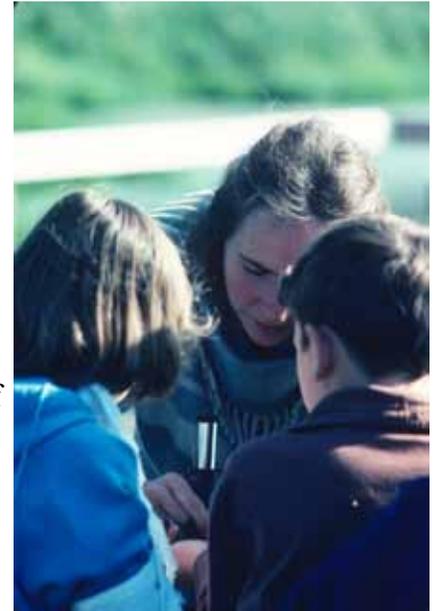
Nature Education has always been a prime directive for the Nature Sanctuary, with humble beginnings in 1976 (850 participants), swelling to over 20,000 per year by 2010! Over the years, a wide range of programs has been developed to reach pre-schoolers, students (primarily Kindergarten to Grade 7), the general public, family groups and seniors. The Nature Sanctuary has developed and maintained a number of partnerships with other organizations (the Victoria Natural History Society, Victoria Palaeontology Society, South Vancouver Island Mycological Society, CRD Parks & Environmental Services, to name a few) to extend the range and expertise available on a variety of topics.

#### **e) Volunteers**

One of the key advantages to operating the Nature Sanctuary as a non-profit agency is the significant community connections that are created as a part of the day-to-day operation of the facility. As a result, volunteers have always played a key role in the development and management of the Nature Sanctuary. Volunteers play a vital role by helping with nature education programs, stream restoration activities, invasive plant removal, trail building, working in the native plant garden, providing office assistance, or leading groups of birdwatchers. In the fall of 1990 the Society hired its first Coordinator of Volunteer Services, and the contribution made by volunteers every year increased from an average of 4,400 hours to over 11,360 hours per year by 2000, leveling off at around 8,000 hours per year by 2014.

#### **f) Members**

The Nature Sanctuary is very much a membership-driven organization. Memberships directly support the many conservation, research and education initiatives that take place in the Nature Sanctuary, and provide a valuable link between the community and the activities at the Nature Sanctuary. Members receive a member discount when visiting the gift shop or registering for a program, and get to go behind-the-scenes at member-only events. Members are invited to take part in shaping the future of the Nature Sanctuary by voting at the Annual General Meeting. Annual or monthly payment options are available.



Heather Crampton, one of the Sanctuary's founding members, demonstrates the microscope to eager students



Volunteers plant wildflowers rescued from development sites into the native plant garden

# Ecosystems

## 1) Swan Lake wetlands

### a) General

Practically all the lands in the Sanctuary were [historically] cleared for agriculture, and farmed until 1975 when Swan Lake Christmas Hill Nature Sanctuary was formed. Today the wetlands are dominated by invasive reed canary grass, though some native shrub thickets remain. Swan Lake watershed is approximately 25% impervious, causing high-energy flows in Blenkinsop Creek and highly unnatural (variable and reactive) changes in water levels in the lake. Overall, the ecosystems are characterized by extensive invasive species, a simplified vegetation community, poor water quality and altered hydrology. Despite these problems,



Aerial view of the lake and surrounding fields, June 1980

the Sanctuary provides habitat for a large number of species, including the endangered western painted turtle, a variety of mammals and over 200 species of birds. Social values provided by the Sanctuary include ecosystem services such as carbon sequestration and air pollution removal, education, community service opportunities, recreation and research partnerships. (Excerpt from the Swan Lake Adaptive Ecosystem Management Plan, Lise Townsend, 2010)

### b) Plant communities



A small but significant stand of Garry oak and arbutus off the end of Nelthorpe

Around the lake and wetland area of the Nature Sanctuary, there exists a range of habitats, including rocky outcrops with Garry oak and arbutus (on the slope up towards Saanich Road on the east and the Lochside Trail on the south) and a small Douglas-fir/grand fir forest, just behind the Nature House. However, the majority of land around the lake is flat and low, and susceptible to seasonal flooding.

Part of this wetland area is covered with a shrub/tree layer, dominated by native willows, red osier dogwood, hardhack and black cottonwood. The majority, however, is smothered with an introduced grass, primarily reed canary grass. This grass was planted many years ago during the agricultural period, because although it is not a prime feed grass, the roots withstand winter flooding, so annual replanting was not required. Large areas of reed canary grass persist today because of its tenacious qualities.

Around the lake edge there still exists a remnant of what may have been the original shrub/tree layer where the agricultural clearing did not reach. Here you will find Pacific willow, Sitka willow, Geyer's willow and Hooker's willow mixed with red osier dogwood. Large introduced weeping willows can be seen along the inflow stream to the east and the head of the outflow stream on the west side of the lake.

On the lake side of this area you will find large floating mats of reed canary grass interspersed with towering cattails, bulrush and the yellow pond lily.

### **c) Mammals, Reptiles and Amphibians**

A variety of (mostly small) mammals can be found around the lake and wetland area, including black-tailed deer, North American river otter, mink, muskrat, wandering shrew, white-footed deer mouse, North American raccoon, Townsend's vole and variety of bat species. In recent years the introduced eastern grey squirrel and the eastern cottontail rabbit have moved into the area. Cougars are spotted around the lake area on very rare occasions. There have been North American beavers around the lake, but they have not been spotted since 2002 or so.

Two species of turtles can be found in the lake, especially visible during the summer months. The western painted turtle is the native species – it is red-listed on the Provincial Species At Risk list, and has endangered status on the Federal listing. The red-eared slider is the introduced species. It can be distinguished from the western painted turtle by the presence of a red spot on the side of the head. The females of both species can be seen in the spring digging nests and laying eggs, often in the native plant garden adjacent to the Nature House. It is not clear, however, whether the eggs of the red-eared slider, native to south-eastern United States, survive the winter and hatch out successfully.

Frogs are fairly uncommon around Swan Lake, probably due to predators, poor water quality and lack of appropriate habitat. Pacific tree frogs (aka Pacific chorus frogs) can sometimes be heard (and less often seen) in the willow thicket below the nature house on the west side.

In recent years the lake has been plagued by the introduced American bullfrog. Concerted efforts have been underway for a number of years to eradicate the bullfrogs by capturing the breeding adults, though with a sizeable population upstream in Blenkinsop Lake, ongoing monitoring and response will be required.

Three species of snakes can be seen at Swan Lake. By far the most abundant snake is called the common garter snake. On occasion one can spot a north-western garter snake or a western terrestrial (or wandering) garter snake.

The native lizard is the alligator lizard, and can sometimes be found sunning on the rocks in the native plant garden in front of the nature house. More recently, there have been sightings of the introduced European wall lizard.

### **d) Birds**

The Nature Sanctuary has an abundant and rich variety of bird life, especially around the lake and wetland areas. This diversity is supported by large areas of flood plain undisturbed by trails, along with an abundance of insects and small fish provided by the lake and streams. It provides one of the best opportunities for bird watchers and photographers in the heart of the city.

More than 200 species of birds are regularly seen around Swan Lake throughout the year. Of course, the numbers and species of birds that can be seen on a particular day changes dramatically depending on the season - the fall and spring migrations bring in a wide variety of birds, some just passing through, and some staying for the season. The Nature House, surrounded by a variety of habitats, supported by bird feeders, and with a commanding view of the lake, is one of the best places for bird watching.

There are informal bird walks every Sunday morning at 9:00, which are highly recommended for enhancing your knowledge of birds and where they may be found. A Checklist of the Birds of Swan Lake (compiled by Chris Saunders) is available at the Nature House and on the Nature Sanctuary web site - [www.swanlake.bc.ca](http://www.swanlake.bc.ca). The web site also displays (via BirdTrax and Ebird) a listing of the latest bird sightings around the lake.

Ted Ardley, a local photographer and a frequent visitor to Swan Lake, has generously provided a selection of bird photographs for your enjoyment on our web site at [www.swanlake.bc.ca](http://www.swanlake.bc.ca) - well worth a look. All photographs were taken at Swan Lake.



Barred Owl



Marsh Wren



Kingfisher



Anna's Hummingbird

A small sample of the 24 pictures by Ted Ardley available for viewing on our web site

Photographs © Ted Ardley

## 2) Christmas Hill Garry Oak ecosystem

We are incredibly fortunate to have such a treasure as Christmas Hill form part of the Sanctuary. It is one of the few significant Garry oak-forested hilltops in the region without a road and vehicle traffic. It has abundant areas of both types of Garry oak ecosystem (see below). In addition, thanks to over 30 years of dedicated efforts to control invasive exotic species, Christmas Hill has a diverse and healthy ecosystem. Spring is the best time to visit Christmas Hill, when carpets of camas lilies, easter lilies, shooting stars and chocolate lilies dazzle the senses.

### a) Endangered status

British Columbia is the only place in Canada where you will find the Garry oak ecosystem – restricted almost exclusively to the southeast coast of Vancouver Island and the nearby Gulf Islands. It is the most highly endangered ecosystem in Canada, with less than 5% of the original ecosystem remaining in its natural state (graphically illustrated in the **historical Garry oak ecosystem map, appendix 4**).

Garry oak ecosystems are home to more than 90 species that have been designated at risk in British Columbia. Of these species, 23 are threatened or endangered globally and 21 are listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as being at risk nationally.

From the *Garry Oak Ecosystem Recovery Team (GOERT) web site*:

*Over the past 150 years, waves of settlers have been attracted to Vancouver Island's southeastern coast. Land conversion for agricultural, residential and industrial development has vastly reduced the extent of Garry oak ecosystems. Less than 5% now remains in a near-natural condition, and that too is threatened.*

*Threats include habitat loss, fragmentation of larger areas of habitat into smaller, more vulnerable patches, encroachment of woody species as a consequence of fire suppression, and invasion of exotic species that out-compete native species.*

*Originally, two major types of ecosystems occurred in the Garry oak areas: those on deep soils, known as parkland Garry oak communities; and scrub oak ecosystems, found on shallow soils.*

#### **Deep soil sites**

*A mosaic of shrubs, trees, and meadows of flowers and grasses are typical of deep soil sites. Almost all of the deep soil parkland sites in the Victoria region were cleared for agriculture and urban development. Many large Garry oak trees remain, but most have lawns, roads,*

*agricultural fields, golf courses or blacktop beneath them, rather than native plant communities. On Vancouver Island, only 1.5 % of the original deep soil sites remain.*

### ***Scrub oak shallow soil sites***

*More of the scrub oak shallow soil sites exist, as many of these rocky areas are difficult to develop. Spring flowers, grasses and mosses originally dominated the understory of these rock outcrop communities. Many of these native plant communities have been invaded by weedy species such as Scotch broom, daphne, and agronomic grasses. On Vancouver Island, only 44% of the shallow soil sites remain.*

Christmas Hill is blessed with both types of Garry Oak ecosystems. Much of the rocky hilltop is the scrub oak shallow soil ecosystem, while the lower area to the north and west of the summit (traversed by the outer loop trail) is a prime example of the very rare deep soil ecosystem, with both Garry Oak and Douglas-fir.

### **b) Rare and endangered plants**

Christmas Hill is home to approximately 250 plant species and over 25 distinct plant communities. There are several plant species that are unique or of special interest and seven plant species at risk. Probably one of the better known plant species at risk is the yellow montane violet, a small but showy flower which is red-listed Provincially and endangered nationally.

The vernal (seasonal) pond on Christmas Hill is a unique and fragile natural feature. A rock basin was formed over 12,000 years ago when the last glacier was scouring the surface of Christmas Hill. The basin holds the winter rainwater well into the spring growing season, resulting in a unique plant community found nowhere else on the hill. Half of the species at risk on the hill (Carolina meadow-foxtail, chaffweed, heterocodon, tall woolly-heads) are found within two plant communities located in and around the vernal pond.

### **c) Invasive Species**

The biggest single threat to the ecosystem on Christmas Hill is from invasive exotic plants, with Scotch broom as the main culprit, assisted by English ivy, Himalayan blackberry, spurge laurel (daphne), money plant, English hawthorne and cyclamen.

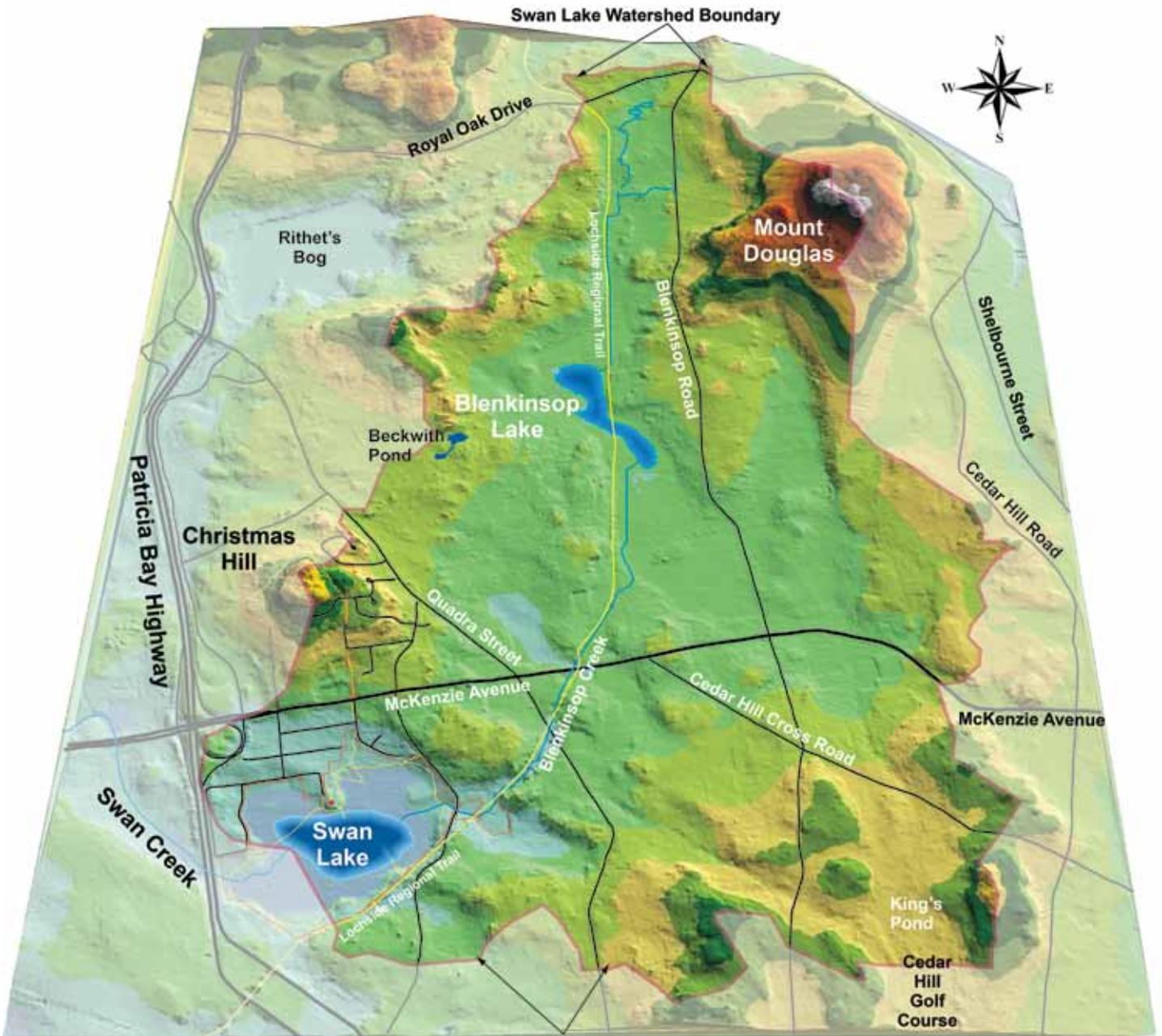
By 1983 most of the open areas of the hill were covered in Scotch broom, resulting in a major loss of the wildflower populations. A concerted effort that year cleared much of the area, but by 1986 the significant seed bank in the soil sprouted and grew, and the hill was once again a sea of yellow flowers. Millions of broom seeds lay waiting in the soil, and can remain viable for up to 25 years. It became evident that a systematic long term approach was required.

In 1991 a systematic approach was started, with particular attention paid to the vast seed bank in the soil, and the rapid rate of regrowth. Small areas of mature broom were cleared each year, and the regrowth (knee-high and above) in these areas was pulled before new areas of mature broom were added.

As most of the area was cleared of mature broom plants, the focus switched to preventing the addition of any new seeds to the soil. Beginning in the middle of May, the broom starts flowering, signalling any seedlings that have been overlooked. These plants must be pulled before they set seed. The flowering season is fairly long, so several passes have to be made to catch them all.

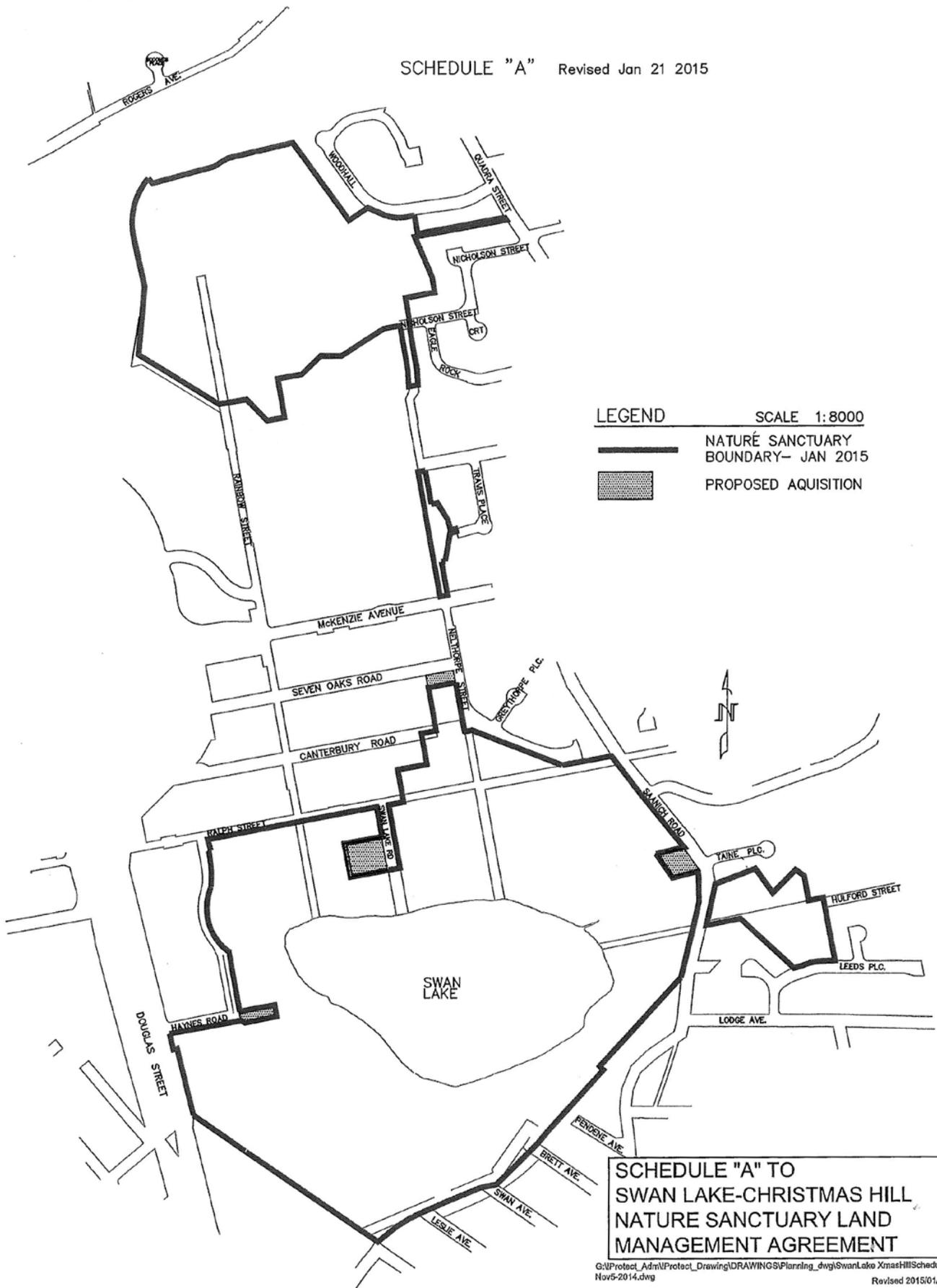
That approach is still underway today, and persistence has paid off – the wildflower populations, especially the camas lily, once again carpet the hillsides in the spring.

# Appendix 1 – Swan Lake Watershed Map



# Appendix 2 – Animals Bylaw Map

SCHEDULE "A" Revised Jan 21 2015



**LEGEND** SCALE 1:8000  
 ——— NATURE SANCTUARY BOUNDARY- JAN 2015  
 [Hatched Box] PROPOSED AQUISION

**SCHEDULE "A" TO  
 SWAN LAKE-CHRISTMAS HILL  
 NATURE SANCTUARY LAND  
 MANAGEMENT AGREEMENT**

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 Revised 2015/01/20

## Appendix 3 – Geological History

### Living With The Shapes The Glaciers Carved Us by William Stavdal

(with special thanks to Hugh Nasmith, P. Eng.)

For generations, kids have played atop a certain rock behind the shingle annex at Sir James Douglas School in Fairfield. It's a kids' rock, a kingofthecastle rock, shaped like a teardrop sliced along its length and laid flat side down. Its north end slopes gradually, level enough to walk up it. The south end drops steeply.

Over in Esquimalt, behind Lampson Elementary, the same shapes poke above the surface. These ones also have deep, smooth grooves. And if you stand back to the west of Gonzales Bill, or study South Trial Island in outline, or open your eyes to a hundred other rock outcrops, the same profile appears: north end rising smoothly, south end dropping abruptly in broken steps.

The French call them roches moutonnees, likening them to the shape of grazing sheep. They are the mark of glacial ice which lay threequarters of a mile deep atop Victoria 15,000 years ago.

Within the lifetime of humanity the City of Gardens has matched Antarctica, become seabottom and emerged again.

The shaping of Victoria is a story as old as the world, of course. But only the latest act of this grand and ponderous drama is known with any certainty.

Thirty thousand years ago, when men like ourselves were appearing in Europe, Victoria lay quietly awaiting the return of the ice.

Our familiar hills were in place, but rougher and a little higher than today. The climate was much the same perhaps a little cooler and wetter. Our Garry oaks shaded the hills, sharing space with arbutus and fir.

Victoria's harbour was no harbour at all because the sea stood lower then, all around the world. It was merely a vale through which a small river passed en route to the ocean some distance south.

By that tranquil period, vast ice sheets had ground across Victoria at least three times.

Three times or more the snows had massed and compacted into bluegreen ice on the mountains of Vancouver Island and on the mainland. slid down and outward, destroying all life unable to migrate south. Three times a warming world shrank the ice, and life crept back.

In the great quiet park that was Victoria it had been like this for 7,000 years or more. The scars of the last glaciation were long healed.

It was a false spring.

The ice caps that mantled Canada and northern Europe had shrunk but not vanished. They were now to deepen and expand more than ever before, and become colder too.

Had there been anyone here, the change would have been barely perceptible in a human lifetime. But the average temperature in the mountains hovered at the critical point at which winter snow didn't entirely melt the following summer. Each year more was added until its own weight pressed the mass into ice. Then, like a thick pancake batter, it spread slowly outward.

On to Mt. Newton

Twentyseven thousand years ago it had grown distinctly cooler, but Victoria remained icefree. In the hills and on the mainland slopes it was a time of incredible snow. In *The Forging of Our Continent*, geologist Charlton Ogburn Jr. drew this word picture:

"...The snows fell patiently and quietly or poured in on blizzard winds, and to provide water for the little

white flakes the oceans shrank in their beds. And still it snowed. And when it stopped, it stopped only to resume. For periods exceeding the span of human history the long and bitter winters brought snowstorm upon snowstorm. By the time the maximum amount of water held in the snowformed ice had been reached, the depleted oceans had dropped several hundred feet all around the world..."

Such volumes of water were being locked up as ice that numbers lose meaning. When the ice had reached its greatest extent the world's oceans had dropped 330 feet.

Century by century the sea drew back miles from the earlier shore, followed quickly by the plants. Constance Bank, six miles south and now 60 feet underwater, first became an island and then a promontory of Vancouver Island.

The shoreline at Port Angeles moved north and the Strait of Juan de Fuca shrank to a narrow channel about 100 feet deep.

Twentyfive thousand years ago the continental ice front lay at Campbell River, moving south down the Strait of Georgia. It was a long time reaching here; well before it did, other ice was grinding at Victoria's back door.

As the climate of the northern hemisphere moved to its coldest, the mountains of this region spawned their own ice. The Olympics across the narrow water were mantled in a brilliant white. Glacier tongues moved out of the valleys.

In the hills behind Duncan an ice field formed and slid southeast about 24,000 years ago. It filled Cowichan Bay, butted a left shoulder against Salt Spring Island, edged the other into Saanich Inlet, then ground onto the Saanich Peninsula at Deep Cove and Patricia Bay.

Ice cliffs gleaming, the mass first blocked Saanich Inlet. then shoved south into Finlayson Arm. Unable to exit northward any longer, the Goldstream River formed a lake which rose until it found an outlet to the south through LangfordColwood.

When the snows came

On the peninsula the mass overrode the lowlands and halfencircled Mt. Newton. The left shoulder pushed east through Satellite Channel but may not have reached Swartz Bay nor Sidney.

And then, 18,000 years ago, it seemed to be over. In this part of the world the climate warmed. Unable to balance winter snowfall against summer melting, the glaciers dwindled.

A watcher here would have seen the valleys of the Olympic Mountains change from white to green. Around the flanks of Mt. Newton and on the flats the glacial out-wash sluiced sand and gravel from the body of the glacier. Its front began to withdraw.

Victoria was reprieved, or so it seemed. But atop Mt. Newton the watcher could have looked northeast to a cliff of ice in the Strait of Georgia. The continental ice cap was here.

Warmer weather, yet ice advancing? Despite an improved climate regionally the inconceivable mass of the continental ice cap had reached a height which shoved outward irresistibly. Like First World War soldiers plodding into machinegun fire, the ice wall melted as it came, yet came onward.

Soon after 18,000 years ago the ice was on the Saanich Peninsula again. It overrode the retreating Cowichan ice tongue and began scouring the land.

We don't know exactly how fast it happened, but when the ice front reached Seattle it was traveling at a rate of 100 to 160 feet per year. Say 150 feet per year locally; that's 1,500 feet in a decade, two miles in a human lifetime.

It requires but little imagination to conjure the brooding contrast of those years in Victoria.

Ahead of the ice hardier plants thrived on an unaccustomed ration of water melted from the glacier front. More tender species withered in the clammy winds blowing off the mass. Sooner or later it was death for all; both plant and animal communities were trapped between ice and ocean.

Offshore the waves bit at the base of the ice, creating vertical cliffs like those in Greenland and Antarctica today.

On land the tumbled icefront moved straight south, grinding countless parallel grooves in the bedrock to mark its path. Muttering from slow internal shifts, it edged around the flanks of hill after hill, then overtopped and swallowed them. Mt. Douglas, Mt. Tolmie, Gonzales Hill, then the low foreshore vanished.

The ice filled Puget Sound, moved over Seattle, Tacoma and Olympia, then halted against the mountains. There was nowhere to move but west; the ice spilled out the Strait of Juan de Fuca to the open sea.

And now, at the featureless spot that was Victoria, there was nothing but a glittering white, perhaps 3,500 feet deep. To the south the Olympics stood forth, but west and north and east the vague horizon was broken only by the highest peaks of Vancouver Island and the Coast Range.

Time passed 2,000 years of it. Nothing changed.

Things were happening below the ice. Beneath the weight the earth's crust sagged hundreds of feet. The Strait of Georgia was a mile deep in ice and its bed dropped 800 feet. At Victoria the bedrock subsided about 550 feet.

Where ice met the earth's surface the land was being scoured anew. Soil and gravel were removed. Large and small fragments of stone, ranging from boulders to microscopic rock flour, chiseled grooves in the bedrock, scratched its surface and even left a chinaware glaze in places.

The rock at Sir James Douglas school retains patches of this glaze. Wet it and it glistens.

Between 14,000 and 15,000 years ago the warming world climate finally took effect. The ice cap thinned, reducing its outward thrust. At the ice front, melting defeated the advance. It happened very quickly, as glacial events go. In about 1,000 years, the ice retreated from the Strait of Juan de Fuca, Puget Sound, Victoria and the Saanich Peninsula.

Before it backed away to the north the ice left one final mark on the bedrock.

By this time the top of the decaying hulk was crisscrossed with streams of melt water. It tumbled into crevasses and found its way to the bottom through the glacier's internal plumbing system. Then it spewed out at the base under great pressure, carrying sand and gravel picked up along the way.

These torrents sandblasted the serpentine channels seen here and there on exposed rock. They coil this way and that, sinuous and everchanging, sometimes at right angles to adjacent northsouth grooves.

Some finely sculptured examples ornament the beach around Harling Point, especially just below the old Chinese cemetery. More than any other traces of the glacier, these graceful plastic shapes evoke the ponderous drama of those years.

Like the advance of the ice, the great melting was on a scale too big, too long to comprehend. Century after century it hemorrhaged its substance. Someone has calculated that, worldwide, the ice caps liberated 8,000,000 cubic miles of water.

By 13,000 years ago the ice had disappeared from Victoria and the Saanich Peninsula.

And so had the land. This was the new Victoria:

Under the weight of ice the land had sunk about 550 feet. The sea level had also dropped as much as 330 feet, but was now rising. Let's assume it stood 300 feet below present level.

That left Victoria and the region covered with up to 250 feet of icebergdotted salt water, as proven by traces of marine life found that high above today's ocean.

Gonzales Hill and the FortPandora junction were 50 or so feet below the waves. Mt. Tolmie stood 150 feet out of the sea, and Mt. Douglas even more. Prevost Hill on 10Mile Point was a mere rock.

To the northwest a maze of shallow bays fringed the bare rocks of the Highlands.

It was these two factors submergence and a quick ice retreat which drew the final broad strokes of the landscape we know today.

When an ice front stands still, or nearly so, it deposits vast amounts of rocky debris at its snout. There was very little of that on the southern part of the peninsula, though there are gravel deposits to the north and west. For some reason the ice lying atop Victoria held comparatively little rock. It did contain huge amounts of powdered "rock flour," and this it released into the sea.

Tides swept it back and forth, silt staining whitecaps grey below looming ice cliffs, but it had to settle somewhere. In most places the water was deep enough and therefore still for the particles to sink to the bottom. There they formed the bluegrey clay beds that cover the lowlands of the Capital Region from Esquimalt up the Saanich Peninsula.

The deepest beds were deposited where the ice had gnawed the bedrock most. In pockets it lies as much as 100 feet thick.

Victoria's unpredictable subsurface long has been the despair of building contractors. Test holes often miss rock outcrops (which means unbudgeted blasting) or deep clay pockets (which may require pilings).

The Royal Bank Building at Douglas and Pandora rests its rear firmly on bedrock and its front on pilings 60 feet long.

When they excavated for the Mulek Apartment Tower at View and Quadra they never did hit bedrock; they just poured a thick pad of concrete and built on the clay.

The old Crystal Gardens developed its wellknown sixinch sag to the north because that end is on deep fill which subsided more than at the other end.

In places the retreating ice contained far more rocky debris. "drift," it's called than in others. The ice lying astride ColwoodLangford held great amounts because of increased grinding action as it pushed south through narrowing Saanich Inlet and Finlayson Arm.

Before the waters receded the glacier left final calling cards: the countless boulders that glaciologists refer to as erratics. Some had already been deposited by the melting ice; now they were joined by others.

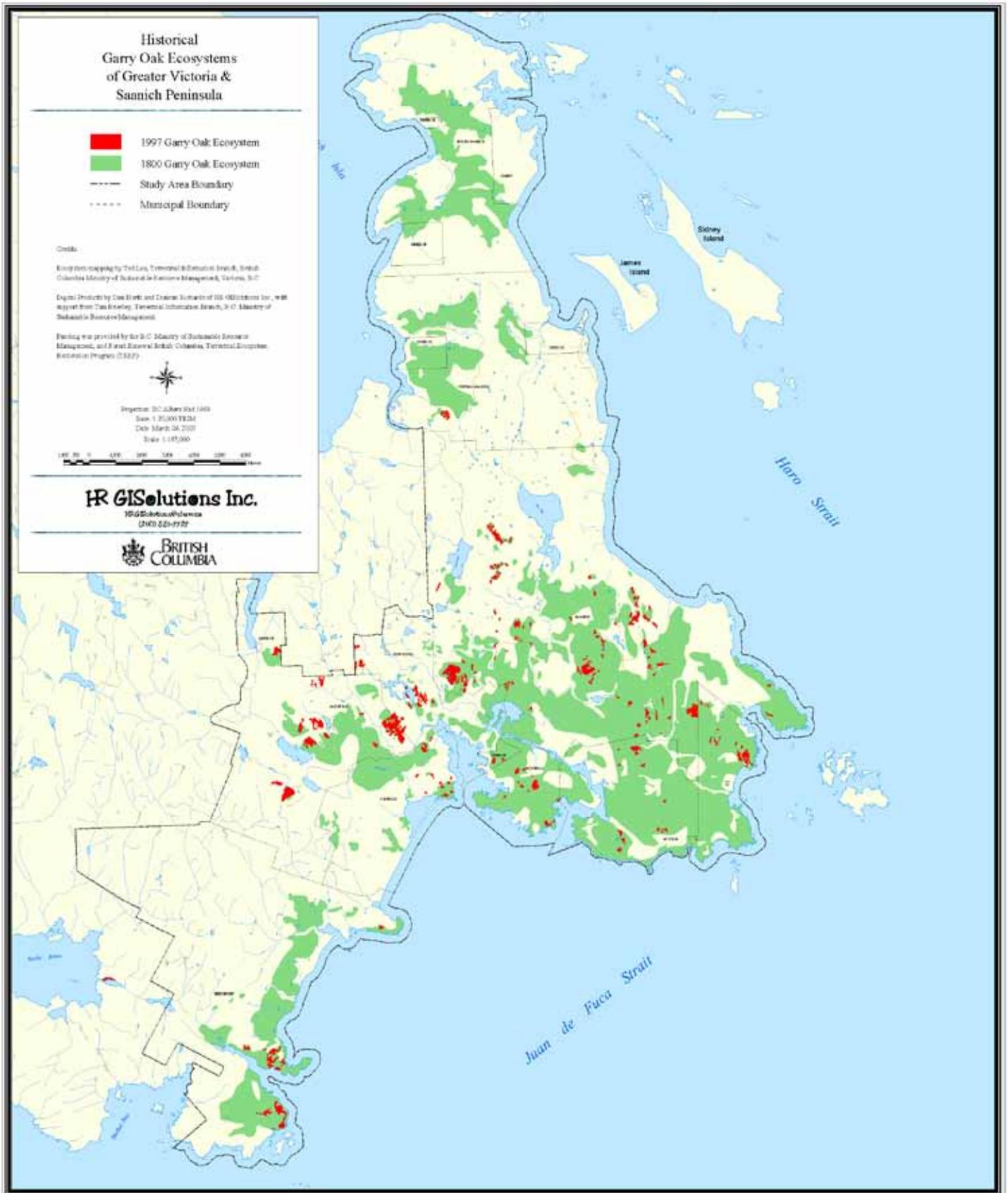
Icebergs calved in the Strait of Georgia brought them here while the water over Victoria was still deep enough to float large ice. The 'bergs ran aground, melted and dropped their loads. Or the unwieldy boulders broke loose in deep water and plunged to the bottom as their ferries rolled drunkenly to a new equilibrium.

One erratic the size of a small room was taken from the clay during excavation for the medical building at the northwest corner of Fort and Richmond.

Easiest to spot are the pepperandsalt granite erratics. They are scattered along the shore (like the big one in Gonzales Bay) and they litter Cattle Point and the Uplands generally.

Many big ones were just rolled aside by early roadbuilders. There are a couple on Beach Drive near the entrance to the Victoria Golf Club. Ignored by passersby, another granite boulder rests in the shadow of an apartment house at Oak Bay Avenue and Mitchell, its travels forever unknowable.

# Appendix 4 – Historical Map of Garry Oak Ecosystems



## A note from the author:

I can't write a booklet like this without acknowledging a number of people who had the foresight, in the early 1960's, to recognize the potential of this land and waterway as a Nature Sanctuary, a safe haven for native plants and animals, and a nature education facility for the Greater Victoria area.

At the time, it was a stretch of the imagination. The majority of the land and the vegetation had been drastically altered from farming practices for over 160 years in some areas. The inflow and outflow streams had been channelized and straightened to accommodate hay removal. By the 1960's, the lake was suffering from what an early study by Wayne Zaccarelli called "rampaging cultural eutrophication". Effluent from two wineries and a sewage treatment facility upstream had taken their toll.

To our good fortune, there were people who could see beyond these problems and imagine a brighter future where the lands, vegetation and waterways could be restored to a more balanced functioning ecosystem, and used to help restore and nurture our connections to the natural world.

With the support of Saanich Council led by Mayor Hugh Curtis, Saanich's planning department staff and a number of interested and dedicated community members, the dream started to become a reality in June, 1975 when the Nature Sanctuary Society was formed. Along with Teresa Shepard and George Sirk, I was very fortunate to be hired in September of 1975 to begin planning and development of the Nature Sanctuary's facilities and habitat restoration initiatives.

By the time the operations moved into the Herda house in 1979, Saanich began providing sufficient annual funding for us to establish a more expansive permanent staff. I had filled the role of Executive Director, and over the next few years, Fran Benton and Ann Scarfe (naturalists), Anne Howie (office manager) and Willie MacGillivray (site manager) joined the team. By 1988 we had successfully raised the funds required for a new Nature House, which opened in the fall of that year. That December Margaret Lidkea joined the naturalist staff, and in the fall of 1990 Joan Cowley joined the staff as coordinator of volunteers. That was to be our staff for the next 17 years!

As a team we did some groundbreaking work in the field of nature interpretation, ecosystem restoration and invasive exotic control. We gained a reputation in the community as leaders in those fields. We are all proud of the work we have done.

I feel very privileged to have been a part of this process from the beginning. I am also very fortunate to have had the opportunity to work with an amazing community of committed and dedicated individuals.

Because the community connections of the Nature Sanctuary run deep, there have been thousands of individuals who have collectively contributed to the success of the Swan Lake Christmas Hill Nature Sanctuary. This booklet is dedicated to them.

Terry Morrison

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