Chapter

02: INVENTORY & ANALYSIS

Exposed bedrock and stone structures in the Park contribute to the natural and rugged impression created by the Park landscape.

This chapter provides a summary of existing Park features and an overview of each component's relevance for the comprehensive plan.

Before we can create and evaluate new management and design initiatives, we must thoroughly understand existing conditions in the Park.

We interpret the Park's physical, biological and cultural elements using inventory mapping. These maps can be used on their own or in combination to support management decision-making. For instance, the slope-aspect map demonstrates exposed south-facing slopes susceptible to future intense storms that usually come from the south. The vegetation-density map demonstrates the areas damaged by Hurricane Juan, as well as places that were resilient to high winds. This information, alone or in combination, is essential in the adaptive management process.

"On the day I am blue, I go again to the wood where the tree is swaying, arms touching you like a friend, and the sound of the wind so alone like I am; whispers here, whispers there, come and just be my friend."

– Rita Joe

Point Pleasant Park - 2002

2.1 Geology, Soils and Hydrology

Geology

Slate bedrock lies beneath the thin soil of Point Pleasant Park. The bedrock was scoured clean by Pleistocene glaciations and subsequently recovered with glacial till. Areas of exposed bedrock occur on high ground and cliffs, as well as at the shore. The shallowness of the soils and till inhibits the ability of trees to form deep roots that can anchor them within the soil, which naturally increases their susceptibility to wind throw. Exposed bedrock on steep slopes and cliffs and at higher elevations in the Park limits the development of forest cover. Pyritic slates contained in the Halifax Formation bedrock contribute to the development of relatively acidic soils.

Shallow tills impede excavation for the construction or placement of underground services. Pyritic slate requires extra care in the disposal of excavated rock to prevent the acidification of surface water. Archaeological investigation has uncovered previously known quarry sites within the Park, which may have been the source of the stone used in the construction of the Martello Tower, various fortifications and the retaining walls supporting trails and roads. Exposed bedrock and stone structures contribute to the natural and rugged impression created by the Park's landscape.

Soils of Point Pleasant Park

After Hurricane Juan, Park soil types were mapped from more than 300 survey points and a visual assessment of exposure of mineral soils associated with uprooted trees (Map 2.1). Soils in the Park are derived from olive-coloured glacial till that is high in slate. Surface horizons are generally of medium texture (loam to silt loam) and either stony or very stony. Flat, grassy, near-shore areas appear to have been filled in and reshaped. In most areas of the Park, clearing, military use and farming have disturbed soils to some extent.

Quarry face - Point Pleasant Park

MAP 2.1: SOILS

Legend:

* Ref.	Description
ST2L/15	Predominantly well-drained (fresh) soil with loamy surface horizon; some areas of dry, shallow soil
ST15/2L	Predominantly dry, shallow soil; some areas of fresh soil with loamy surface horizon
ST3L/16	Predominantly moist soil with loamy surface horizon; some areas of moist, shallow soil
ST16/3L	Predominantly moist, shallow soil; some areas of deeper soil with loamy surface horizon
ST3L/2L	Predominantly moist soil with loamy surface horizon; some areas of fresh soil with loamy surface horizon
ST3L/4	Predominantly moist soil with loamy surface horizon; some areas of wet soil with loamy surface horizon
ST4	Wet (poorly drained) soils
ST9	Moist, rich soils (organic matter in surface horizons)
ST15	Dry, shallow soils
Beach	
Grass	
Pond	

*Reference numbers and map information from Neily, Keys and Quigley, Forest Ecosystems of Point Pleasant Park

Eroding till bluff - Point Pleasant Park 2007

"The very uprightness of the pines and maples asserts the ancient rectitude and vigor of nature. Our lives need the relief of such a background, where the pine flourishes and the jay still screams."

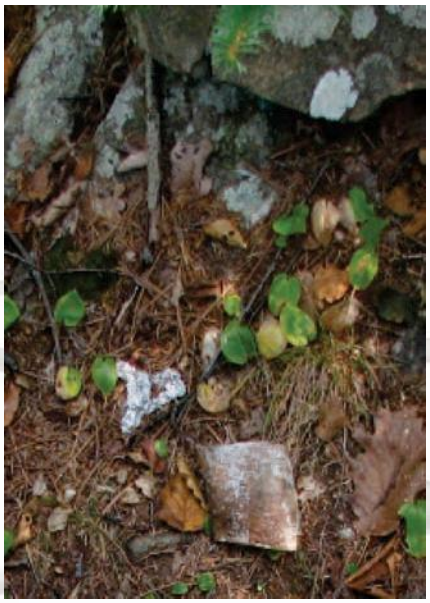
–Henry David Thoreau, "A Week on the Concord and Merrimack Rivers" in The Writings of Henry David Thoreau, Vol. 1, p. 179, Houghton Mifflin (1906)., 1849

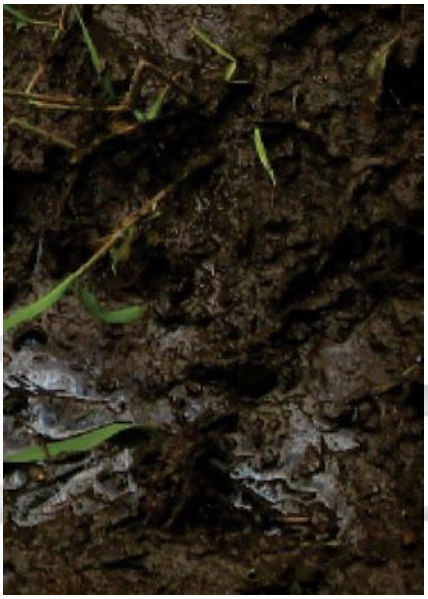
Soil Erosion

Erosion is the primary soil hazard in the Park, because shallow loamy soils are highly erodible and 42% of the terrain in the Park has slopes of over 10 per cent (Map 2.8). Shallow soils are also more sensitive to the loss of forest floor horizons, leading to decreased fertility and increased potential for erosion (Neily et al., 2004). Steep hillside landforms within the Park show evidence of past soil slippage and the susceptibility for future slippage, particularly near the North West Arm Battery. (Soil slippage is the term applied to the sudden movement of large hillside soil pockets, often when saturated with water.)

Soil Compaction

Keyes (2004) examined soil disturbance within Point Pleasant Park in the wake of post-Juan clean-up operations. He found that the levels of soil compaction measured at 30 sites were well below the levels that are damaging to tree growth. Good drainage and the high rock content of Park soils tend to reduce the risk of soil compaction. One unusually high measure of compaction was treated as an anomaly in Keyes' study, but he suggested that there might be forested areas with high levels of compaction caused by people walking near trails or features of high interest. He recommended targeted surveys to determine if this anomaly is representative of high-traffic areas in the Park and if the level of compaction is significant.



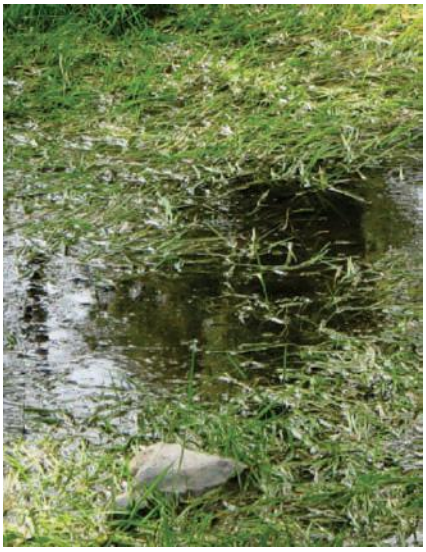


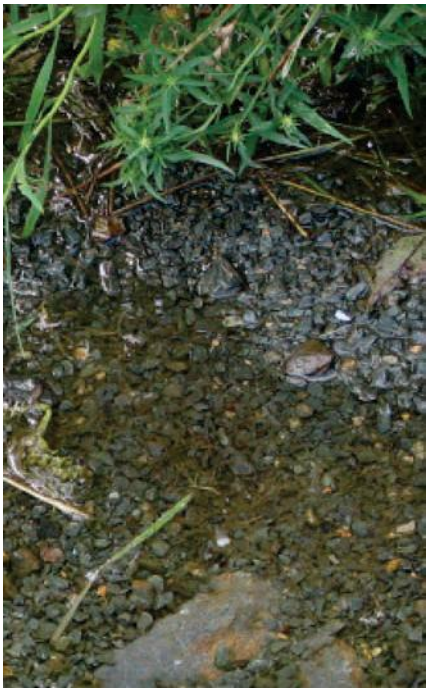
Soil Fertility and pH

The examination of post-Juan forest recovery in Point Pleasant Park by Burley et al. (2007) also examined soil quality. Like Keyes (2004), they found that soil disturbance caused by Hurricane Juan does not appear to have resulted in the degradation of soil quality in terms of depth, bulk density or nutrient content. Comparing Park soil to similar natural sites, they found organic content in the B horizon (mineral) was significantly higher in the Park, a difference that could not yet be attributed to the tree loss caused by Hurricane Juan but that may reflect the repeated disturbance of soils in the Park.

While earlier studies have considered soil fertility and pH (see Idziak and Rusak, 1997), the comparisons by Burley et al. (2007) with a similar natural site allowed further interpretation of soil chemistry. They concluded that while there were differences in soil chemistry, there was no obvious indication that nutrient levels in Point Pleasant Park would limit regeneration, though low levels of phosphorus may cause local limitations. Soil pH levels measured in 1997 compared to 2007 levels have not altered greatly.

Researchers don't exactly understand how the chemistry of the Park's soil has changed over time or what the actual impacts of human, pet and management practices on soil chemistry have been. However, the fertility and pH levels in the soil of most of the Park's forested areas should pose no barrier to the development of a healthy mature forest.





Freshwater Hydrology

The topography and relatively small watersheds that comprise the park do not have enough surface area to create defined surface freshwater features such as continuously running streams (Map 2.2). The only remaining permanent pond in the Park lies just south of the maintenance compound, in a small depression created by rock quarrying. The small pond has not developed complex plant and wildlife habitats, although frogs and insects are plentiful. A small stream carries overflow from the quarry pond to the east and to a wetland west of the lower parking lot, north of the summerhouse. This area probably has the best potential for pond creation because the watershed is one of the larger ones in the park, and the geology there is less fractured. Steele's Pond once lay just outside the Park's entrance, south of the area known as "Greenbank" (roughly in the area of the current shipping terminal). The pond was partially filled in the late 19th century and eventually completely filled in, to make way for the port's development. Despite the minimal watersheds in the Park, there are several perennial streams and drainage channels that occasionally create drainage problems and washouts that necessitate repair work.

Pond at Birch Road - Point Pleasant Park

MAP 2.2: HYDROLOGY & OUTCROPS

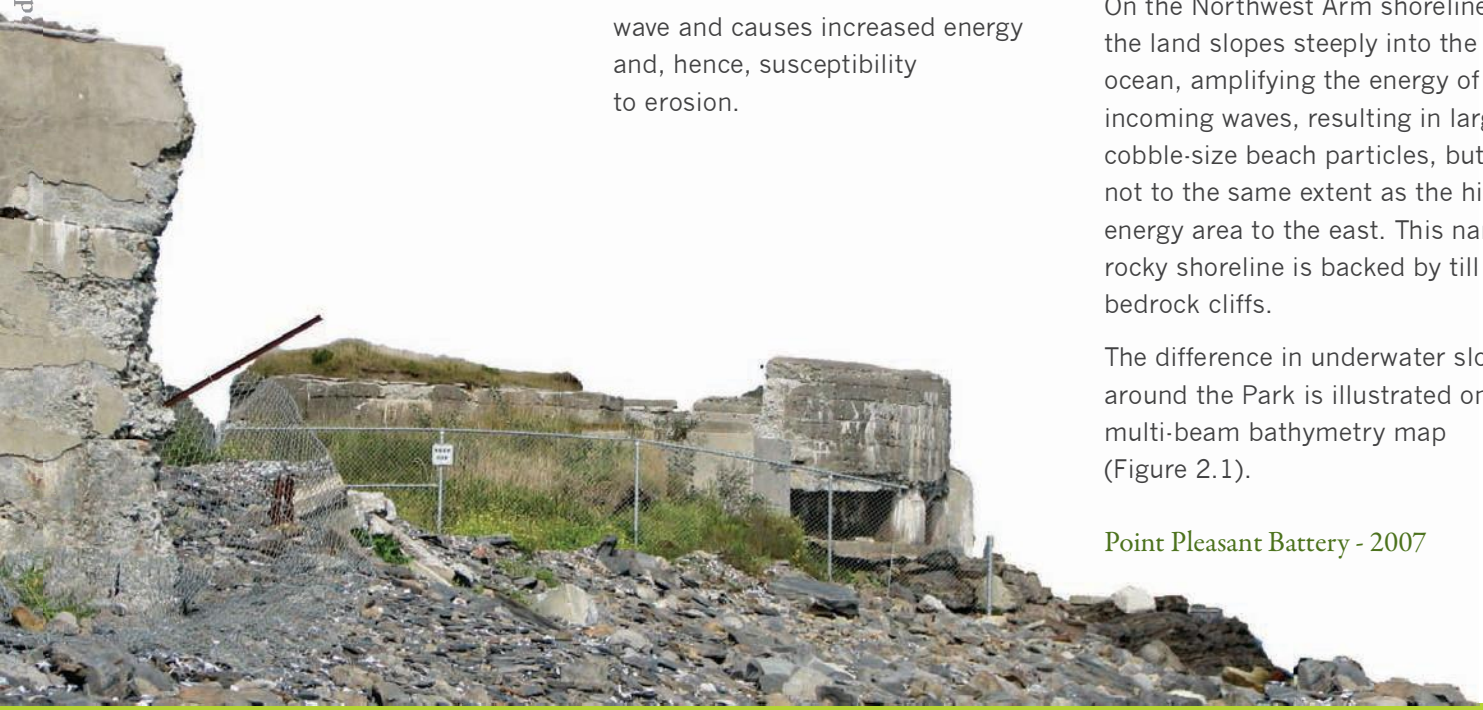
2.2 Coastal Dynamics

Point Pleasant Park is located on the southern tip of the Halifax Peninsula, which divides the waters of the Halifax Harbour from the Northwest Arm. Saltwater defines the southern half of the Park boundary, with the Pleasant Shoal—and in particular, the area known as "Hen and Chickens"—tempering the impact of waves on the Park's southern tip (Map 2.3). The blue arrows in this map indicate the direction of prevailing wave travel. The coastal area perpendicular to the prevailing wave direction receives the most wave energy; consequently, it is more susceptible to erosion and, in lower areas, to increased wave overwash and flooding. This is the reason that, despite the shoal, the area between the North West Arm Battery and the Canadian Peacetime Sailors Memorial (also known as the Bonaventure Anchor) is subject to very high waves. The northwest area behind the Hen and Chickens is somewhat sheltered from these powerful waves. The area directly north of Hen and Chickens refracts the wave and causes increased energy and, hence, susceptibility to erosion.

The coastal areas to the east (Black Rock Beach) and west (Northwest Arm shoreline) of this high-wave-energy area do not receive the brunt of the waves' energy and are somewhat sheltered from the full erosive impacts. On the east side of the Park's shoreline, the land slopes gently into the harbour, slowing waves and causing a refraction that results in the beach particles being of a smaller size (the imported sand on Black Rock Beach is not immediately washed away) and less coastal erosion. Northeasterly storms have the most pronounced impact on this shoreline.

On the Northwest Arm shoreline, the land slopes steeply into the ocean, amplifying the energy of incoming waves, resulting in larger cobble-size beach particles, but not to the same extent as the high-energy area to the east. This narrow rocky shoreline is backed by till and bedrock cliffs.

The difference in underwater slope around the Park is illustrated on the multi-beam bathymetry map (Figure 2.1).



Point Pleasant Battery - 2007

Shoreline Changes

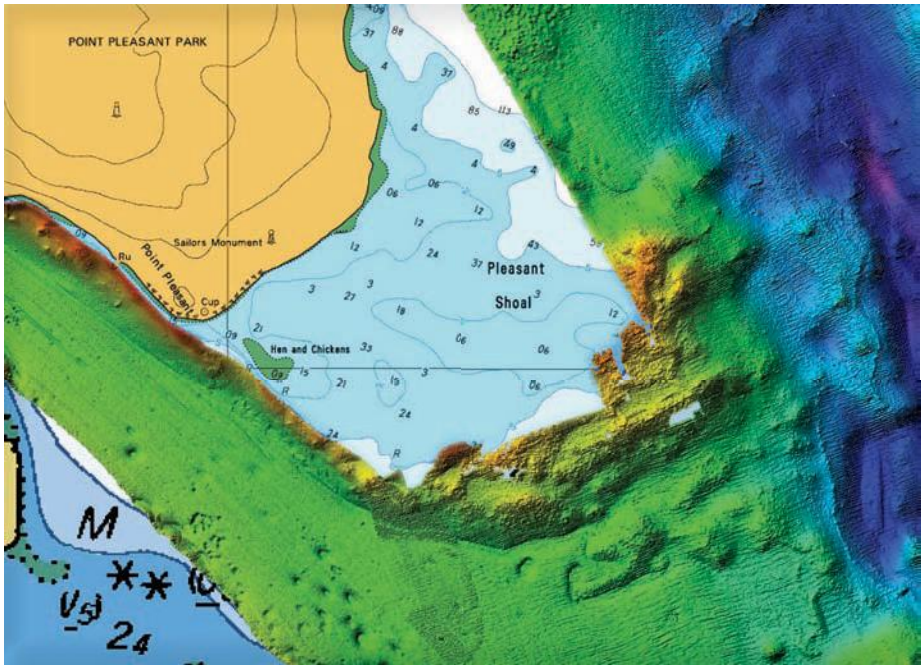
Shoreline retreat (erosion) and progradation (shoreline advancement as a result of the accumulation of waterborne sediment) are normal processes along Nova Scotia's South Shore. To understand shoreline change at Point Pleasant Park over the last 150 years, the Hopkins survey of 1858 was geo-referenced with post-Juan (2003) aerial photography (Map 2.4). The Hopkins survey appears to have been accurate, because the path and structures line up well with the aerial photography; therefore, we would expect the same degree of accuracy with the shorelines.

The results clearly demonstrate how the shoreline has evolved over the last 150 years. The most significant change has been in the area surrounding the North West Arm Battery, just northeast of the Point Pleasant Battery, and north of the Bonaventure Anchor shore, where up to 25 to 30 metres of soil have been lost at an average of 16 to 20 centimetres per year. Those areas aside, the Park's shoreline has been remarkably stable over the last 150 years; the shoreline between the North West Arm Battery and Point Pleasant Battery has been remarkably stable, with some slight progradation.

The current beach profile along this part of the shoreline is a fairly steep (about 20 per cent slope) stone beach. Beach slope is related to the composition of the shore and the wave energy impacting it. Generally, pebble-cobble shores are steeper than sandy shores.

With a predicted ocean-level rise of 30 to 50 centimetres over the next century, it is reasonable to expect a somewhat increased rate of retreat. At the current rate, we can expect a maximum erosion of 12 to 13 metres over the next 100 years without an active shoreline-protection strategy; accelerated rates could increase erosion upward of 20 metres by 2108.

Figure 2.1. Multibeam bathymetry map



Black Rock Beach - 2007

Beaches

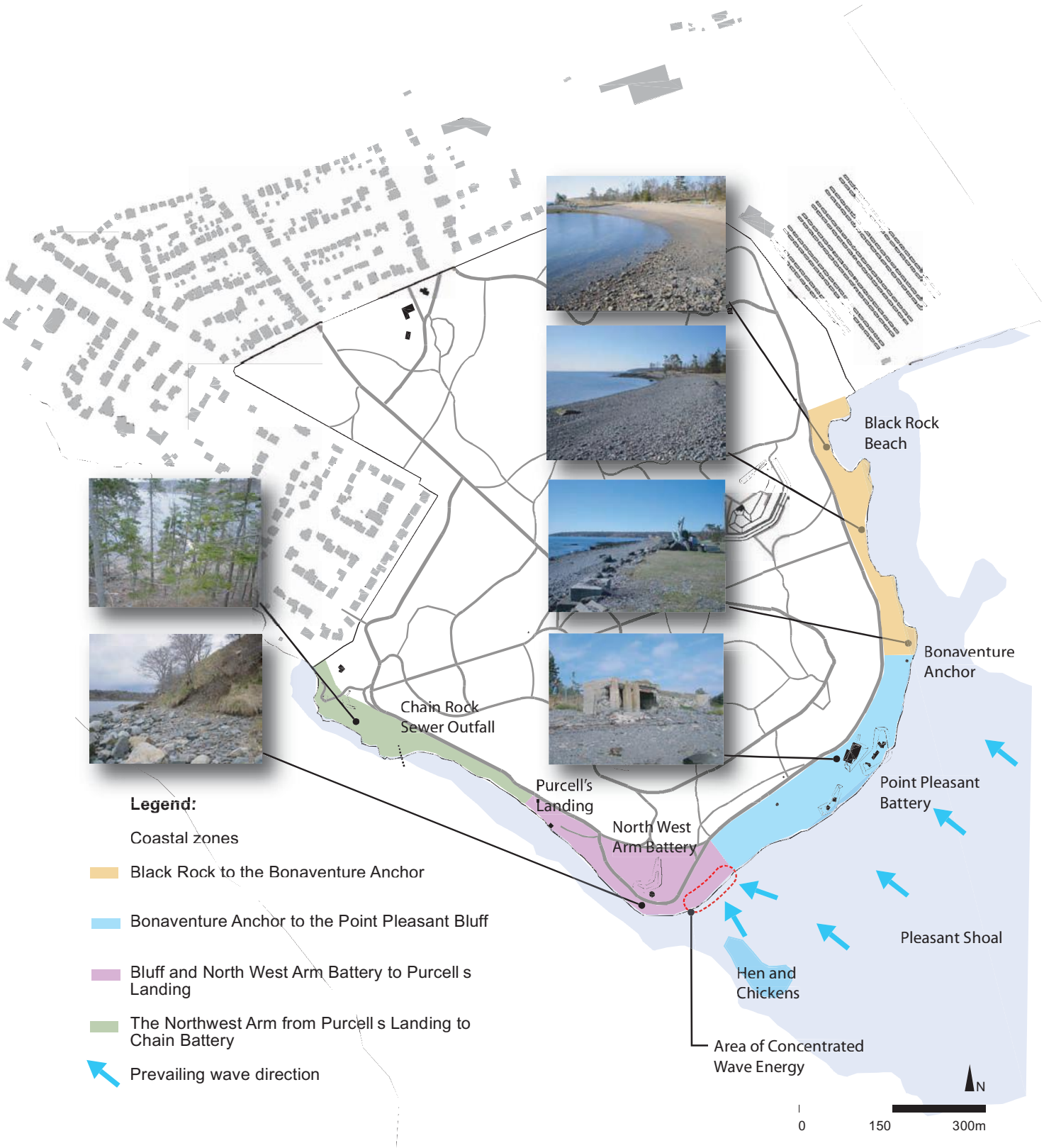
There are beaches at the western and eastern ends of the Park, but swimming is prohibited in both of them due to the high amount of fecal coliform bacteria in the water and bottom sediment. The northeastern-most extent of shoreline is known as Black Rock Beach, a small manmade sandy beach created within an area protected by bedrock outcrops. Completion of the Harbour Solutions project will provide advanced primary treatment of effluent entering the harbour, which will enhance overall water quality in this location. Favourable results from bottom-sediment testing would be required before HRM would consider opening the beaches to the public.

Shoreline Zones

The shoreline around Point Pleasant Park has a variable morphology, the result of different wave energy, offshore/near shore conditions and onshore topography (see Map 2.3). There are four distinct parts of the Park's shoreline, each with its own natural characteristics and each bringing different considerations to the planning process:

1) Black Rock Beach to the Bonaventure Anchor
2) The Bonaventure Anchor to Point Pleasant Bluff
3) Point Pleasant Bluff to Purcell's Landing
4) The shore of Northwest Arm from Purcell's Landing to Chain Battery

MAP 2.3: COASTAL FEATURES



Canadian Peacetime Sailors Memorial (Bonaventure Anchor)

Black Rock Beach to the Bonaventure Anchor

This section of shoreline might be called the active use, or the "beaches," section. This is the beach-and-bedrock promontory shoreline from the container pier infill shore protection, extending to just north of the Bonaventure Anchor. It generally faces east and is not subject to significant wave stress, except when caused by infrequent northeasterly winds.

This area has a hard bottom and rocky shore, with a silty till cover that has a flat lawn near shore in the vicinity of Sailors Memorial Way. Park staff provide a high amount of maintenance to the lawn because of its popular use as a picnic area. In the past, sand was added to maintain the beach. The southern or northern stony beach appears to have been prograding, possibly due to the impact from the container pier infill and addition of material at Black Rock Beach.

Traces of Black Rock Battery are now only visible on LIDAR images (Map 2.6), and no other significant cultural resources have been identified here. The shoreline appears to have been relatively stable over a long period of time. South of Black Rock Beach, the shoreline provides a different habitat for marine species than other parts of the shoreline, based on the gradation of the beach stone and the beach slope.

The slate promontories that extend into the harbour act like groynes (erosion-protection structures protruding from beaches) to protect the beaches from heavy waves and to divide the shoreline into separate sections. This suggests that future reliance on these areas as recreational resources makes sense, as they will exist for some time.

A rising sea level will affect this part of the Park, but with the regular maintenance work and investments made here, it may not cause as large an impact as elsewhere. There is no immediate need for shoreline protection work in this area.

Cobble Beach near Point Pleasant Battery

Point Pleasant Battery

The Bonaventure Anchor to Point Pleasant Bluff

Coastal erosion is evident along the shoreline between the Bonaventure Anchor and the Point Pleasant Battery, as well as around Point Pleasant bluff; this area also has the highest waves. Flat fields in the near-shore area are probably the result of human activity, though the reason for their creation remains unknown. Here the landform does not resemble natural shapes in similar shoreline morphological regions in the Halifax/Dartmouth area. It is probably a combination of earthworks made by cutting into the hill behind and filling the resulting material toward the shoreline, on the landside of the battery and other cribwork structures that provided protection from the sea.

The area of fill will tend to be erodible if exposed and capable of rapid regression in a major storm. The processes that guide coastal erosion tend to be significantly amplified by sea level rise. If the predicted amount of sea level rise does occur (approximately 30 to 50 centimetres over 100 years), there will almost certainly be significant coastal erosion in the harbour approaches, including at Point Pleasant Park.

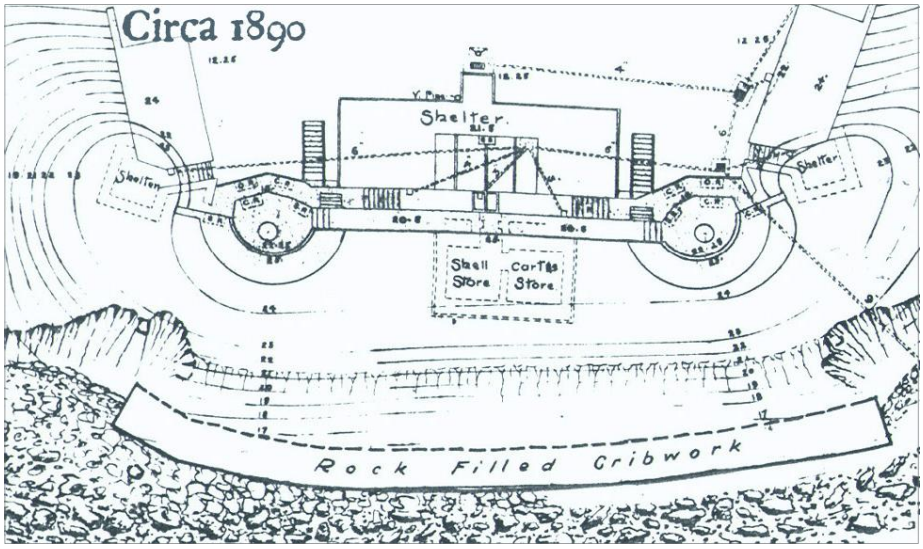
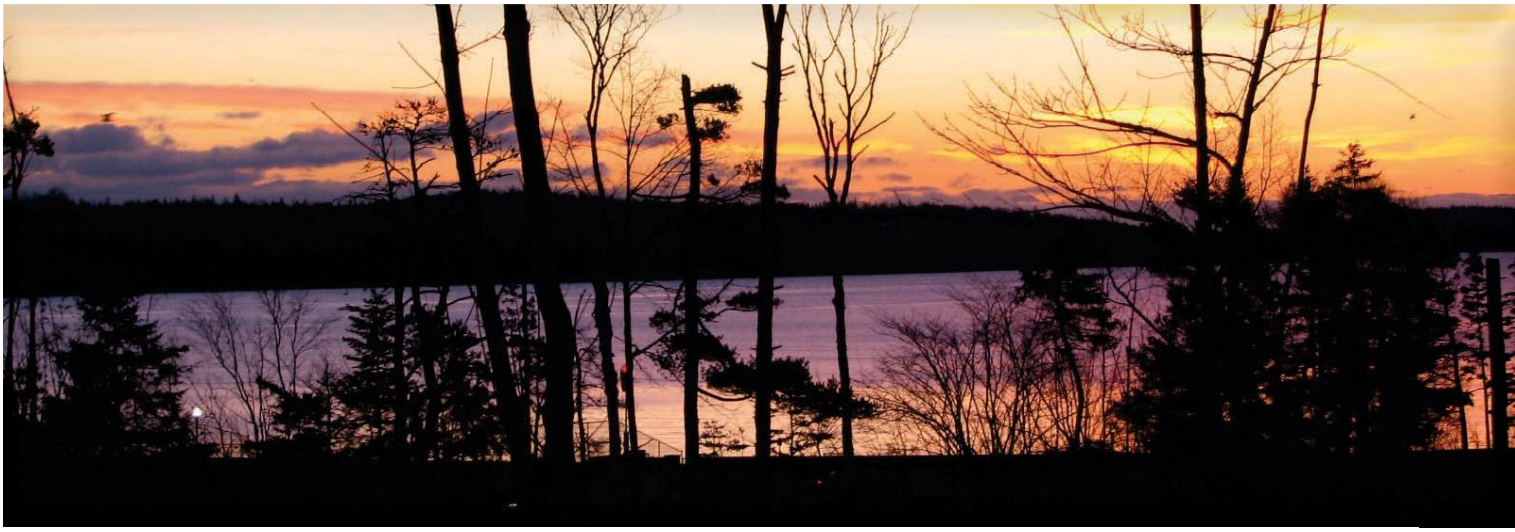


Figure 2.2. Point Pleasant Battery, circa 1890



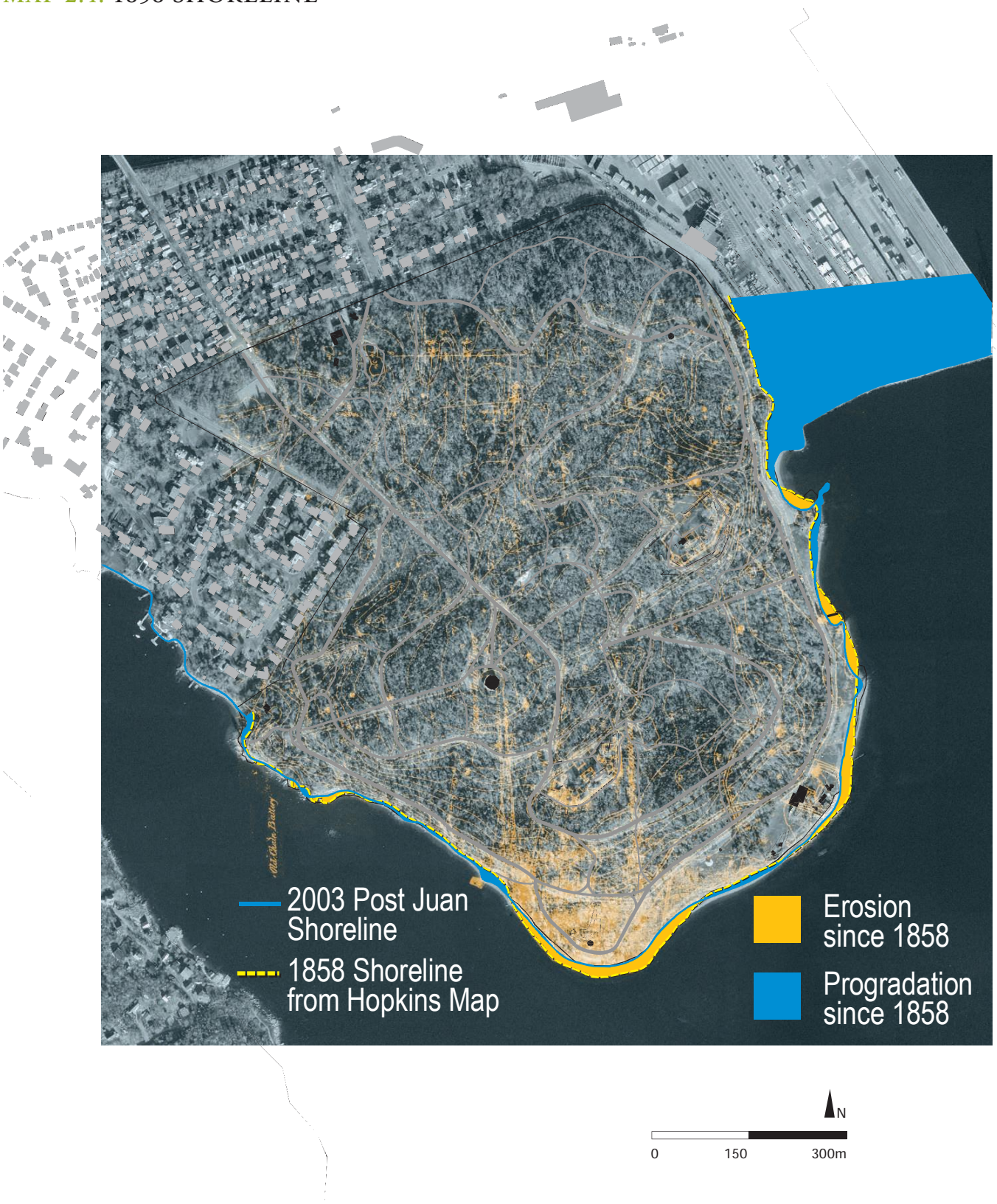
Morning View from Fort Ogilvie

Point Pleasant Battery is the most visible of the cultural resources identified in this area. This fortification was built near the active shoreline; land was reclaimed in front and beside the structure by the construction of a timber-crib retaining wall further seaward. An early plan of the battery with the cribwork in place (Figure 2.2) showed the backfill eroding at either end and behind the crib structures. The remains of the 18th-century battery lie in, under and behind the later structure, which is the main visible feature on the site today. This resource is now at risk daily, as coastal erosion works to undermine the main structure. A portion of the battery structure, just south of the main Point Pleasant Battery, is at high risk for structural failure in the near future. This structure poses one of the most serious risks to human safety in the park.

This beach is partially protected from direct waves by the offshore shoals and reefs (Hen and Chickens), which tend to dissipate the direct energy of the waves aimed at the coastline. With higher water levels caused by rising tides and storm surges, the protective effect of these shoals and reefs would be reduced; wave action will break close to the shore and may pound the shoreline. Recent storms have deposited ocean debris well up onto the grassy fields behind the battery. Despite the visible activity here, the flat shoreline area to the southwest of Point Pleasant Battery seems to have been remarkably stable over the last 150 years. With sea level rise reducing the sheltering impact of the Pleasant Shoal, wave energy could have significantly more erosive impact on this area in the coming years.

This shoreline zone is more susceptible to sea level rise, since the fields behind the shoreline would be vulnerable to inundation, significant shoreline recession and loss of parkland. A strategy for protection or a retreat from the shoreline, or a combination of the two, is needed here.

MAP 2.4: 1858 SHORELINE



Point Pleasant Bluff to Purcell's Landing

From the start of this drumlin-like feature at the Park's southwestern tip, the shoreline takes on the character typical of the Eastern Shore of Nova Scotia and the Halifax Harbour islands where they face the sea. This is a classic eroding headland, or coastal bluff, made of a red-brown till. The bluff erodes from the base due to wave action, the slope fails into the eroded void and the till is washed to sea, leaving the larger cobbles and the boulders at the beach. As the slope recedes, trees tip over and gradually fall into the ocean. Given rising sea levels, this is an inevitable process visible at other nearby locations in the harbour vicinity, such as the southern tip of McNabs Island and at Hartlen Point.

In recent years, this portion of the Park's shoreline has benefited from the greatest effort at shoreline protection. Immediately following Hurricane Juan (2003), extensive shoreline reinforcement took place. The base of the bluff was augmented with a significant revetment of riprap (large stones used for shore protection and as a foundation), and part of the improvements has provided extra resistance to slope failure from above, by creating a balancing load at the toe of the slope.

This engineered fill shoreline protection is only a temporary measure that can provide time to properly catalogue and understand the archaeological resources present here before nature takes its course. Other works that will enhance the stability of this coast include the control of surface drainage from above to prevent the concentration of surface and shallow groundwater into an erosive runoff over the edge, or in concentrated seeps. Areas where this now happens show advanced recession of the bank, which will continue to recede.

There are two sub-areas within this bluff zone that have slightly different wave forces. The eastern bluff area, from the southeast of the North West Arm Battery to the base of the flat lawn, experiences concentrated wave energy as a result of added deflection from the Hen and Chickens. This area may require a modified approach to shoreline protection than the area to the west of the bluff. Despite the similar riprap treatment on both areas, the protection on the eastern bluff appears to be failing faster than the western bluff.

Structures at risk at Point Pleasant Battery

Slope failure in this zone will range from small surface shear slides to potentially catastrophic larger slip failures, mostly depending on the following two parameters: the amount of toe erosion and the depth of saturation of the till in the slope above. Smaller slide failures will probably be unavoidable. The probability of larger movement in the form of a deep slip-circle failure (a type of landslide) may be reduced if the control of surface and groundwater drainage in the bluff area is achieved. Such a slope failure could extend back from the shoreline as much as 10 metres and could result in a potentially significant disturbance to buried archaeological resources, as well as the possible loss of some archaeological resources to the sea.

Significant cultural resources have been identified in this area, at risk from erosional processes. They include the first house associated with Purcell's Ferry, a summerhouse, and the North West Arm Battery and its associated resources. These would not be at risk from chronic small-scale erosion for some time, but parts of them may be at risk from a larger, more catastrophic slip-circle-type slope failure.

"A wild / tame space to leave the city behind, be alone or with the like minded."

Anonymous, 2005 PPP questionnaire response

The Shore of Northwest Arm from Purcell's Landing to Chain Battery

The shoreline to the northwest of the bluff changes to a steep rock-cliff landscape that extends inland along the Northwest Arm. In this region, known and yet to be discovered First Nations' historic resources could be affected by slope erosion.

The formation of the cliff-edge shape is influenced by upland drainage features and bedrock. Many drainage swales, or marshy hollows between ridges, with concentrated surface and shallow groundwater, flow from upper valleys that drain across the cliffs in this zone; this causes more rapid recession of erodible materials. Where bedrock is closer to the surface, recession of the coastline is slowed, resulting in promontories that extend into the Arm.

Coastal erosive forces are mitigated here by the oblique orientation of the shore to the path of ocean waves and by the shelter provided by the bluff. There will be localized recession of the top of the slope where drainage concentrates, but the base of the shore is predominantly bedrock. Over time the shoreline may become more irregular, as coves recede inland. This area does not face significant risk from sea level rise.

2.3 Climate and Microclimate

Climate

The Atlantic Ocean is the dominant influence on the climate of the coastline and Point Pleasant Park. Relatively high exposure creates a high-energy environment, while the water moderates air temperatures and creates a moist environment. Coniferous trees favour cool, wet and acidic coastal environments, while deciduous trees grow better in more sheltered sites with good drainage.

Temperature

Coastal winters are comparatively mild; springs start early but are long and cool. Summers are short and cool, and autumns tend to be warm and normally extend late into the year. Temperature variation near the coast is muted compared to inland locations. Near the coast, mean temperatures vary 15 to 20 degrees Celsius over the course of the year; inland mean temperatures vary 20 to 25 degrees Celsius. This translates into a long frost-free period, an extended growing season and relatively low rates of evapotranspiration (the sum of evaporation and plant transpiration from the surface into the atmosphere), although summer temperatures are cool (Nova Scotia Museum, 1996; Environment Canada, 2007).

Point Pleasant Park falls into a Zone 5 hardiness zone along the coast, with possible sheltered areas crossing over into Zone 5B.

Looking towards Black Rock Beach after and before Hurricane Juan

"A place of beauty and serenity where I come to find solace and peace during life's hectic pace."

Anonymous, 2005 PPP questionnaire response

Precipitation

Weather measurements taken at the Halifax Citadel reflect the influence of the ocean; about 1,500 millimetres of precipitation fall on the Halifax peninsula annually, with 90 per cent as rain and 10 per cent as snow. On average, there is fog 15 to 25 per cent of the year, more often in summer and autumn, when warm air temperatures from the south mix with cooler offshore waters. High humidity is also a common coastal influence (Environment Canada, 2007). Relatively cool moist conditions tend to encourage forest development, reduce the stress of midsummer droughts and lower the risk of forest fires.

Wind

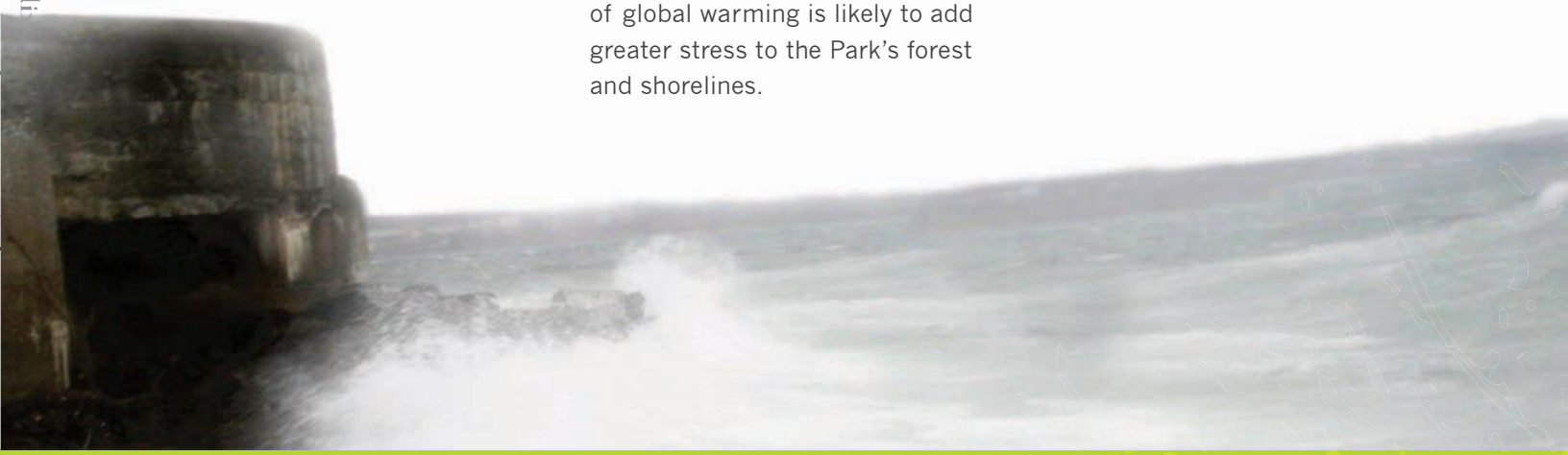
Strong winter winds tend to be westerly, blowing in from the north in April and from the southwest during the summer months. Point Pleasant Park is positioned more than five kilometres inland from the southern tip of McNabs Island, providing considerable shelter from coastal winds. Near the coast, salt spray can kill all or part of trees, though vegetation development in the Park attests to the relatively sheltered condition of this coastal location. The persistence of white pine and red oak in the Park indicates a less harsh inland environment (Nova Scotia Museum, 1996).

The open channel south of the Park allows winds to generate strong waves, with the consequence that storms originating in the southwest tend to have amplified wave impact on the Park's shoreline. Storms from the northeast have a smaller area over which to build wave action inside the harbour, and the impact of the waves tends to be milder and less frequent.

Scientists generally agree that global warming and associated sea level rise is occurring (IPCC, 2007). Predictive models provide some forecast of the anticipated long-term changes. Along with recent history, these models suggest that the globe has already begun to experience warmer temperatures, more frequent extreme weather events and gradual changes in precipitation. In the coming decades, the impact of global warming is likely to add greater stress to the Park's forest and shorelines.

Microclimate

User surveys demonstrate that many people visit Point Pleasant Park on a daily basis and that the Park is used regularly in all seasons. This year-round use places increased importance on the quality of the microclimate—the need to provide shelter from the elements in extreme weather and to allow people exposure to sun or wind to temper cooler or warmer weather. From an ecological perspective, minor variations in light and exposure to winds and moisture can significantly influence the survival of plant species and their growth, as well as the development and stability of forests.

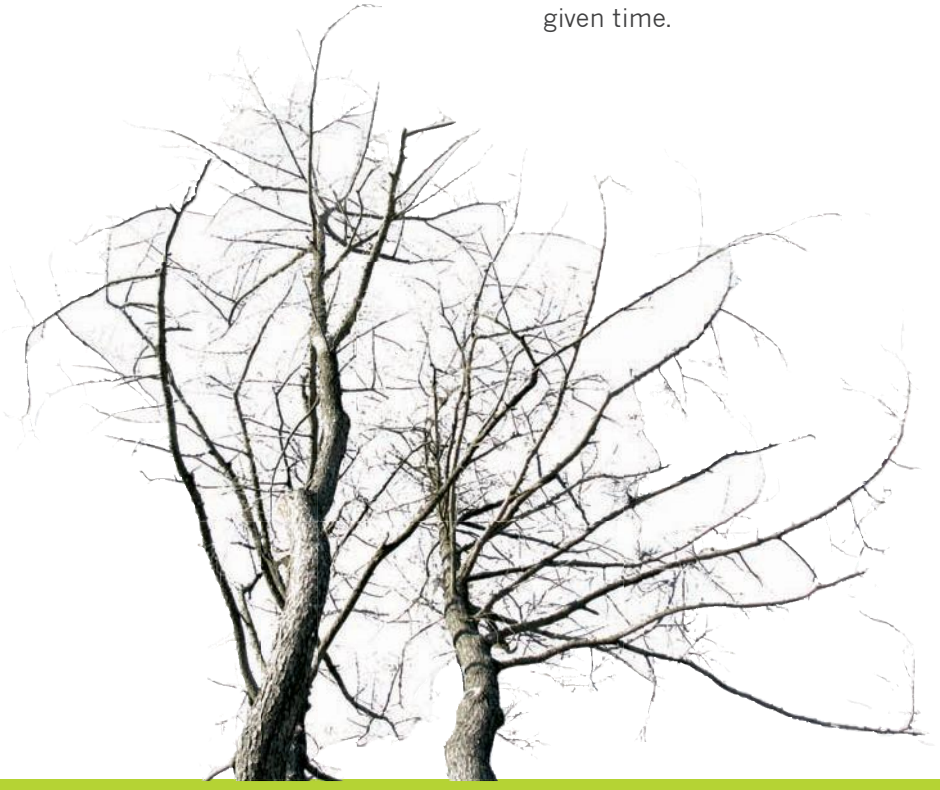


MAP 2.5: CLIMATE

Hurricane Juan damage - 2003

Clean up after Juan - 2004

While Point Pleasant Park is a relatively sheltered location compared to the Atlantic coastline, its position projecting southward to separate the Northwest Arm from the harbour leaves it relatively exposed to the sea. The Park's convex shape and its position at the head of the channel between Purcells Cove and McNabs Island leaves its southern half exposed to winds off the water and southeastern sections vulnerable to winds that funnel up through the mouth of the harbour, which is what happened when Hurricane Juan struck. On hot summer days, the cool breezes off the water make Point Pleasant Park a pleasant escape. The southeasterly sloping terrain shelters the Park from northwesterly winds. The Park's convex shape creates both sheltered and exposed areas, depending upon the location of the sun and wind at any given time.



Prior to Hurricane Juan, the Park's dense forest cover provided shelter to areas off the paths and trails under all but the most extreme conditions. After Juan, the balance of sheltered and exposed areas shifted dramatically. The low plain near the shore along the southern and southeastern coasts was sparsely vegetated prior to the hurricane and remains a relatively exposed area. Shrub and forest vegetation still provide small spots that offer Park users shelter from the elements. The exposed edges of the forest may develop more slowly than elsewhere due to cooler temperatures, wind and salt spray on plant growth. Forest edges play an important role in sheltering the forest interior from the full force of the wind and sun, creating conditions where canopy, shrub and ground vegetation can develop. This is particularly important in the Park, where much of the forest edge is exposed at the shore.

2.4 Forest Conditions

The Mi'kmaq referred to peninsular Halifax as Kouwakati, or the "place of pines." A letter reprinted in Gentleman's Magazine in September of 1749 also spoke of "a great quantity of pines, fit for masts" growing along the western side of the harbour entrance (Anon., 1749). Speaking specifically of Point Pleasant Park, that letter spoke of "the wood being chiefly oak, ash, beech and birch" (Anon., 1749).

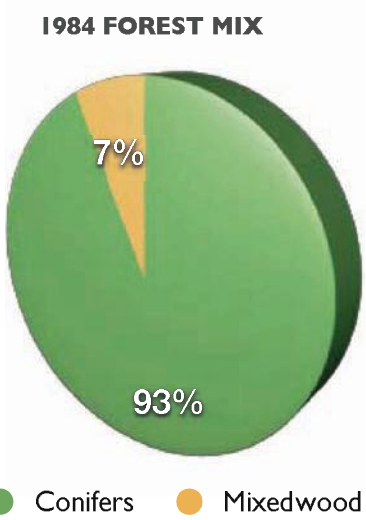
The Park's forest has undergone significant changes since Europeans settled in Halifax in 1749. While the parklands are coastal, they are also strongly sheltered from the west. This means that even though the soil is mostly shallow, the Park can develop natural forests dominated by large specimens of typical Acadian forest species such as red and sugar maple, red oak, yellow birch, hemlock, white pine and red spruce.

Since 1749, the Park's forests have been repeatedly cut for farming, grazing, road construction and military functions, all of which required clear sightlines. The forest that has developed since 1866, when the land officially became the Park, is a potpourri of natural regeneration and plantings of both native and non-native tree species.

Cultural evidence under tree throw

Three significant events during the past decade have dramatically changed the Park's forest. The first is the invasion of the brown spruce longhorn beetle (BSLB). The BSLB is believed to have killed many mature red spruce trees through the 1990s, after which sanitation cuttings were undertaken to remove dead and dying red spruces. Second, a severe ice storm in March 2001 damaged many mature trees and led to significant fellings. Finally, by the morning of Sept. 29, 2003, after Hurricane Juan blew through the Park, roughly three-quarters of its mature trees were blown down or damaged.

The following account of forest conditions in Point Pleasant Park has been assembled from both published sources and the personal observations of the planning team. Since the Park's forest was so strongly altered by Hurricane Juan, the account is divided into the decades immediately before the hurricane and the few years since. Conditions related to the overstorey (the uppermost canopy formed by the tallest trees), the forest regeneration and coarse woody debris are described below.



The Forest Overstorey Before Hurricane Juan

Four recent studies (LaHave Forestry Consultants Ltd., 1984; Johnson, 1989; Jotcham et al., 1991; and Guscott, 2000) documented the forest conditions of the Park prior to Hurricane Juan. The studies characterized the pre-Juan forest as:

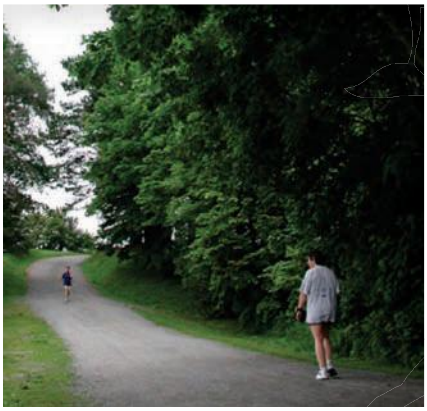
- dominated by needleleaved species (predominantly red spruce) to the extent of well over 90 per cent of the mature trees;

Evidence of brown spruce longhorn beetle

- dominated by old trees, with average tree age in any one stand ranging from 60 to 100 years. Some authors called the forest largely overmature; the concept of overmaturity comes from production forestry where, in broad terms, a stand of trees is no longer gaining wood volume, and indeed may be losing it;
- of modest tree height, ranging from 14 to 20 metres;
- even-aged (see below Note) and even-storied in many areas;
- of relatively high basal area, in the range of 30 to 60 square metres per hectare;
- having rather dense crowns, giving a high degree of crown closure;
- having a high degree of competition among trees for light and nutrients, leading to tree stress;
- intensively managed and heavily used; and
- having little deadwood, either standing or down (prior to Hurricane Juan, most of the deadwood was removed from the forest).

In general terms, Point Pleasant Park's forest before Hurricane Juan was an old, even-aged forest. There were few areas of either young stands or uneven-aged stands.

[Note: A short explanation is warranted about age-class structures of stands and forests. A stand is a collection of trees, and a forest is a collection of stands. When a stand has trees of different ages, we call it uneven-aged. When it consists of trees of all about the same age, we call it even-aged. If the stands in a forest are mostly even-aged, we can describe the age-class structure of the whole forest in terms of the stand ages.]



Clean up after Hurricane Juan

Young trees left untouched during Juan clean up operations

Forest Regeneration Before Hurricane Juan

Few formal surveys of natural forest regeneration were undertaken prior to Hurricane Juan. Of the surveys that were completed, LaHave Forestry Consultants Ltd. (1984) wrote that:

> *"...the majority of the stands are [composed] of a canopy layer under which very little is growing...Regeneration is scattered (1–500 stems/hectare) to understocked (500–1,200 stems/hectare)... Red spruce, soft maple and in fewer numbers balsam fir, white birch and red oak are the main regenerating species."*

Later, Idziak and Rusak (1977) found the following:

> *"The predominant regeneration species are balsam fir followed by red spruce and red maple. The regeneration is of native species only. Regeneration is present and adequate where gaps in the canopy are present."*

As the following text describes, although this limited regeneration may have been true under the dense forest canopies prior to Juan, regeneration changed drastically after the hurricane.

The Forest Overstorey After Hurricane Juan

Several forest patches remained relatively intact following the hurricane (Figure 1.2). Overstorey characteristics of these patches have not been comprehensively measured since Juan, but a picture can be assembled from various sources. Spruces (mainly red spruce) outnumber pines (mainly white pine) by a range of 2:1 to 8:1 (based on data from Guscott, 2000). Combined densities of spruces and pines are in the range of 345 to 660 trees per hectare. When less-abundant mature trees of other species such as oak, red maple and hemlock are taken into account, these densities are typical of what is found in mature Acadian forests in rural Nova Scotia.

Table 2.1 Forest data from Guscott (2000) corresponding to the five main patches of forest not blown down by Hurricane Juan.

Patch location	Stand # in Guscott (2000)	Approx. density of mature trees (#/ha)		
		Spruce spp.	Pine spp.	Total
East of Cambridge Battery	7	500	60	560
Southwest of Cambridge Battery	11	585	75	660
Northwest of PofW Tower	8	250	95	345
North of Fort Ogilvie	5	325	75	400
Across north side of PPP	3/4	285	150	435

Sample area with poor distribution of conifer regeneration

At a site in Patch No. 5 (Table 2.1), Kalkreuth and Duinker (2006) found 1,117 trees per hectare strongly dominated by needleleaved species. They found considerably fewer trees in three sites severely disturbed by the hurricane; all were below 230 trees per hectare, and one site had only 17 trees per hectare.

Burley et al. (2007) studied vegetation responses to Hurricane Juan's attack on Point Pleasant Park. They reported that red maple, red spruce, white birch and white pine dominated the Park's tree canopy. White pine and red spruce were predominant in stands that suffered little blowdown, whereas red maple and white birch dominated in heavily windthrown patches.

Forest Regeneration After Hurricane Juan

Two studies of natural tree regeneration in Point Pleasant Park have been conducted since Hurricane Juan. Burley et al. (2007) found that natural forest regeneration is occurring throughout most of the Park, with the expected abundance of red maple and white birch regeneration on many sites. The researchers concluded that "... the regenerating vegetation consists mainly of native species assemblages emerging from local seed and propagule sources including advanced regeneration, seed bank sources and dispersal from adjacent intact areas."

Steenberg (2007) set out to determine the levels of natural regeneration of needleleaved species in the Park's southern portions. He found that:

a) spatial variation of regeneration density, for each species and for all species combined, was large, both within sample areas and among them;

b) at the sample-area level, seedling densities ranged from under 1,000 stems per hectare to more than 5,000 stems per hectare;

c) the sample area with the worst distribution of needleleaved regeneration still had seedlings in about half of the sample plots, while the area with the best distribution had seedlings in more than 80 per cent of the sample plots;

d) red spruce dominated the overall regeneration pattern of needleleaved species in the sample areas, with balsam fir less abundant but as widely distributed;

e) white pine was found in all sample areas, but densities were relatively low. The regeneration of eastern hemlock was substantially lower yet, with a density over the entire sampled area of just 33 stems per hectare;

f) non-native needleleaved species, mainly Austrian pine and Scots pine, were found in highly patchy distribution and low densities; and

g) regenerating stock, measured in height classes of 10 to 30 centimetres, 31 to 100 centimetres and 101 to 200 centimetres, was found to be reasonably well distributed across the height range.

These studies reveal that just three growing seasons after Hurricane Juan, natural regeneration to both native and non-native tree species is fairly abundant. In some places, however, natural regeneration is quite patchy.

Beginning of forest regeneration - Heather Road - Summer 2005

Tree Species Assessment

Point Pleasant Park is currently home to a wide range of both needleleaved and broadleaved tree species. Based on the literature, numerous visits to the Park for natural history observations and peer review, Table 2.2 has been assembled to summarize the status of each tree species currently found in the Park, or which, as a species native to Nova Scotia, could become a component of the future forest.

As the table shows, many of the native Nova Scotia tree species are present, even if in low numbers, in the Park. One notable exception is the American beech, which is afflicted with a bark disease throughout Nova Scotia. The Park also hosts about 15 non-native tree species, mostly of European origin.

Tree species are divided into two main groups: cone-bearing trees (coniferous) and trees without cones (non-coniferous). In common language, people often use the terms “softwood” and “hardwood,” but these are ambiguous in ecological discussions. Other people use “coniferous” and “deciduous,” the latter describing trees that lose their leaves in the autumn. The problem that arises is that there is one native species in Nova Scotia that is both coniferous and deciduous—the larch, or Larix laricina—and there are some non-native species, used as ornamentals, that are neither deciduous nor coniferous; for example, the holly (Ilex spp.), which has berries and keeps its leaves all year long. Yet another pair of terms includes “needleleaved” and “broadleaved” (we include the cedars, which have scale-like leaves, with the needleleaved species).

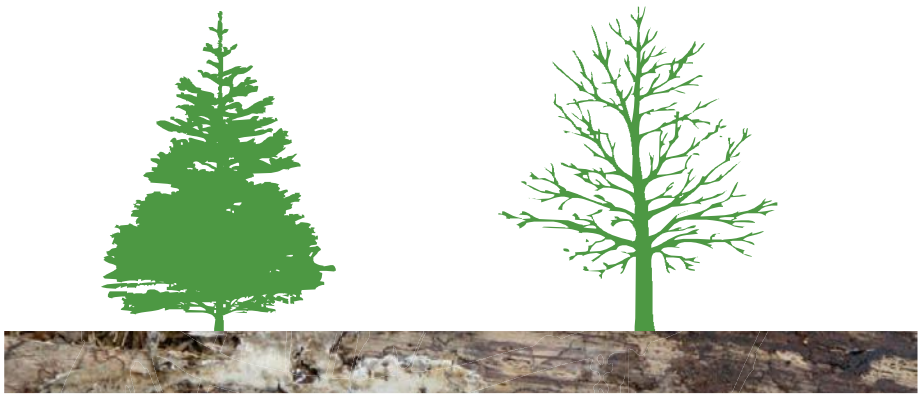
Because Park visitors are likely to identify one tree species from another mainly on the basis of their leaves, we have chosen to standardize the language in this management plan and use only needleleaved and broadleaved (except where other studies are cited that use other terms). All of the needleleaved trees in the Park except larches keep their leaves year round, and all of the broadleaved trees lose their leaves each autumn.

Table 2.2. Major tree species in Point Pleasant Park

Species (Common name)	Native to NS?	Tolerance to Competition	Abundance and Distribution	Inclusion in 2007 Planting Program
Sugar Maple	Yes	High	Rare; scattered	Yes
Red Maple	Yes	Med	Abundant; widespread	Yes
Norway Maple	No	High	Abundant; widespread	
Striped Maple	Yes	High	Occasional	
Mountain Maple	Yes	High	Occasional	
Sycamore Maple	No	Unknown	Occasional	
Balsam Poplar	Yes	Low	Occasional	
Willow (Salix spp)	Yes	Low	Rare; scattered	
English Walnut	No	Unknown	Occasional	
Ironwood	Yes	High	Occasional	Yes
Yellow Birch	Yes	Med	Occasional	Yes
White Birch	Yes	Low	Abundant; widespread	
Grey Birch	Yes	Low	Unknown	
American Beech	Yes	High	Absent	
European Beech	No	High	Occasional	
Red Oak	Yes	Med	Abundant; widespread	Yes
English Oak	No	Unknown	Occasional	
Trembling Aspen	Yes	Low	Occasional	Yes
Largetooth Aspen	Yes	Low	Rare; scattered	Yes
European White Poplar	No	Low	Rare; scattered	

Table 2.2. Major tree species in Point Pleasant Park (continued)

Species (English name)	Native to NS?	Tolerance to Competition	Abundance and Distribution	Inclusion in 2007 Planting Program
Red Ash	Yes	Med	Probably absent	
Green Ash	Yes	Med	Probably absent	
Horse Chestnut	No	Unknown	Rare; scattered	
White Elm	Yes	Med	Probably absent	
American Basswood	Yes	Med	Absent	
European Linden	No	Unknown	Rare; scattered	
Black Locust	No	Unknown	Rare; scattered	
Serviceberry	Yes	Unknown	Unknown	
White Pine	Yes	Med	Abundant; widespread	Yes
Red Pine	Yes	Low	Rare; scattered	
Jack Pine	Yes	Low	Absent	
Austrian Pine	No	Low	Occasional	
Scots Pine	No	Low	Occasional	
Douglas Fir	No	Med	Rare; scattered	
Balsam Fir	Yes	High	Abundant; widespread	
Red Spruce	Yes	High	Abundant; widespread	
White Spruce	Yes	Med	Occasional	
Black Spruce	Yes	Med	Rare; scattered	
Norway Spruce	No	Med	Occasional	
Eastern Hemlock	Yes	High	Occasional	Yes
Eastern White Cedar	Yes	Med	Rare; scattered	



Needleleaved Broadleaved

Coarse Woody Debris

If a tree dies while it is standing, it becomes what is called a "snag"; it eventually falls to the forest floor, where it continues to rot. In a natural forest, there would be some recent snags, some old ones, some fresh downed logs and some old ones; there would be standing and downed logs at many levels of decay.

In a forest, the decay of wood is a natural process with several benefits. Deadwood provides a habitat and food for many plants and animals, as well as organic matter and nutrients for the soil. Some forest managers prefer not to have any snags or downed logs; for example, if the forest is meant to produce timber for sale, dead trees represent a loss of income. Also, some species that thrive in deadwood, such as certain kinds of wood-eating beetles, may experience population explosions that may lead them to inhabit and kill live trees.

Point Pleasant Park is anything but natural when it comes to coarse woody debris. Prior to Hurricane Juan, dead trees were cut down for safety, sanitation and aesthetic reasons, and the downed logs were removed. As a result, just before Hurricane Juan hit, the Park had low levels of snags and downed logs. These levels would be lower than similar types of fully natural stands but close to the levels encountered in stands managed for timber production in rural Nova Scotia.

In the late 1990s, tree mortality increased dramatically, particularly among red spruces. Most of the dead and dying trees were removed from the Park's forest. Hurricane Juan killed a large number of the Park's trees, and a careful cleanup took place during the winter of 2004.

The Park is now in the peculiar situation of having more snags and fewer downed logs than would a healthy natural forest. The snags are particularly evident, with so few large live trees left in the hardest-hit areas of the Park.

During the next few decades, the existing snags will fall and increase the abundance of downed logs. Many of the existing large live trees have been in poor condition following the hurricane, and many of them will die and become snags. Therefore, with careful management that only brings to the ground the deadwood that may pose a safety hazard, the balance of coarse woody debris in the Park should help form a healthy ecosystem.

When the Park was being cleaned up after Hurricane Juan, a small research plot was kept in virtually untouched blown-down condition just south of the Cambridge Battery. This was done for two reasons: first, to facilitate the research and tracking of how the forest naturally responds to a major blowdown; and second, to provide visitors with a reminder of what the forest looked like after the hurricane.

Coarse woody debris left in place

Forest Understorey

The forest understorey in Point Pleasant Park has received a less-detailed examination than the condition and prospects for the renewal of the tree canopy. This lack of interest in the understorey may reflect broader trends in the study of forests, where the consideration of canopy species is generally more prominent. Nonetheless, the understorey of the Acadian forest is relatively rich in species when compared to the canopy. Burley et al (2007) identified 105 understorey species in the Park, though only about two dozen of these contribute to the native Acadian forest canopy.

In the 1994 Draft Park Management Plan, the authors noted "the groundcover in most cases was conifer needles. There was little deciduous leaf litter, mosses or lichens. An exception is area 7, which has primarily a moss and bunchberry groundcover. Other common groundcover herbs include sarsaparilla, clintonia, wild lily-of-the-valley and teaberry" (PPP Draft Management Plan, 1994).

In 2004-05, Burley et al. (2007) looked at the composition of the forest understorey, comparing the composition, extent of cover and growing conditions among plots in areas undisturbed by Hurricane Juan and those areas where most of the canopy was lost. They found that much of the understorey is in an early stage of forest succession due to the loss of canopy, and that the early progress of succession in the understorey was consistent with what would be expected following a similar disturbance in a natural Acadian or boreal forest stand.

Burley et al. (2007) found that the species composition of the herb layer (5 to 15 centimetres in height) was similar regardless of canopy disturbance. The extent of cover in the herb layer was found to be greater within plots that suffered the removal of the canopy, as increased light and warmth promoted growth. In the herb layer, the most common plants included:

- Wild lily-of-the-valley (Maianthemum canadensis)
- Sarsaparilla (Aralia nudicaulis)
- Blue bead lily (Clintonia borealis)
- Bunchberry (Cornus canadensis)
- Checkerberry (Gaultheria procumbens)
- Starflower (Trientalis borealis)
- Lowbush blueberry (Vaccinium angustifolium)

Wild lily-of-the valley

Sarsaparilla

Blue bead lily

Bunchberry

Checkerberry

Starflower

Lowbush blueberry

In the shrub layer (15 centimetres to 2 metres in height), the growth of early successional shrub species in disturbed plots contributed to the greater species richness observed in these areas. The most common plants in the shrub layer included:

- Red maple (Acer rubrum)
- American mountain ash (Sorbus americana)

Red maple

American mountain ash

"...the views of the ocean, the seals, the trails on the steep hills, the spot where dogs can drink out of the creek."

Anonymous, 2005 PPP questionnaire response

The extent of understorey cover varied from 50 to 100 per cent among the plots examined, with more understorey cover in the disturbed areas of the forest. Part of this difference was caused by the rapid growth of herbaceous perennials and shrubs that existed prior to the hurricane. The proliferation of shrub growth has the potential to stifle the emergence of tree seedlings, although this was not found to be the case. While the impact of the hurricane on the overstorey has been dramatic, influences on the forest understorey observed in 2005 seemed to be generally positive.

Lundholm (2008) noted that a number of wetland areas in the Park also contribute to the species richness and are probably unique on the Halifax peninsula.

A key concern in the study of the Park's understorey was the impact of the hurricane disturbance on the dispersion and growth of non-native understorey species. Of the 105 species identified by Burley et al. (2007), 16 are non-native. Away from trails, the researchers found that:

- less than 5 per cent of understorey cover is non-native, and that only a few species have the potential to become invasive, and
- non-natives were not hindering the growth of tree seedlings.

Undisturbed research plot

Nearer trails, Burley et al. estimated that as much as 25 per cent of the cover may be non-native and, again, that non-natives pose a low risk for invading the less-disturbed forest interior. They suggested that most, if not all, of the non-native species were probably present prior to the hurricane.

Lundholm (2008) suggested the following list of non-native species that may pose a risk to the forest understorey due to their invasive nature:

- Hemp-nettle (Galeopsis tetrahit)
- Spotted devil's paintbrush (Hieracium maculatum)
- Common hawkweed (Hieracium lachenalii)
- Japanese knotweed (Polygonum cuspidatum)
- Heather (Calluna spp.)
- Norway maple (Acer platanoides)
- Sycamore maple (Acer pseudoplatanus)
- Scots pine (Pinus sylvestris)
- Black locust (Robinia pseudoacacia)
- Japanese or common Barberry (Berberis vulgaris)

Hemp-nettle

Spotted devil s paintbrush

Common hawkweed

Japanese knotweed

Heather

Norway maple

Sycamore maple

Scots pine

Black locust

The lack of soil exposure during the Hurricane Juan cleanup could have helped reduce any spread of non-natives. Native species may also have a competitive advantage due to the low pH level of soils, since non-natives might prefer less stressful environments. Some colonies of non-natives were found to occupy areas with greater soil nitrogen.

Lundholm (2008) described three primary threats to the forest understorey:

a) Invasive non-native species may proliferate and either reduce or eliminate native species that play an important role in the Park forest ecosystem, thereby reducing its integrity and resilience. Impacts may take a toll on both flora and fauna.

b) The course of natural succession may eliminate or reduce populations of native species currently found in the Park. For example, the altered growing conditions caused by Hurricane Juan could eliminate understorey species that require particular habitats. Without a nearby natural reservoir to re-colonize the Park, this becomes a greater concern. We have no knowledge of any species at particular risk, but our data on the understorey are yet well developed.

c) Human activity in the park also poses a challenge to the understorey. The trampling of vegetation by park users, disturbances caused by forest-management activities and animal excreta may all be affecting the development of native and non-native understorey vegetation.

2.5 Landscape Physiology

The 77-hectare Park rises 37 metres above sea level and is surrounded on all but the north side by salt water. The higher points provide panoramic views of the outer harbour and the Northwest Arm. Since Hurricane Juan, many dramatic vistas in the Park and the surrounding landscapes have been rediscovered, providing excellent views that may be maintained.

"A woodland in full color is awesome as a forest fire, in magnitude at least, but a single tree is like a dancing tongue of flame to warm the heart."

–Hal Borland, Sundial of the Seasons,

Landscape physiology

The Park's geomorphology—the landforms and the processes that produce and modify them—is characterized by strong east–west ridges, as illustrated in recent LIDAR imagery (Map 2.6). The rugged terrain is punctuated with numerous rock outcroppings and massive boulder fields, emphasizing the strong influence of geology on the landscape. The terrain along many of the paths throughout the Park is quite steep; the combination of steep slopes and minimal topsoil layers creates challenging regeneration conditions for trees, especially along the south-facing slopes most exposed to high winds and erosion. Tree growth along those slopes is important for creating desirable microclimates throughout the Park, as well as wind protection against future storms that may threaten the forest's health.

MAP 2.6: LIDAR MAPPING: RIDGE MORPHOLOGY OF POINT PLEASANT PARK

MAP 2.7: SOUTH-FACING SLOPES

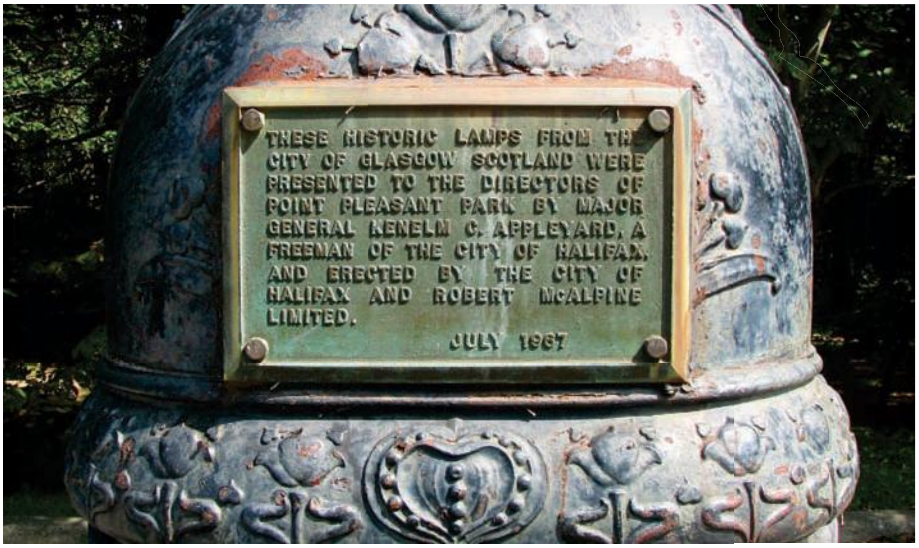
MAP 2.8: SLOPES

2.6 Infrastructure

Water

A narrow-diameter waterline linked to a Halifax Regional Water Commission main, near the intersection of Tower Road at Point Pleasant Drive (Map 2.9), has been the main source of drinking water for the Park. Prior to the construction of the sewage pump station, the waterline was the sole source of piped water within the Park. The older line services two fire hydrants, the seasonal washroom near Black Rock Beach and the canteen (a drinking-water fountain near the seasonal washroom has been decommissioned). The flow of the waterline at the fire hydrants is only sufficient to fill backpack tanks. The exact location of this line is not known, although linking the points where water service exists may help obtain a rough idea of its course. The depth of the line may not be sufficient to prevent winter freezing, which would cut off the water supply in winter.

The new washroom facility above the pump station is served by a new waterline extended from Francklyn Street. A new hydrant has been installed on Cable Road, with the capacity to help fight fires in the Park and to help protect adjacent homes. Fire hydrants on the streets adjacent to the Park may play an important role in firefighting in the Park. The lodge, maintenance building and Shakespeare by the Sea office are serviced with a year-round supply of water.

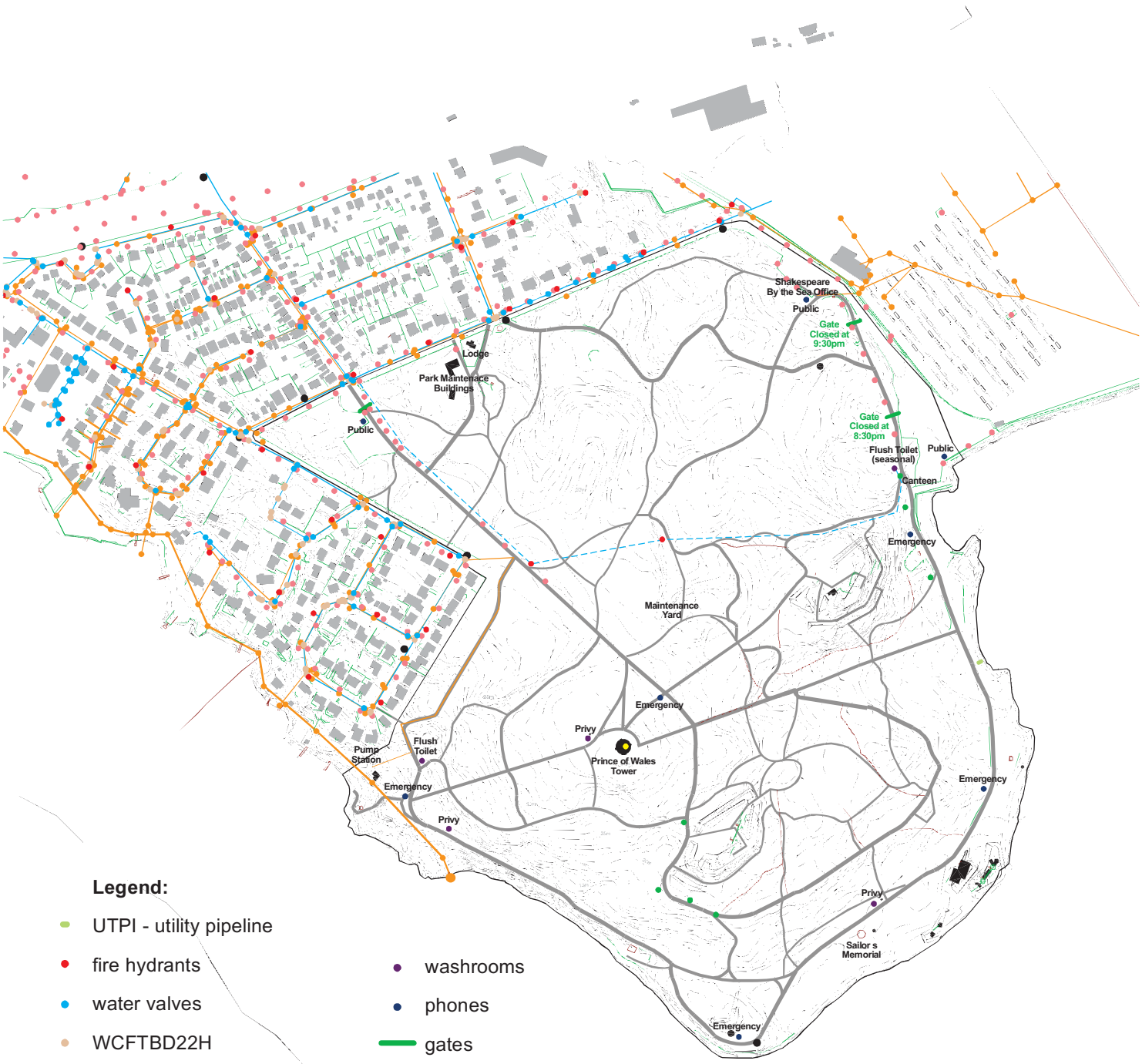


City of Glasgow lamp standards - Tower Road entrance

Electrical

Electrical power is drawn from Nova Scotia Power lines; within the wooded part of the Park, conduits are entirely underground; these lines have been renewed in the years since Hurricane Juan. There are no overhead lights in the Park, except for those in the parking lots. An electrical service is located near the Halifax Memorial to support the Remembrance Day ceremonies held there. A junction box is located north of Prince of Wales Tower (the Martello Tower), which is serviced with electricity. The new washroom facility above Chain Rock Beach is serviced with electricity brought underground from Francklyn Street. The electrical service at this building may have the capacity to be extended to serve adjacent areas of the Park. The lodge, maintenance building, Shakespeare by the Sea office and canteen are serviced with electricity drawn from poles at the Park's periphery. Lighting for Shakespeare by the Sea performances is supplied by portable generators. The current level of service meets basic needs only; lighting and overhead wires in parking areas are not in keeping with either the historic or natural character of the Park.

MAP 2.9: PARK INFRASTRUCTURE



Tower Road entrance - upper parking lot

Sewer

Two public-washroom buildings with flush toilets are connected to the municipal sewage system. Sewage from the new washroom above Chain Rock Beach flows to the pump station below. The lodge, maintenance building and Shakespeare by the Sea office are serviced by sewer connections in the street. The location of the new washrooms may be heavily influenced by the feasibility of extending water and sewer services through the Park. The sensitivity of cultural and natural features in the Park will constrain service routing and require significant remediation; the cost of excavating in bedrock to suitable depths for services may be substantial, if it's required.

Phone

Four emergency telephones are located in the Park, and pay phones are located at three entry points. Telephone service also extends to the lodge, the maintenance building, canteen and Shakespeare by the Sea office. All telephone wires in the Park are located underground. The current level of service is deemed satisfactory.

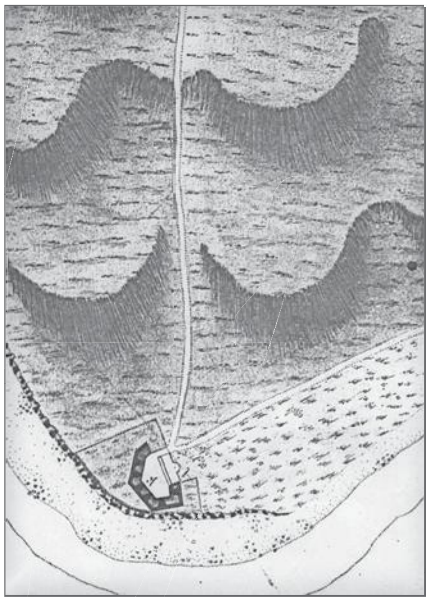
Parking & Bus Service

There are 60 parking spaces in the Tower Road parking lot. There are an additional 300 spaces in the lower parking lot by the container pier. The No. 9 Metro Transit bus (Barrington Street route) services both the Tower Road and lower parking lots.

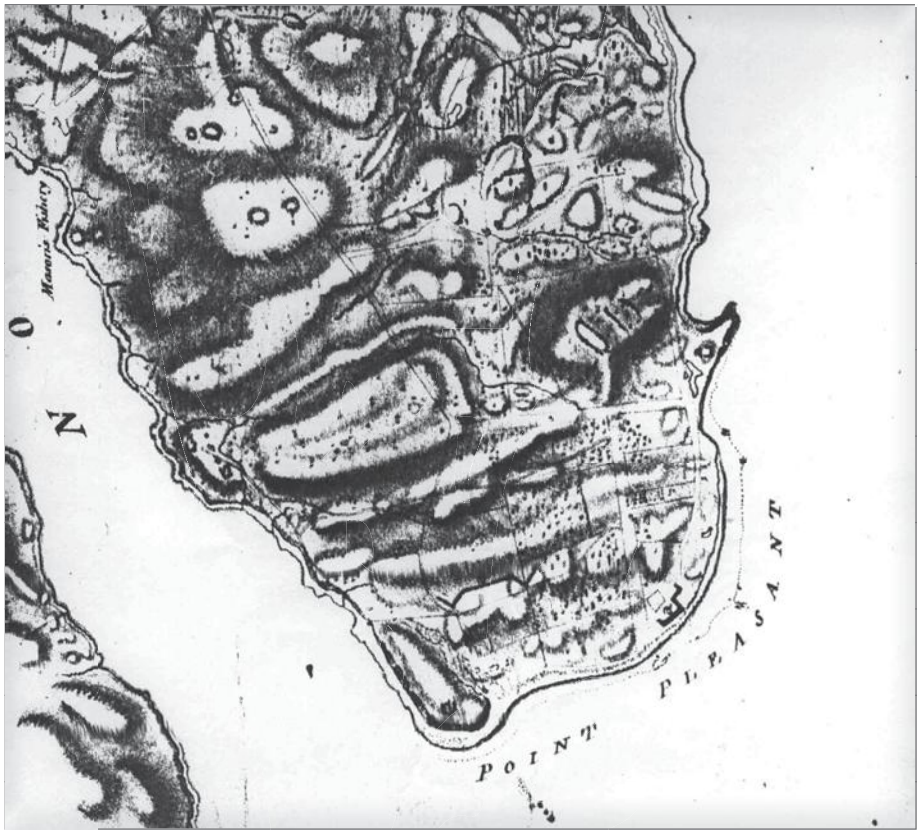
2.7 Historic Resources

Hurricane Juan provided an opportunity for HRM staff to learn more about the heritage of Point Pleasant Park. The roots of fallen trees excavated hundreds of "test pits" throughout the Park, allowing archaeologists to find previously unsuspected sites. In conjunction with a researcher of Mi'kmaq history, archaeologists located the sites of Mi'kmaq traditional ceremonies and a historic battle. A lost cultural landscape of the Park has been brought back into the community's consciousness. Historical and archaeological research also rediscovered a forgotten 18th-century European domestic landscape.

Present-day elements such as pathways and trails have evolved over time, yet many of these routes were first defined during the Park's early settlement and can be located on maps dating to the 18th century.



Fenwick map, North West Arm Battery, 1803



Blaskowitz map - 1784

Baseline Condition of Historic Resources within the Park

It is difficult to determine the baseline pre-hurricane conditions of historic resources, since we have few sources to draw upon. Personal observations by archaeologists and historians, contemporary photographs and a 1990 map prepared by the Orienteering Association of Nova Scotia (OANS), which contains a wealth of evidence on features that would have been visible in the 1980s, are some of the sources used. These data may be combined with a large body of historic maps from the 18th, 19th and 20th centuries (Blaskowitz map, 1784; Fenwick map, 1803; Innes map, 1858).

There is no comprehensive inventory of archaeological resources in the Park. However, an archaeological assessment during and following the hurricane remediation work from 2004 to 2005 (Schwarz, 2005; Schwarz and Schwarz, 2006) led to the recording of more than 240 archaeological features of varying age and type. Some are features that have long been recognized, while others only became apparent during and following the remediation work.

Point Pleasant's Archaeological Sites

The 240-plus archaeological features recorded within the Park vary widely in type and age and are also scattered around the area. Following the hurricane remediation work, eight moderately distinct archaeological sites—each composed of a large number of individual features—were formally designated (bracketed alphanumeric codes are each site's unique Borden number). The First Nations site has only been reported recently.

Point Pleasant Park (BdCv-32)

Is a catch-all site that includes 31 features in eight locations that do not cluster well, spatially or thematically, and are widely distributed, mostly in the northern half of the Park. They range widely in age and include features relating to 18th-century civilian settlement and 18th- to 20th-century military occupation, as well as features related to 19th- and 20th-century Park use. The most substantial archaeological feature is Chain Battery, overlooking the Northwest Arm.

Harbour Fields (BdCv-45)

Includes 39 features on the east-facing slopes overlooking the harbour, most or all of which relate to a mid- to late-18th-century civilian settlement in the Park. These include the fragments of field walls (corresponding to walls shown on a 1784 map), at least one possible house foundation, and 18th- to early 19th-century artifact deposits that may indicate the location of additional houses.

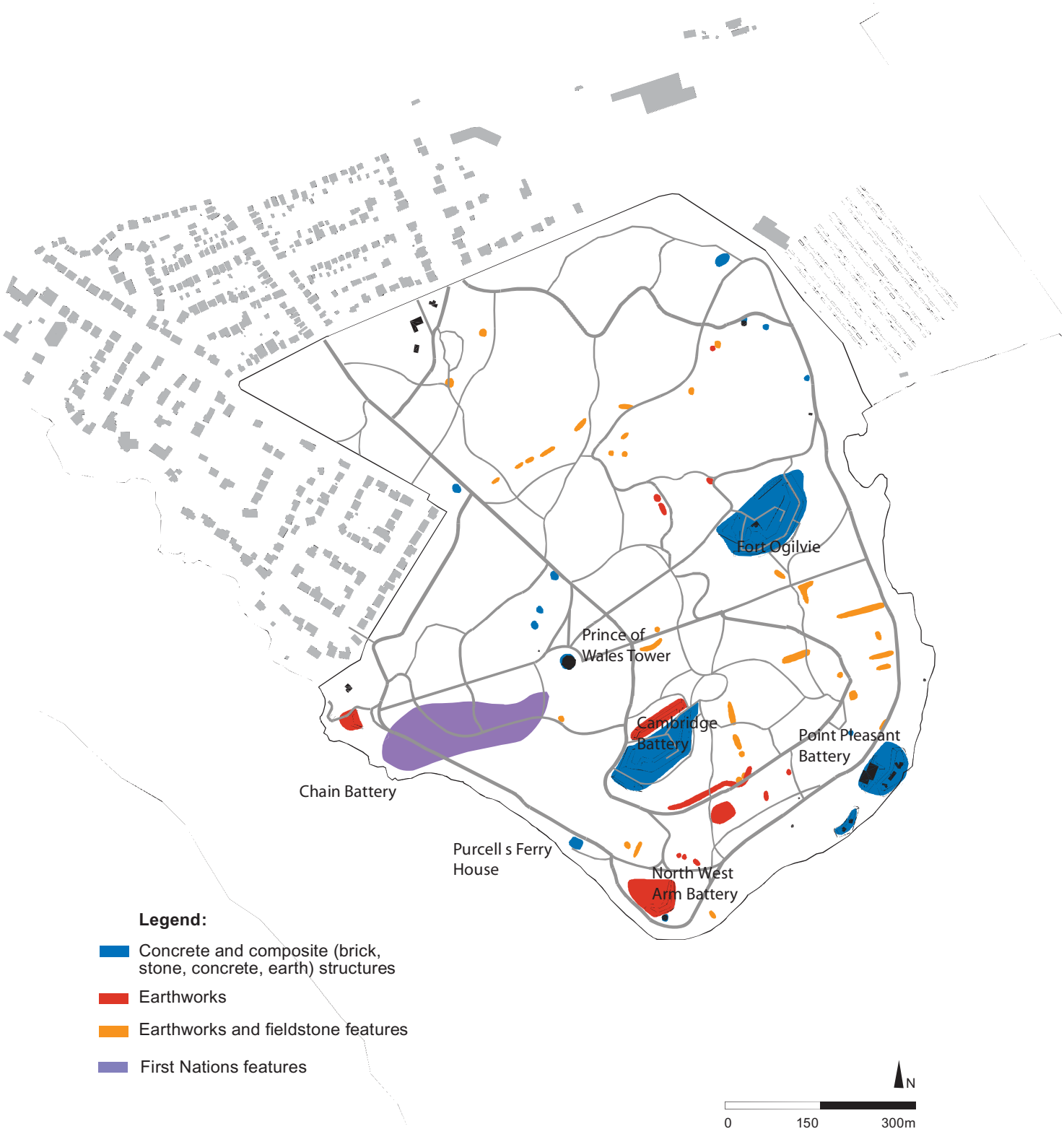
Green Field Site (BdCv-47)

Includes 14 features in the vicinity of the Green Field picnic area; most apparently relate to a mid- to late-18th-century civilian settlement in the Park and—paradoxically, for a civilian site—the only musket ball yet found in the Park.

First Nations Site (Borden Number to be assigned)

Includes the stone feature known as St. Aspinquid's Chapel, plus the stone mound, stone circle and battle area that were reported to the Curator of Special Places in July 2007. Although they are close to Chain Battery, it would be logical to continue to group Chain Battery into the Point Pleasant Park site because of the cultural distinctiveness of the First Nations site.

MAP 2.10: CULTURAL HERITAGE



Fort Ogilvie

Cambridge Battery

Fort Ogilvie Site (BdCv-46)

Includes 35 features around Fort Ogilvie. Most are military, dating from the 1860s to the 1940s, and many represent demolition debris from the rebuilding of the fort between 1860 and 1890.

Cambridge Site (BdCV-42)

Includes 39 features distributed over a wide area centred on Cambridge Battery. Most, but the not all, are related to military activities, but many—including the remains of a 1778 earthwork (an artificial bank of earth in a fortification) and an 1855 gun battery—may predate Cambridge Battery.

Point Pleasant Battery Site (BdCv-44)

Includes 20 features, again mostly related to an 18th-to 19th-century fortification and barracks, but also including late 19th- and 20th-century concrete military structures.

Point Pleasant Battery

North West Arm Battery Site (BdCv-43)

Includes 21 features, most related to the 18th- to 19th-century fortification and barracks. However, it may also include evidence of an 18th-century civilian settlement, as well as the remains of the original 1850s Purcell's Ferry house.

Tower Site (BdCv-41)

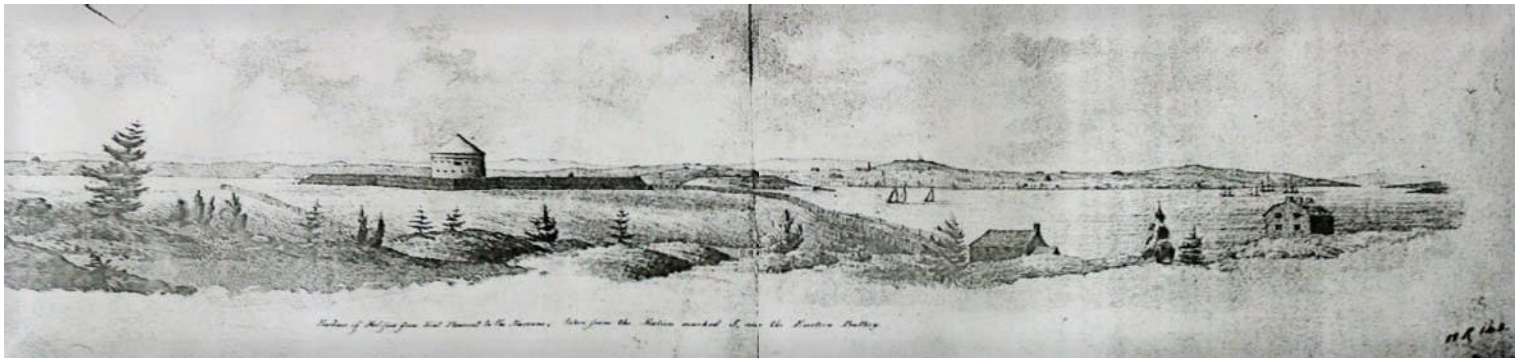
Includes and surrounds the Prince of Wales Tower. Twenty-seven features include artifact deposits and structural remains, mostly related to military activities around the Tower and dating to between the 1790s and the 1870s. However, the only pre-Contact First Nations artifact—a ground slate axe—was also recovered from this area.

Current Condition of Historic Resources within the Park

Centuries of history have left Point Pleasant Park with a wealth of standing buildings and archaeological remains relating to pre-Contact First Nations settlement, 18th-century British civilian settlement, 18th- and 19th-century military fortifications, and 19th- and 20th-century Park-related features. Some are relatively stable and intact, mostly consisting of Victorian and later installations and buildings. Most of the major fortifications, such as the Cambridge Battery and Fort Ogilvie, have undergone many phases of rehabilitation and demolition, with a phase of infilling of rooms to make their structures more stable. Some fortifications, including Chain Battery and Walker Battery, have largely disappeared from public consciousness, while Point Pleasant Battery is being severely eroded by the sea.

In addition to the fortifications, the Park contains many cultural features, including 18th-century field walls, wells, pickets, cellars and the remains of the ferry houses, all of which are in ruins.

The Park's cultural resources have been divided into these four distinct historical and interpretive themes into four categories to analyze their present status.



Martello Tower, Dartmouth - looking towards Halifax and the Prince of Wales Tower

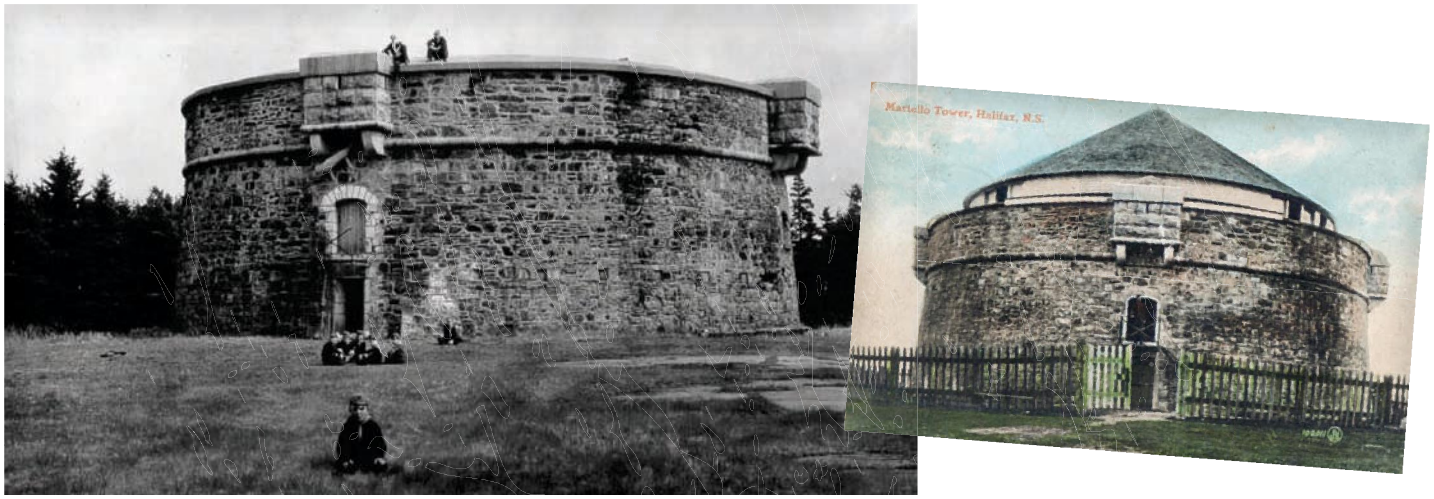
Pre-Contact and Post-Contact First Nations Occupation

A pre-Contact stone axe, recovered in an otherwise largely early 19th-century British military artifact scatter, is one known First Nations artifact found at Point Pleasant Park. Recovered in a treethrow, it is not clear that a pre-Contact deposit per se was affected either by forest development or by hurricane damage. Oral and written historical evidence indicates that the ancient Spring Feast, later the Feast of St. Aspinquid, was held by the Mi'kmaq along the Northwest Arm shore; this major celebration was banned in 1783 (Awalt n.d.). A burial site may also be associated with the gathering site. The burial site and possibly campsites, if present, may have been affected by coastal erosion along this shore. Any surviving deposits would certainly have been affected by root disturbance as the forest became re-established in historic times. Hurricane damage is not likely a major factor, so any remains surviving to the late 20th century probably remain intact.

Point Pleasant Battery - circa 1790

Early British Settlement

Evidence for early civilian settlement in the 18th-century suburban hinterland of Halifax includes field-enclosure walls, wells, possible house foundations and artifact scatters. The stone walls, outlining land grants and road rights-of-way, are unique on the Halifax peninsula, with the best-preserved field-wall array found in the Harbour Fields site between Point Pleasant Battery and Fort Ogilvie. Elsewhere in the Park, elements of the 18th-century field-wall system are preserved in short fragments. All are vulnerable to damage by root growth and upheaval, but the fragmentary nature of the wall system today is likely due mainly to disturbance during later military construction and the removal of stone for other building purposes.

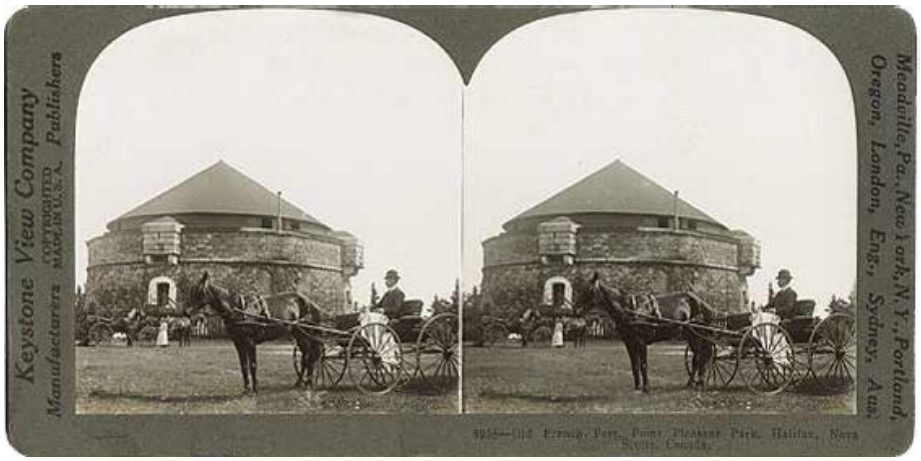


Prince of Wales Tower

Other features related to 18th-century civilian settlement are again concentrated at the Harbour Fields and Green Field sites, although scattered examples can be found elsewhere. One definite 18th-century stone well and two early wells have been identified. At least two were in good condition before and after the hurricane, though all are extremely vulnerable to both root disturbance and upheaval. One possible house foundation has been recorded at each of these sites. Both the wells and the cellar have been damaged by root growth.

Eighteenth-century artifact deposits, likely associated with former settlements, have been identified in a number of locations throughout the Park, but, again, they are most concentrated at the Harbour Fields and Green Field sites. They are potentially vulnerable to root disturbance, but, since none of the scatters encountered so far appear to be well-defined middens (waste dumps), pre-hurricane disturbance may or may not be significant. Obviously, since all of these deposits were revealed in treethrows, they have suffered some hurricane disturbance.

Present-day elements such as pathways and trails have evolved over time, yet many of these routes were first defined during the early settlement of the Park and can be located on maps dating back to the 18th century.



Gun emplacement - Point Pleasant Battery - 2007

Military Occupation

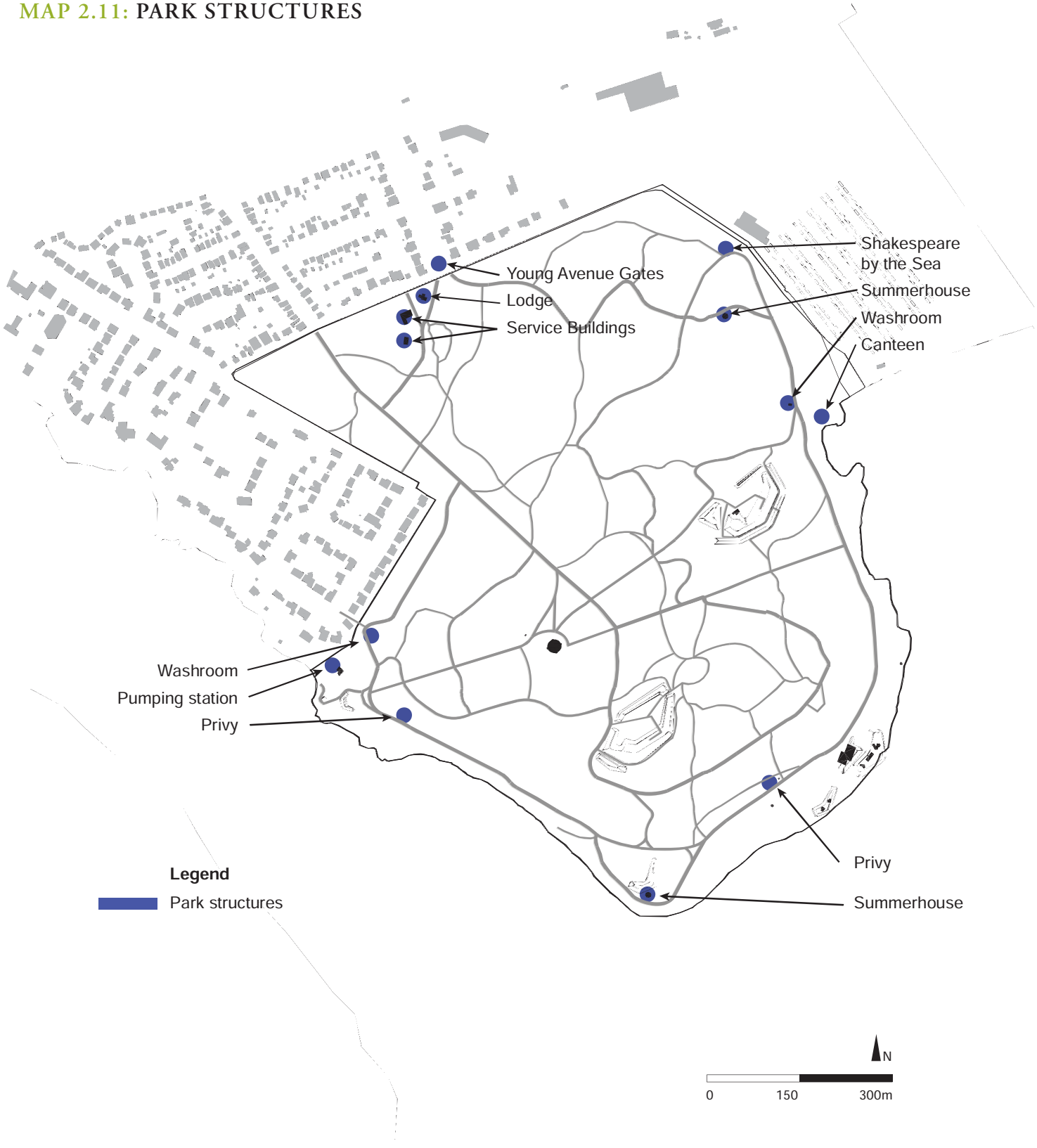
Military features, especially the principal fortifications, are the cultural resources with which the general public is most familiar. As they have become overgrown, their former defensive functions have become less and less apparent.

The Prince of Wales Tower is the best-preserved and best-presented fortification. Active cultural resource management of the Tower has included keeping some of the surrounding area free of trees, and the Tower has therefore been protected from tree root and hurricane damage.

In contrast, Cambridge Battery had become heavily overgrown with trees and was already suffering progressive structural damage from root action prior to Hurricane Juan, which worsened the situation. Other historic military structures near Cambridge Battery are in various states of preservation. The foundation of the laboratory (the magazines) east of the fortification has become somewhat overgrown, though it does not appear to have suffered greatly in the hurricane. The nearby 1778 entrenchment and the 1855 campground had remained partly open, since they correspond in part to the heather patch, and therefore they appear to have suffered less damage from tree roots and upheaval. The same can be said of Walker Battery, located between Heather Road and Sailors Memorial Way, a battery erected as a field exercise in 1855.

Soldiers engraving

MAP 2.11: PARK STRUCTURES



Cambridge Battery

Trees had also been allowed to grow on the fortification at Fort Ogilvie, though the resulting structural damage seems less severe. The steep scarp, or inner slope, in front of the fortification, previously somewhat stabilized by tree growth, now risks being eroded.

North West Arm Battery and Chain Battery are both earthworks that retain their 18th- to early 19th-century configurations. Both areas had become heavily overgrown prior to Juan, though the actual effects of root disturbance are uncertain. Hurricane damage around North West Arm Battery was severe, with large trees falling across the earthworks, although luckily no trees had grown directly atop the earthwork. North West Arm Battery is backed by features and artifact deposits associated with the external barracks, which prior to Hurricane Juan had been affected more by landscaping activities than tree growth.

Unlike North West Arm Battery, Point Pleasant Battery was extensively rebuilt in the late 19th century. None of the early fortification is visible today, although portions may be preserved within and between the more recent structures. Tree growth has never been a significant problem here, but coastal erosion has been severe, and the concrete fortification is wearing away. Part of the battery has already been entombed in an earthwork for safety reasons, and a searchlight emplacement was removed by Parks Canada several years ago. Thus far there is no evidence that erosion has exposed earlier fortifications. Like North West Arm Battery, Point Pleasant Battery is backed by significant artifact deposits, which may be a mixture of domestic and demolition debris. Prior to Hurricane Juan, these had likely been disturbed by root growth, but the damage may have been less severe than the upheavals caused when trees were uprooted during the hurricane.

The The Lodge Quarry and Glade Quarry locations can be regarded as late-18th-century military features. Before Hurricane Juan, the Glade Quarry had become so overgrown that it was almost invisible to passersby. Neither feature is particularly vulnerable to tree growth or upheaval.

Cambridge Battery

Cambridge Battery

Park History

Most structures associated with recreational activities or the Park's history, such as the summerhouses and the lodge, are heritage buildings, monuments or simply such buildings as the garage and the privies. Though these are valued and, in some cases, have historical interest, they do not have the same vulnerabilities or cultural resource management issues as the archaeological remains; regular maintenance prevents them from suffering root damage, although they are vulnerable to storm damage. The main exception may be the well on Pine Road, which should be managed as an archaeological feature. Most of these features were stable prior to the hurricane. Most monuments, in particular, are located on lawns and were vulnerable neither to root disturbance prior to the hurricane nor to treefalls during the hurricane. As a direct result of the hurricane, trees did fall on the summerhouse near North West Arm Battery; although the damage was not severe, it is clear that any structures near trees are potentially vulnerable.

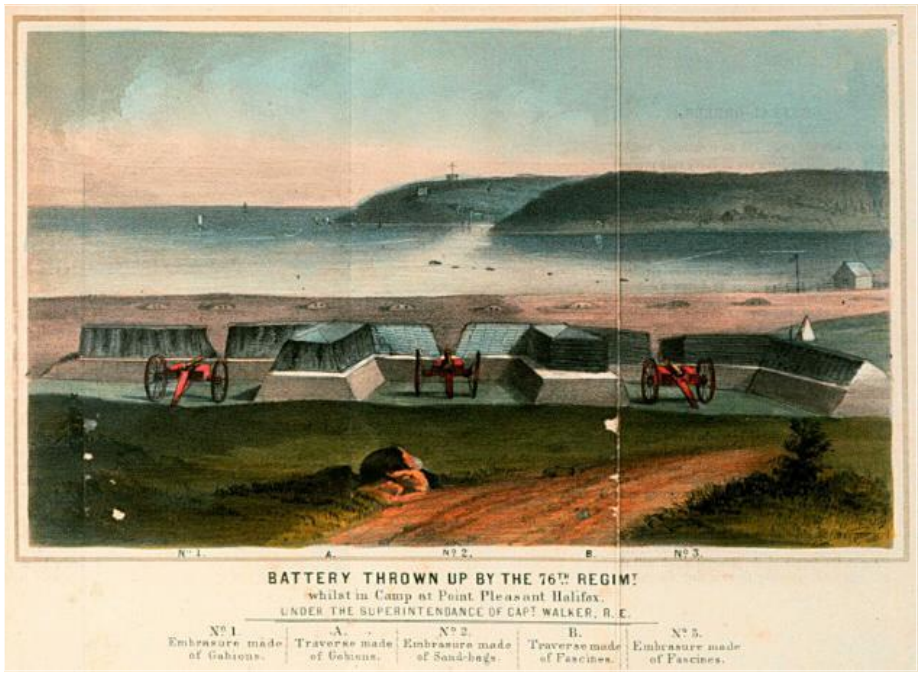


Illustration of Walker Battery, 1855

"Climb the mountains and get their good tidings. Nature's peace will flow into you as sunshine flows into trees. The winds will blow their own freshness into you... while cares will drop off like autumn leaves."

- John Muir

Point Pleasant Park Viewlines

When assessing the viability of restoring historic viewlines from Point Pleasant Park both outward and inward, there are several factors to consider, including the presence of trees and buildings that block once-extant viewlines, the demolition of so many fortifications outside Point Pleasant Park that once formed part of the Halifax Harbour defences and also the complex history of the harbour fortifications.

British fortifications around Halifax Harbour primarily focused on defending the harbour approaches to the port area, where commercial and military shipping needed a safe haven. Over time, the evolution of weapons and communications systems tended to move the most effective defences for the port further south, to the outer harbour and away from the city, but inner harbour defences such as booms, searchlights and mines remained important components of the overall defences throughout World War II.

Existing Views

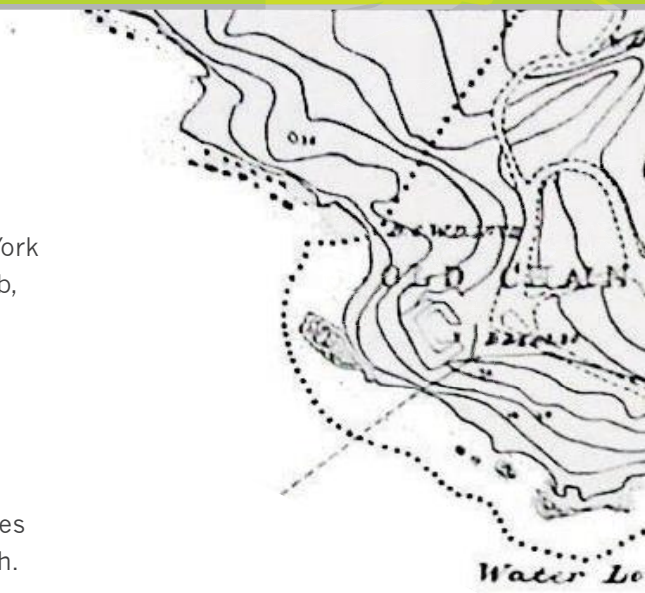
Prince of Wales Tower

The tower was well placed on a height of land. It has views to York Redoubt, Ives Point, Fort McNab, Meagher's Beach (Sherbrooke Tower), Fort Clarence, Fort Charlotte and the Citadel.

From the top of Cambridge Battery (the top of the earthworks), one can see the Ives Point area and Meagher's Beach. Fort McNab could theoretically be seen, but trees on McNabs Island presently block views of Fort Ives and Fort McNab. The location of York Redoubt is visible, but fortifications are difficult to distinguish.

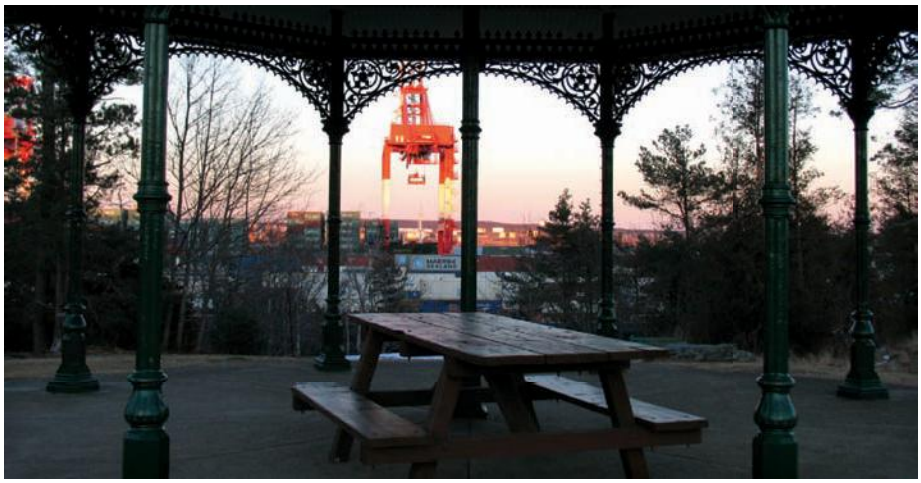
North West Arm Battery

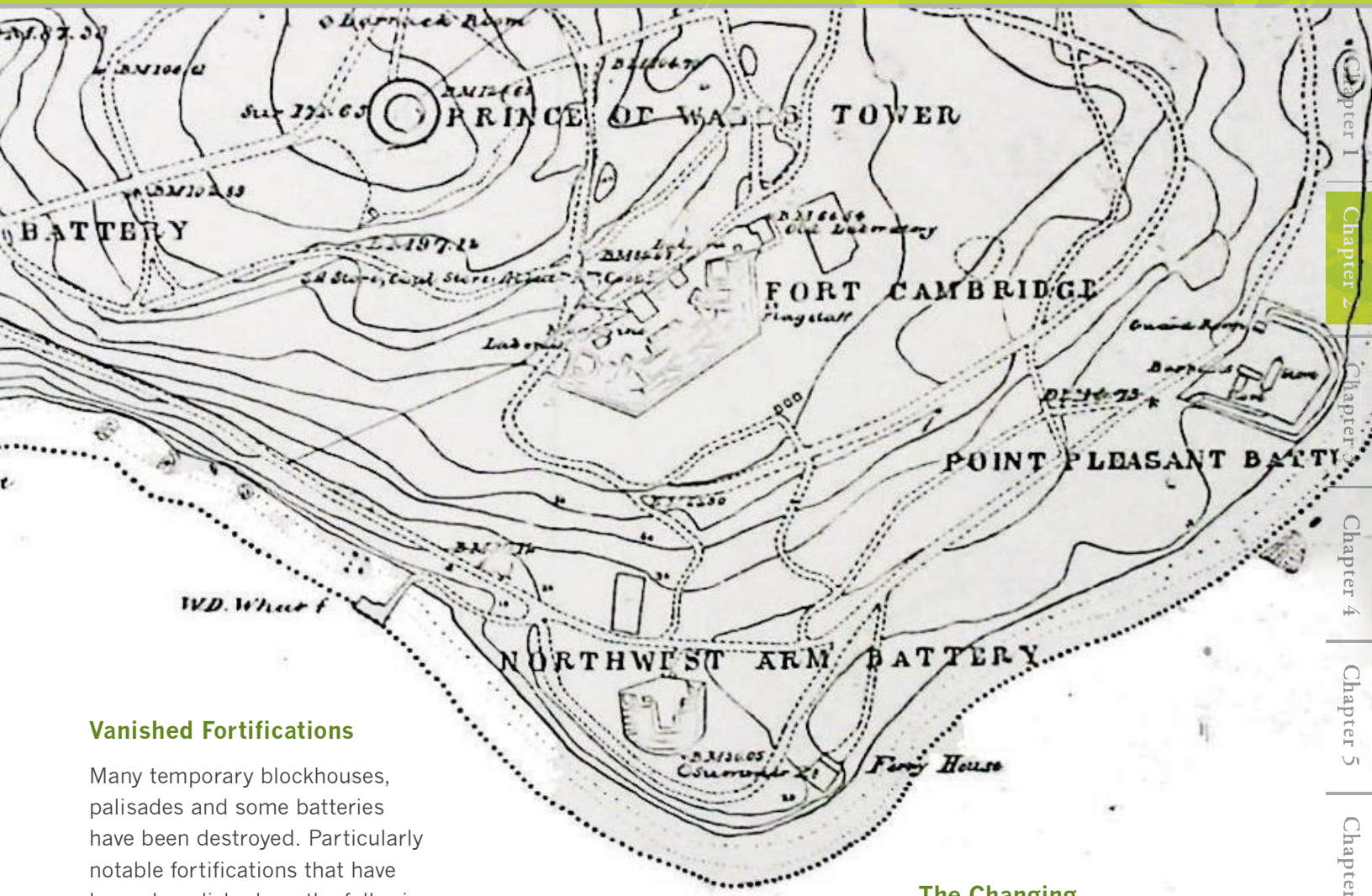
North West Arm Battery has a view to York Redoubt and up the Northwest Arm, and also to the western shore of McNabs Island. During the Napoleonic Era, the battery was defensively interlinked with Martello Tower and Point Pleasant Battery.



Fort Ogilvie

The fort's commanding height gives it a clear view of Prince of Wales Tower, Point Pleasant Battery and Cambridge Battery; plus, Fort Clarence would also be visible if it still had an above-ground superstructure. Views of the Citadel and Georges Island are obscured. Fort Ogilvie had a clear view of the west side of McNabs Island, so Ives Point Battery, Sherbrook Tower and Fort McNab would presumably have been visible at different periods of the fort's history (in the past, vegetation was sometimes allowed to obscure views).





Vanished Fortifications

Many temporary blockhouses, palisades and some batteries have been destroyed. Particularly notable fortifications that have been demolished are the following defensive towers:

- Sherbrooke Tower on McNabs Island is gone, but its former location on Meagher's Beach is visible from many other sites, particularly from Prince of Wales Martello Tower in the Park and Point Pleasant Battery.

- Fort York Tower has been incorporated into another defensive structure at York Redoubt.
- Fort Clarence once stood on the Dartmouth Shore opposite Fort Ogilvie. Some of its foundation remains, but the superstructure is gone.
- The Martello Tower located inside Fort Charlotte (Georges Island) was demolished; only its stone foundation remains below ground.
- Fort Needham Tower, north of the Citadel near the current Hydrostone neighbourhood, was once a three-level tower.

The Changing Harbour Defences

The following summaries are historic snapshots of the Halifax defences over time, dealing with periods when war or the threat of war led to significant modifications and upgrades of the defences. Periods of neglect often occurred when undermanned, sometimes neglected and often obsolete fortifications were still part of the defences. During such periods, trees were often allowed to grow within and around defences, to the point where the guns could not have been fired from some key fortifications (Johnston 53).

Fort Ogilvie

The First British Fortifications

Breastwork Battery and Barbette Battery (Point Pleasant Battery and North West Arm Battery, respectively) were constructed hastily in 1762 at Point Pleasant, in response to the seizure of St. John's by the French. A boom was also strung across the Northwest Arm, anchored on one end at Chain Rock. The fortifications on Georges Island, at the East Battery and at the Lime Kiln Yard, had been the most advanced fortifications until this crisis (Piers, 1947). Work also began on Ives Point Battery at this time, but in 1763w ork abruptly stopped on the fortifications and a period of neglect followed.

" ...a natural forest, unlandscaped in the main, one can imagine what the native people saw before 1749."

Anonymous, 2005 PPP questionnaire response

American War of Independence

Revolution in the American colonies led to a flurry of temporary fortifications being erected around Halifax Harbour, mostly temporary blockhouses and palisades. Both Point Pleasant Battery and North West Arm Battery (named Fielding and Flagstaff Battery, respectively, during that era) were rebuilt and rearmed, with a 560-foot entrenchment excavated above the bank at the North West Arm Battery. Two new batteries defended the Arm: North West Arm Battery No. 1 (Chain Battery) near Chain Rock and North West Arm Battery No. 2 (whose exact location is unknown). Two other batteries were constructed near the location of the former Steele's Pond and at Black Rock Beach; Fort Needham and Fort Massey were built, and fortifications on Citadel Hill were enhanced, along with the defences on Georges Island. The peace of 1783–84 brought all work on fortifications to a standstill for a decade.

The Napoleonic Era

In 1793, Fort Ogilvie was constructed as a small crescent-shaped battery with six 24-pound cannons. Its function was to augment the fire of Fielding Battery (Point Pleasant Battery). Most notably, the Prince of Wales Tower (Martello Tower) was finished in 1798 on the Duke of Kent's orders. It was designed to supplement the defence of the Northwest Arm and to guard the rear approaches to Fort Ogilvie, as well as the Fielding (Point Pleasant) and Flagstaff (North West Arm) batteries. The Martello Tower undoubtedly facilitated communication between the fortifications at Point Pleasant. The Duke of Kent set up a signalling system between stations at Duncan's Cove, Sambro Island Lighthouse and Citadel Hill, and at a telegraph on the hill behind Prince's Lodge (off Bedford Highway); Piers (1947: 29) suggests that the system used visual signals. A munitions store intended to serve the tower and the two batteries is thought to have been located in the area of what was later Cambridge Battery, a structure known as The Old Laboratory.

Fort Ogilvie - 1872

The Refortifications of the 1860s–70s

During this decade, there was a massive change in the armaments of Halifax Harbour; more than 70 new rifled muzzle-loader (RML) cannons were situated at York Redoubt, Ives Point, Fort Clarence, Fort Charlotte, Fort Ogilvie and Cambridge Battery. The Citadel was the last fortification to receive RMLs, which had an effective range of 2,000 yards, so the coverage to the harbour was formidable. One factor reducing their effectiveness, however, was that they needed a significant number of trained soldiers to use them effectively; a large garrison of British soldiers was not feasible, and Canada would not muster militia to train on the guns. In the 1860s, the Prince of Wales Tower was modified to act as a self-defending magazine and was equipped with outdated smooth-bore cannons. In 1870, an aerial line was constructed between York Redoubt and the Citadel allowing telegraphic communication, with additional lines added in subsequent years (Johnston, 33).

Late 1880s to 1906

By the late 19th century, the greatly increased range of the guns meant that the most important defences were outer harbour fortifications, with the more inner harbour defences greatly reduced in importance. By this time, the Citadel was strategically useless. Breach-loading (BL) guns had a range of tens of thousands of yards and were installed at Ives Point Battery, Fort McNab and York Redoubt, all outer harbour sites, but they were also put at Cambridge Battery and Forts Ogilvie, Charlotte and Clarence. As well, a new battery was built at Sandwich Point, south of York Redoubt, which was the most heavily armed defensive work in the Halifax Harbour area during this period. Quick-fire (QF) guns were small, light, fast-operating BL guns intended to defend against enemy countermining and high-speed torpedo boat attacks, and therefore had to be close to the water. They were installed below York Redoubt, at Ives Point Battery, Point Pleasant Battery and Hugonin Battery on McNabs Island, which was operational by 1900.

North West Arm Battery - 1855

World War I and World War II

During World War I, Fort Ogilvie had only six men and an non-commissioned officer as the garrison, while Cambridge Battery was not manned, but the searchlight emplacements at Point Pleasant Battery continued to be useful. In the late 19th century, the focus of harbour defences changed to submarine mining, so fortifications such as Fort Ogilive and Fort McNab had a greatly reduced role. By the mid 1930s, the searchlights and guns had been removed from Point Pleasant Battery and, along with Cambridge Battery, it was abandoned.

Summary

Table 2.3 summarizes many of the Park views that have some historical military significance. The forest clearing that took place after Hurricane Juan highlights the impact of vegetation growth and removal on Park views.

Table 2.3. Historic viewsheds

Historic views from Point Pleasant Park	Visible in the past?	Currently visible?	Historical significance
Prince of Wales Tower to			
The Citadel	Yes	Mostly obscured	High
Fort Charlotte	Yes	Yes	High
Site of Fort Clarence	Yes	Yes	High
Fort Ogilvie	Yes	Yes	High
Ives Point Battery	Yes	Yes	High
Fort McNab	Probably	Obscured by trees on island	Low
Meagher's Beach (Sherbrooke Tower)	Yes	Yes	High
Point Pleasant Battery	Yes	Yes	High
North West Arm Battery	Yes	Yes	High
York Redoubt	Yes	Yes	high
Chain Battery	Yes	Partially obscured by trees	high
Fort Ogilvie to			
The Citadel	Yes	Obscured	High
Fort Charlotte	Yes	Yes	High
Site of Fort Clarence	Yes	Yes (fort destroyed)	High
Ives Point Battery	Yes	Obscured by trees on island	High
Meagher's Beach (Sherbrook Tower)	Yes	Yes (tower destroyed)	High
Fort McNab	Yes	Obscured by trees on island	Low
Point Pleasant Battery	At times	Yes	High
Cambridge Battery	Yes	Yes	High
Halifax Harbour (toward Ives Point)	Yes	Yes	High
Cambridge Battery to			
Fort Ives	Yes	Obscured by trees on island	Low
Fort McNab	Probably	Obscured by trees on island	Low
Meagher's Beach (Sherbrooke Tower)	Yes	Yes	Low
York Redoubt	Yes	Yes	Low
Halifax Harbour (toward Meagher's Beach)	Yes	Yes	High
North West Arm Battery to			
Point Pleasant Battery	At times	Yes	High
McNabs Island	Yes	Yes	High
York Redoubt	Yes	Yes	High
Northwest Arm	Partial	Partial	High
Chain Battery to			
Northwest Arm	Yes	Partially obscured by trees	High
North West Arm Battery	Yes	Partially obscured by trees	High

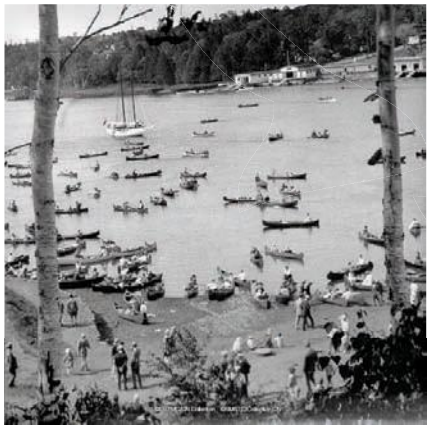
2.8 Landscape Character and Experiential Qualities

The diversity of Point Pleasant Park's landscape character creates the setting for a multitude of visitor experiences in the Park. People gravitate to certain settings at different times of the year depending on their needs, moods or personal preferences. Understanding how the landscape character influences the experiential qualities of the Park is paramount to maximizing its potential and guiding its evolution.

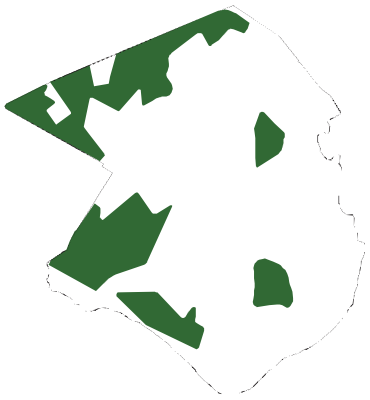
Experiential Qualities During the Early Years

During the Point Pleasant Park's early years, parents with baby carriages ventured to Tower Woods, as it was known at that time, to admire the ocean views and watch the wind-filled sails of the ships that skirted the Atlantic. Chain Rock was an early favourite swimming destination for Haligonians, since it overlooked the entrance to the Northwest Arm and offered many tranquil picnic sites. Later, with the construction of paths and roads throughout the park by Royal engineers requiring 8,000 days of military labour, residents and visitors were able to witness the splendour of the majestic trees that sheltered the pathways and rolling topography, revealing the Park features as sequences of events. The fortifications and unique representative natural features (trees, wetlands, ponds, cliffs, boulders) became popular destinations and landmarks.

Other manmade landmarks (summerhouses, entrance gates, monuments) were later added to orient, signify and heighten the Park's experiential qualities. Whether intentionally or accidentally, the pastoral and wild qualities of Tower Woods provided what could only be contrived in a typical English landscape garden. In Tower Woods, art and nature collaborated—but nature dominated.



Beach and cobble

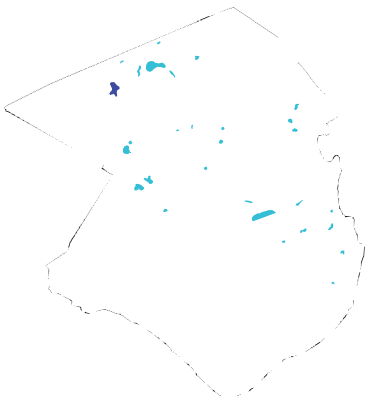


Mature needleleaved forest

Boulder field

Regeneration forest

Grass and glades



Wetlands

Pre-Juan Experiential Qualities

Prior to Hurricane Juan, many of the same experiential qualities enjoyed by early Park users were still present. Some were a bit more blurred, while others were brought into sharper focus. The many views of the ocean that visitors had cherished from the trails and shorelines were reduced as dense, old-growth, coniferous forests soared overhead, providing canopies around almost every interior trail. The lack of groundcover in the primarily coniferous forests created a setting with deep open views into the forests. Strong vertical lines were created by trees with branches trimmed above head height (Jotcham, 1991). The similarity in the Park's forest composition and stand age created a landscape of low visual interest. Topographic features and landmark structures provided welcome accents, although forest cover often obscured their visibility in the broader landscape and clouded the historic purpose of the military features. The optical illusion created by the dense forest meant that trails felt maze-like; after many decades, Point Pleasant Park gradually acquired a greater sense of mystery. The feeling of containment was heightened, providing a sense of security to some and a sense of danger to others. Trails were sheltered from the wind and sun, creating monotony in microclimatic conditions. The Park's edge and interior were vastly different places.

MAP 2.12: LANDSCAPE CHARACTER




Open grasslands




Rock outcropings / sand beaches / cobble shorelines




Freshwater wetlands

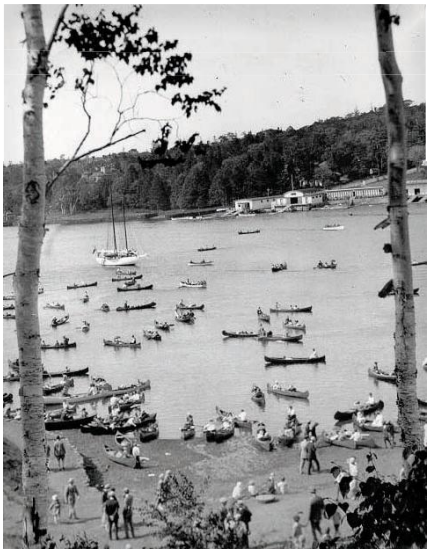



Mature needleleaved forests (witness grove)



Regeneration forests

Northwest Arm shoreline



Fleming Park

Lush forests and their intrusive roots obstructed views of the ocean from the historic batteries. Coupled with deterioration over time, this compromised the integrity of key historic resources. Since change happened so slowly, even the oldest park users scarcely noticed it. To the northeast, an additional 500 metres of Park shoreline was filled in 1968 to create the Halterm container terminal, further obscuring views north back into the harbour from the Park; Steele's Pond and the Royal Nova Scotia Yacht Squadron were also lost in the process. Two large parking lots were built at key gateways into the Park.

The number of "destinations" in the park increased with the introduction of more landmarks (beaches, buildings, monuments, memorials), as well as a greater variety in programmed uses (sporting events, plays and other cultural events). Arguably, the quality of new landmarks and park features has deteriorated as reduced budgets and uncoordinated design styles took their toll. The exacting standards of the Royal engineers and original Park forefathers were being eroded by time and neglect. There were requests from many special-interest groups to erect new monuments in the Park.

A formal beach created at Black Rock was well protected from offshore winds. Originally made of fine cobble and later supplemented with sand, it was a popular swimming area until it was closed in 2000 because the water was contaminated with fecal coliform bacteria. Water quality will improve as a result of the harbour cleanup, and swimming could be permitted in the future, depending upon the quality of both the water and the bottom sediment.

The shoreline extending from Black Rock Beach to Point Pleasant is a steep cobble beach backed by an expanse of lawn. Large ocean waves often carry driftwood, mussels and seaweed great distances up the bank. At low tide, sea birds and seals bask atop the exposed Hen and Chickens shoal along the southern shoreline. Moving along the water's edge toward the Northwest Arm, the shoreline becomes extremely steep and is replaced by large cliffs of glacial till. These higher elevations closer to Purcell's Landing and Chain Rock Beach offer beautiful sheltered views across the often-tranquil Northwest Arm.

Scenic views from the Park are an important feature of the shoreline. The water reflects diurnal tidal fluctuations and the lunar cycle, local weather and varied light from the sky and land. Leisure craft and larger seagoing vessels dot the waters of the harbour and Northwest Arm. The shorelines facing the Park provide a backdrop for activity on the water, as well as the following popular landmarks: the Dingle, York Redoubt, Meagher's Beach and the Imperoyal neighbourhood in Dartmouth. Forests along the shore extend the natural quality of the landscape from the Park across the water to Purcells Cove and McNabs Island, as well as along the shores of the Northwest Arm.

Post-Juan Experiential Qualities

Hurricane Juan caused tremendous changes to the Park, and the rebound of forest growth since September 2003 creates discernible change from one year to the next. The destruction of the forest makes the Park's surroundings much more prominent from within it and creates a more exposed microclimatic environment.

Black Rock Beach

As a result of recent tree loss, increased sunlight to the forest floor has allowed for the growth of shrubs, wildflowers, grasses and other plants that were unable to survive in the dark coniferous forest. Today the regenerating forests create a sharply different aesthetic quality. The previously dense forest canopy is now open and sparse in certain areas, while the formerly barren forest floor has begun to flourish into a lush green mat of plants and small trees. Silvering snags standing in the open create dramatic displays where placid groves of pine trees once stood.

Since the hurricane, many of the Park's manmade elements have become more noticeable. The need to repair or replace old washroom facilities, waste containers and benches suddenly became apparent, revealing the demand for the renewal of park infrastructure and refined landscape treatments in certain areas. Although the Park's forest and its dramatic shoreline views

Robber s Rock on Hemlock Walk

were once the primary attraction for visitors before Hurricane Juan, the ruins are now more noticeable and appealing. These fortifications are a reminder of the strategic military importance of Point Pleasant Park and Halifax from the mid-1700s to the end of the World War II. Each offers a different experience and memory of the past (Halifax Regional Municipality E, 2007).

The sense of vertical containment and enclosure once created by the mature forest has been broken to reveal many extensive new views. While they take in a much larger area of the landscape, they leave the Park feeling smaller. The Park is now perceived as a relatively small point of land within the outer harbour. Many once-concealed paths are now visible, as are previously obstructed landmarks. The relationship of some of these key landmarks, such as the batteries and summerhouses, to the ocean is much more clearly understood. The extreme changes in topography throughout the Park are also more evident. Since trails were originally routed to follow the topography in a dense forest, they gave little hint of the Park's vast topographical variation..

Landscape Textures

Point Pleasant Park offers a wide variety of natural and built materials that provide different forms and textures to the landscape. Variable light conditions and seasonal changes such as snow, ice, rain and fog affect the look of the Park in subtle yet profoundly beautiful ways. The movement, sounds and reflections of the water surrounding the Park create a tranquil setting. Ephemeral streams, bogs, marshes and ponds scattered throughout are calm for much of the year, coming to life with rainfall and snow melt.

Forest and plant materials such as evergreen and broadleaf foliage, shrubs, grasses and groundcovers provide an array of different textures and colours, creating movement and sound with each gust of wind. Large stone outcroppings, boulders, cobbles, pebbles and sand also provide varied textures.

The variety of natural elements found in the Park creates a harmonious and natural character, one that is grounded in the history and surroundings of the site.

Needleleaved

Broadleaved

Groundcover

Water

Pebbles

Views

Point Pleasant Park has extraordinary vistas and panoramas, classified as "external views," due to its physical characteristics and its proximity to Halifax Harbour, the Atlantic Ocean and the Northwest Arm. "Internal views" are those mainly defined by pathway trajectories, site topography, vegetation type and light conditions, all of which vary throughout the Park. This richness of these visuals contributes to the sense of place that defines certain areas of the Park and stirs the senses in those who see it.

a long walk in the woods has been reduced as a result of Hurricane Juan's deforestation, there are opportunities for re-establishing unique views and recreating forgotten "visual events," such as looking at the point where the harbour opens to the Atlantic Ocean. Depending on how the forest is managed in future, it can act as a screen, frame or filter.

For the purpose of this park development plan, the main existing views have been grouped into three categories. The juxtaposition of historic, external and internal viewplanes play a major part in defining the experience of Point Pleasant Park and its intrinsic character. (Views with a historic military significance were discussed previously in Section 2.7, Historic Resources.)

View to McNabs Island from Cambridge Battery

Prior to 2003, the effect of the dense forest cover was to focus visitors' attention on the immediate scenery, allowing intimate views into the forest and toward the Park features. There were fewer external and more internal views. Although the effect of discovering the shoreline and ocean vistas after

Harbour and York Redoubt area as borrowed landscapes

External Views

Aside from their historical value, external views (Map 5.8, page 199) allow visitors to better appreciate the structure and context of the Park's landscape. The powerful presence of the "borrowed landscape" (i.e., external views), incorporating key elements beyond the park limits, creates a strong connection with the regional landscape. Some of the views of the ocean from various sites located on vantage points, such as the batteries and summerhouses, are also significant and should be protected for the future.

Internal Views

Internal views (Map 5.9, page 202) are generally located along straight segments of pathways, at certain intersections, between park landmarks or at clearings and high points in the forest. These views make it easier for people to navigate the trails and allow them to take in the Park's unique details.

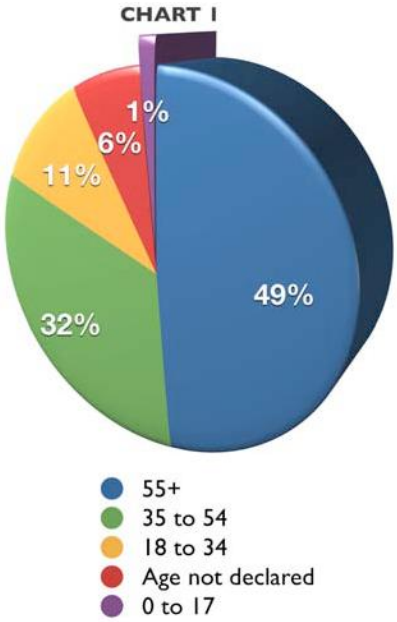
Some functional elements within the Park, and contrasting adjacent land uses, may interrupt visitors' enjoyment of the natural scenery they expect to find in the Park, including large parking areas, maintenance facilities and the Halterm container pier. Views into the backyards of private properties from within the Park may also contribute to the discomfort of both visitors and residents.

Grass meadow behind Point Pleasant Battery

2.9 Park Uses

The Point Pleasant Park Advisory Committee conducted a survey of park users on four occasions in 1998 and 1999. Detailed data collected on a sunny autumn weekday provide a quantitative snapshot of the individual Park visitor's characteristics and motivations.

CHART 1



Individual Park Users

The age distribution of Park users shows that children and parents visit the Park less than both younger and older adults whose time may be less consumed by either full-time work or child rearing. Age data collected on a winter Sunday revealed a slightly lower proportion of youth and children. Park use by older and younger adults may reflect the greater levels of freedom they enjoy and the high numbers of university students living near the Park. Difficulty accessing leisure destinations and a lack of recreation facilities are often cited as barriers to Park use by young people. These factors may contribute to the low levels of use by both youth and children.

The age distribution of Park users may also reflect the demographic character of the urban areas closest to the Park where the majority of users reside. The Park also attracts smaller numbers of visitors from a much wider region, reflecting its reputation and central urban location. Though Point Pleasant is viewed as a major park for all residents of the Halifax Regional Municipality, this small off-season survey indicates low use by those living outside the urban core.

Park Uses

Year-round use of the Park is strong but variable; an average of 1,850 visitors were counted over 12 hours on three of the days surveyed, alongside 5,537 visitors on a sunny Sunday in late May. Special events may attract thousands at one time. Early morning use of the park is high; users reported spending an hour or two in the park per visit (Point Pleasant Park Advisory Committee, 1999).

Passive Park use (walking, running, picnicking) predominates at Point Pleasant. Broad paths, varied terrain, forests, fields and the coast provide an ideal setting for leisure activities that require few specialized facilities. The Park has long been a popular destination for dog walkers and is now one of at least six urban parks allowing dogs off leash in certain areas. The informal Park design is mirrored in the casual types of recreation that take place here, and the natural landscape is an important part of the Park's appeal. For those who don't get a chance to visit natural habitats outside the city, the Park offers an opportunity to experience a large natural environment.

While physical activity is not the main motivation for all Park users, many regular visitors include the Park in their exercise routine. Runners frequent the trails before and after work and at lunchtime. People play Frisbee, kick a soccer ball or toss a baseball back and forth in the flat fields along the shoreline. In the forest, visitors may feed peanuts to squirrels or birdseed to chickadees. And in winter, the rare calm snowy days are ideal for cross-country skiing.

Group Events

Twelve large events and about 100 smaller ones take place annually in the Park. Numerous charity walks and runs include the Park in their route, local organizations hold picnics here and residents gather at the shore in large numbers to watch special events on the harbour, such as the Tall Ships. Day camps and fitness groups also use the Park, but with few places that provide shelter, visitors are subject to the whims of local weather. Shakespeare by the Sea has offered live theatre in the park for 12 seasons, and the Sailors Memorial (Halifax Memorial) is an important venue for Remembrance Day ceremonies.

Table 2.4. Park visitor summary

1998 and 1999	October	February	May	August
Total number of visitors (in one day)	1746	1759	not available	2055
Age Range				
19 or younger	11%	6%	not available	not available
19 • 25	50%	29%		
25 or older	39%	65%		
Purpose of visit			priorities	not available
Walking	50%	47%	1st choice	
Running or jogging	25%	13%	3rd choice	
Dog walking	20%	36%	2nd choice	
Cycling	4%	1%	n/a	
Other (sports, theatre, etc...)	1%	3%	4th choice	
Geographic breakdown of users				
South end and west end Halifax	60%	58%	not available	not available
Downtown, north end, Dartmouth, Bedford, Sackville	24%	28%		
Other areas, including other countries	16%	14%		
Comments	50% of users are daily users with visits extending from 1 to 2 hrs.	The majority of users were walking or walking their dogs. The greatest concerns were both for and against dog off-leash areas.	99% of respondents were walking and 1/3rd of these were walking their dogs. The greatest concern was for the ecology of the park and preservation of the forest.	The head count survey showed that visitors entered the park from the following entrances: Tower Rd. 44%, Black Rock 36% and Young Ave. 20%

Spatial Distribution of Park Uses

Large events often use the open spaces near Black Rock Beach; the highly visible location and ease of access for vehicles carrying supplies is part of their appeal. Distributing use to include other open areas in the Park, such as Cambridge Battery and Fort Ogilvie, could help reduce the impact of such big groups of people, tents and vehicles on the landscape.

The military earthworks and fortifications have been recognized as intriguing and inviting spaces by both children and theatre groups. This use must be balanced with the appropriate regard for the safety of Park visitors and the desire to preserve such cultural resources.

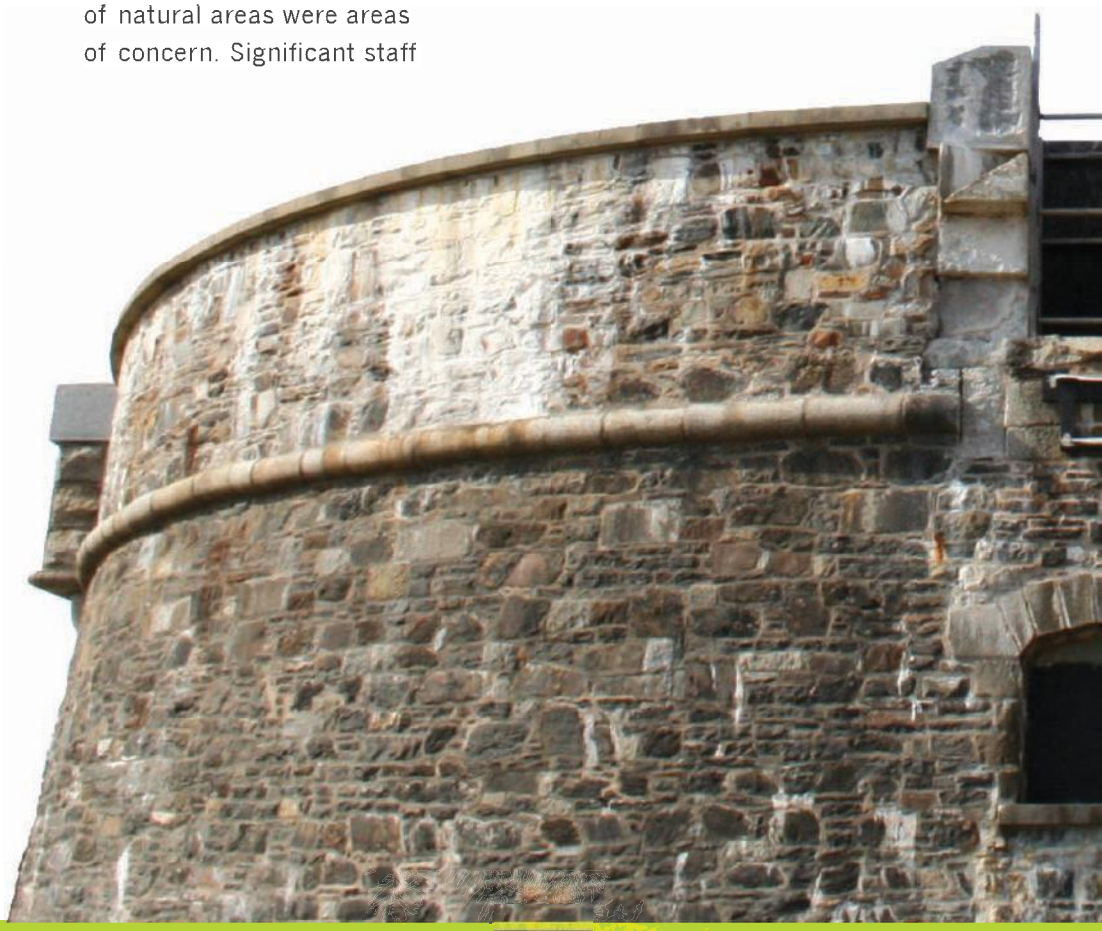
The base of maintenance operations is located next to the Young Avenue entrance, along with an enclosed yard near the centre of the Park. The location, size and configuration of maintenance facilities must be effective without disturbing visitors.

Park Use Concerns

The 1998-99 Point Pleasant Park Advisory Committee survey uncovered a variety of concerns related to Park use; in broad terms, the condition of the Park was the largest. Many visitors viewed the Park as a natural asset but were worried about the rundown state of the facilities, natural environment and cultural resources. The popularity of the Park as a destination for people and their dogs generates both gratitude from dog owners and concern from others that not all dog owners follow the Park's rules about where you can and cannot walk dogs off-leash. Some people said that they had been frightened or even hurt by dogs that had been running loose, while others expressed frustration about unruly canine behaviour and waste on the walking trails.

Post-Hurricane Juan consultations in 2005 echoed those concerns and added similarly mixed opinions about the need to control bicycle traffic. Interviews with Park management and staff confirmed the issues related to dogs and bicycles. User impacts on the natural environment were also highlighted; areas of concentrated use, increasing use and trampling of natural areas were areas of concern. Significant staff resources are consumed by the management of event bookings that might be better directed toward maintenance activities.

The impact of external lights and sounds alters the perception of the Park. The noise of unloading, stacking and reloading containers at the nearby container pier can be heard in the Park's eastern



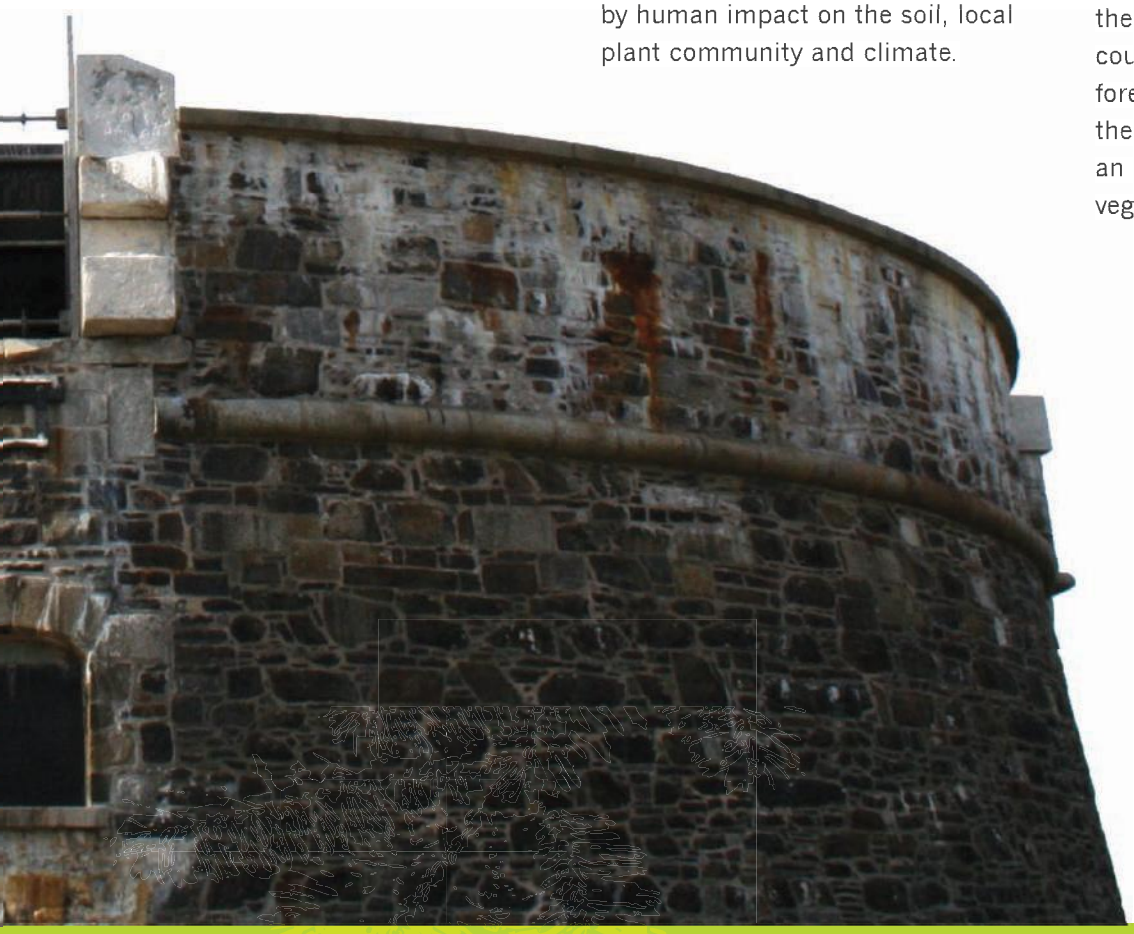
Halterm

sections. Although tree cover tends to be a poor insulator against noise, the increased visibility of the Halterm facility may contribute to visitors' awareness of noise coming from the shipping operations. At night, tall bright lights at the container pier wash the eastern side of the Park.

2.10 Summary

The natural processes that will restore Point Pleasant Park's forest are unlikely to produce a forest identical to the one that existed before the hurricane. We don't understand perfectly how Acadian forests develop, and the ultimate course of natural forest development in the Park is clouded by human impact on the soil, local plant community and climate.

There have been considerable human impacts on the Park's landscape since the founding of Halifax, and despite repeated clearing of the forest, it has been largely successful in renewing itself. Forest management will control the impact of non-native species on forest regeneration. Accelerated global warming is a relatively new influence that, over the course of several centuries, could contribute to the Acadian forest that is indigenous to the Park being replaced with an entirely different type of vegetation.



The time frame of Acadian forest development and the human lifespan are radically different. The abundance of light will allow relatively rapid regeneration of the Park's forest in the next few decades, allowing people to observe the changes from year to year. Within the next 20 years, the forest's regeneration, combined with the remaining vegetation, will lead to more enclosed Park trails and the development of an overhead forest canopy. It will likely take more than 100 years—barring any future destructive storms—before the forest regenerates to the point to which it had matured prior to Hurricane Juan. Many current Park users will not live long enough to see the Park's forest as it once was during their lifetimes.

Under natural conditions, free of any management, the ultimate fate for a mature Acadian forest is destruction by wind or fire. This process will not change and may become worse if the anticipated impacts of global warming—more frequent extreme weather and much higher temperatures—come to pass. In the Park, the remaining mature woodland areas are more prone to being destroyed by high winds because much of the mature forest has been lost.

Therefore, forest management must buffer existing mature woodland patches with new plantings and diversify the age of forest stands to reduce the extent of future destruction. Forest resilience can also be improved by planting longer-lived species and wind-tolerant species in more exposed areas.

Summerhouse at North West Arm Battery

The cultural resources within Point Pleasant Park will deteriorate over time and, depending on the nature and location of the resources, may either be lost entirely or may be around for centuries to come. Coastal erosion is wearing away Point Pleasant Battery; it will threaten the North West Arm Battery and the remains of the first ferryman's house in the decades ahead. Left unchecked, coastal erosion will gradually reveal and then wash away artifacts from the shore. To preserve them over the long term, stone, brick and concrete structures will require active conservation efforts. With the exception of the Martello Tower, many historic structures have been neglected since they were decommissioned and are now in poor condition. Inland, historic resources from the early years of Halifax and the pre-Contact period are relatively durable and threatened mainly by human activity in the Park and forest growth. Vegetation growth may also obscure or reveal patterns in the landscape that remain from past human occupation of the land.

MAP 2.13: SUMMARY MAP