Environmentally Sensitive Areas (ESAs)

ESAs represent those areas of the Park that are particularly vulnerable to disturbance. They include a diverse mix of natural features and habitats that are essential to the biodiversity and ecosystem health of the Park as a whole.

A system of designated ESAs is an essential step in securing Stanley Park’s remaining natural values for the future. The Stanley Park Ecology Society designated and mapped ESAs based on specific criteria for use in the Vancouver Park Board Restoration Plan in 2007, and they were used, in part, in the subsequent Forest Management Plan where they were called Wildlife Management Emphasis Areas.

Areas were designated as high priority ESAs if they had one or more of the following attributes:

- areas significant to ecology integrity,
- unique or rare habitats,
- productive wildlife habitat (for birds, mammals, fish, amphibians, reptiles, etc.)
- areas of disappearing biodiversity,
- essential corridors for wildlife movement, and
- critical Species at Risk habitats.

Methods

The first phase of the ESA project involved a preliminary literature search of available reports, research, and historical data concerning Stanley Park ecosystems and habitats. The use of specific knowledge from individuals with extensive familiarity of the Park (including SPES staff, Park naturalists and the VPB wildlife manager) helped to determine the delineation of ESA areas. A draft preliminary map was created using basic forest cover and site association maps; at that time only paper copies existed.
Phase 2 of the project involved the mapping of these areas using GIS software. This was done by SPES staff and experienced volunteers in cooperation with temporary Park Board GIS staff that were hired during the 2007-2008 Restoration Plan to digitize existing paper maps. The new map reflected changes to site associations, waterways, and various other developments that came as a result of storm and work that took place during the Restoration.

Phase 3 of the project involved the ground-truthing and small-scale inventory of several of the ESAs. The Riparian, Old Growth Path, Steep Slopes, Deciduous Patches, and Skunk Cabbage Swamp ESAs were surveyed such that the entire area was viewed, and locations of significant features were marked with a GPS. The features marked in all areas included:

- Wildlife trees: snags generally used by wildlife (i.e., woodpecker holes, etc. were noted). Almost all wildlife trees are western hemlock and red cedar. This is likely because few dead-standing alders or maples were observed.
- Nests and nest boxes: most nests observed were larger ones in deciduous areas, due to ease of spotting nests in bare trees.
- Illegal trails and camps

In addition to the above features in riparian areas, the following were also noted:

- Coarse and small woody debris in channels,
- Log jams or man-made bridges, and
- Cobble or boulder substrate in creeks.

Stand type, vegetation, veteran tree, and invasive species inventories were done separately and not as part of the ESA inventories.

The following table outlines some of the results of these surveys:

<table>
<thead>
<tr>
<th></th>
<th>Riparian Areas</th>
<th>Old Growth Patches</th>
<th>Steep Slopes</th>
<th>Skunk Cabbage Swamps</th>
<th>Deciduous Patches</th>
</tr>
</thead>
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<tr>
<td>Wildlife Tree</td>
<td>33</td>
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<td>Nests</td>
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</tr>
</tbody>
</table>
Environmentally Sensitive Areas:

**Riparian Areas**

**Description:**
Riparian areas (also called riparian zones) are frequently composed of a number of habitats in close proximity, and due to the high diversity of plant species, wildlife use is also high. By definition, they are areas of mostly deciduous vegetation found directly adjacent to watercourses. Their linear structure makes them valuable as corridors for wildlife movement. The Lost Lagoon and Beaver Lake riparian zones are particularly diverse, but all riparian areas and their associated water courses are extremely valuable.

**Locations in the Park:**
There are major riparian areas surrounding both Beaver Lake and Lost Lagoon although both areas are truncated by perimeter trails. Within the Park most streams flow in narrow, confined channels, and as a result have only a narrow band of typical riparian vegetation. Riparian areas have been mapped as the active channel and the incised slopes adjacent to the channel. Typical riparian vegetation is often lacking on these slopes due partly to better drainage than is typical for stream side environments.

**Wildlife Usage:**
These are essential habitat for many species of wildlife including some water birds, migratory songbirds, small mammals, amphibians, and invertebrates.

**Inventory data:**
During inventories, these areas were found to have the highest density of wildlife trees. Invertebrate surveys in the Park found that two sites near streams were the only ones found to contain amphizoid larvae, a previously undocumented invertebrate group in Stanley Park.
Environmentally Sensitive Areas:  
_Wetlands and Streams_

**Description:**  
Wetlands are areas inundated with water for all or part of the year and can be characterized by the presence of aquatic vegetation such as rushes, reeds, cattails, or peat moss. Streams are flowing bodies of water with a current, and are confined within a bed and stream banks. The watershed of a given stream is the area that drains into the watercourse.

Wetlands provide a rich habitat for wildlife and ecosystem services for all life including the filtering of water and air pollution. Streams provide a unique and necessary habitat for fish and other aquatic species, as the fast moving water is more highly oxygenated and cooler than the water in wetlands.

**Locations in the Park:**  
The two most significant wetlands in Stanley Park are Lost Lagoon with its bio-filtration marsh and Beaver Lake with its associated bog, although there are many smaller and less permanent wetlands in the Park. The major streams in Stanley Park include Beaver Creek and North Creek as well as the artificially created salmon stream. Several other unnamed streams exist including the ones near Tisdall Trail and Cathedral Trail, and the stream flowing north from the miniature train overflow parking lot.

**Wildlife Usage:**  
Wetlands and streams are used by a high diversity of wildlife including water birds, migratory songbirds, small mammals, amphibians, reptiles, fish and aquatic invertebrates. Species at risk that depend on this habitat include barn swallow, great blue heron, green heron, American bittern, coastal cutthroat trout, red-legged frog, and Pacific water shrew.

**Inventory data:**  
Inventories of Beaver Lake and Lost Lagoon have been conducted and show that these wetlands are home to diverse and abundant species of plants and animals. Recent amphibian surveys have shown that several of the Park’s historic wetland-dependent species have become locally extirpated, such as the western painted turtle and the Pacific tree frog. Invertebrate life and water quality is high in Beaver Lake but poor in Lost Lagoon. There is also evidence to suggest that Beaver Lake is undergoing rapid succession due to the introduction and perseverance of invasive water lilies.

All of the watercourses in Stanley Park have been altered, culverted or created by human intervention. Inventories of Beaver Creek and North Creek have shown they contain a diversity of aquatic life, including salmonid species.
Environmentally Sensitive Areas:

*Deciduous Patch*

**Description:**
Bigleaf maple and red alder dominate the deciduous forests of Stanley Park. The alder forest significantly affects the health of the conifer forest by harvesting nitrogen from the air and converting it into nitrates. The trees in the forest use the nitrates to build their leaves and other tissues. There are few red alder groves in Stanley Park at present, though there is a small but healthy stand located beside the police office parking lot near South Creek Trail, and a few at the intersection of South Creek Trail and Beaver Lake Trail.

Due to the Park’s history of logging and forest management practices, deciduous groves are now a somewhat rare habitat type in the Park. These stands will change over time, but wherever they occur either naturally or through planting, they represent areas of particularly high biodiversity and wildlife use.

**Locations in the Park:**
They are found in a few locations including behind the Park Board works yard, south of Kinglet Trail, and in the old wildflower meadow.

**Wildlife Usage:**
Deciduous groves containing pioneering red alder or bigleaf maple trees represent valuable habitat especially for forest birds and other animals that prefer young seral forest stages. These deciduous patches are important nesting, foraging and refuge habitat for these species. The species most commonly represented in these areas are forest birds especially pine siskin, red crossbill, and woodpeckers, as well as small mammals and their predators. These areas are also habitat for several Species at Risk including the band-tailed pigeon (*Patagioenas fasciata*), and possibly the southern red-backed vole (*Myodes gapperi*), Townsend’s big-eared bat (*Orynorhinus townsendii*), and Keen’s myotis (*Myotis keenii*).

**Inventory data:**
Three deciduous patches are dominated by invasive species in the understory: south of Kinglet Trail, southeast of Beaver Lake and northeast of Beaver Lake on Park Drive. Most of the nests observed during ESA surveys were located in deciduous areas, likely due to the ease of seeing them when the trees were bare. An invertebrate survey in Stanley Park found that deciduous forest sites produced the largest number of individual invertebrates in pitfall traps. Forest bird surveys undertaken in the 1980s found the highest recorded diversity of bird species in the deciduous-dominated plot.
Environmentally Sensitive Areas:

**Skunk Cabbage Swamp**

**Description:**
Skunk cabbage swamps are a type of treed wetland found in Stanley Park. They may only have standing water in the wetter times of year and are identified by the rich, organic soils with a closed canopy of coniferous or deciduous trees and plants such as skunk cabbage, lady fern, rushes, western red cedar and Sitka spruce (Southham and Curran, 1996).

The extremely wet, nutrient-rich soils serve as a unique habitat for water-loving plant species including sedges, rushes, salmonberry, and especially skunk cabbage. Swampy soils are particularly sensitive to compaction.

**Locations in the Park:**
These areas are scattered throughout the Park but are particularly evident north of Lagoon Drive and adjacent to Beaver Lake where shallow soils, slope position, and a high water table have created them.

**Wildlife Usage:**
Skunk cabbage swamps are considered high quality habitat for species associated with moist conditions, such as amphibians and invertebrates, and for three Species at Risk in particular: the Pacific water shrew, Pacific giant salamander, and the red-legged frog.

These swamps are also used by mammals such as raccoons and skunks, and terrestrial amphibians during the dry summer months.

**Inventory data:**
Skunk cabbage is the dominant plant species in this site association. Abundant shrubs are stink currant, red elderberry, salmonberry, false azalea and oval-leaved blueberry. Other abundant plants are lady fern, deer fern, bunchberry, horsetail and sedges. Skunk cabbage swamps experienced significant blowdown during the 2007 windstorm, likely due to the wet soils resulting in poor root strength.
Environmentally Sensitive Areas:

**Old Growth Patch**

**Description:**
An old growth patch consists of veteran trees; these are considered to be over 150 years old and are typically conifers. They would have survived logging in the late 1800s, and fires and windstorms. While there are veteran trees scattered throughout the Park, there is only one grove remaining, and it is one of very few left in the Lower Mainland.

Veteran trees usually occur in species that provide ever-increasing bark thickness over the years. They stand out over the forest canopy and usually develop deformities and dimensions that attract many species that are dependent on wildlife trees. Most of the veteran trees in the old growth patch are western red cedar, with some Douglas-fir and western hemlock.

Douglas-fir and western red cedar can reach over 1000 years of age while hemlock can only live about 500 years.

**Locations in the Park:**
Prior to the 2006 storm, two old growth stands could be found: one between Siwash Rock and Prospect Point northwest of Park Drive, and the other between Pipeline Road and Tunnel Trail east of Beaver Lake. The stand once found near Prospect Point blew down during the 2006 windstorm, so the Beaver Lake stand is the last remaining old growth patch in the Park.

**Wildlife Usage:**
This environmentally sensitive area provides a unique habitat that is essential for tree-dependent species like bald eagles, owls, bats, and flying squirrels. Other species that find a home here include Johnson’s hairstreak butterfly, western screech-owl, red-backed vole, Townsend’s big-eared bat, and Keen’s myotis.

**Inventory data:**
The canopy of this small patch of forest near Beaver Lake is open and is dominated by veteran cedar and Douglas-fir. The understory consists of *vaccinium* species, red elderberry, and salal. This area is home to a nesting pair of bald eagles. No other wildlife inventories have been conducted.


**Environmentally Sensitive Areas:**

*Ecotone*

![Image of ecotone]

A graphical representation of a low contrast and high contrast ecotone.

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**Description:**
The areas in the Park where two structurally distinct habitat types meet are called ecotones. These edge habitats provide special refuge, breeding, and feeding opportunities for wildlife and represent high species diversity. Edge habitat is common in Stanley Park, and can be divided into low contrast (i.e., edges between two forest types) and high contrast (i.e., a forest and lawn edge) (Robertson, 1989).

Ecotones are important features because they provide a diversity of habitats in close proximity and which are utilized by many species (Robertson, 1995).

**Locations in the Park:**
Ecotones are found throughout the Park.

**Wildlife Usage:**
Shrub-forest ecotones are the most productive for wildlife in Stanley Park but all edges are used preferentially by certain species of breeding birds, aerial predators such as bats and hawks, grazers, and opportunistic hunters such as jays and crows. In general, forest fragments such as those found in Stanley Park can also lead to detrimental situations for wildlife in a process termed “edge effect” (Paton, 1994). Many bird species prefer to nest along edges because of their inherently greater habitat diversity (Robertson, 1995), but fragmented forests can also create a greater risk of nest predation and parasitism (Paton, 1994).

Species at Risk associated with ecotones include the western screech-owl (*Megascops kennicottii*), Keen’s myotis (*Myotis keenii*), peregrine falcon (*Falco peregrinus*) and barn swallow (*Hirundo rustica*).

**Inventory data:**
Ecotones have not been surveyed.
Environmentally Sensitive Areas:

Surficial Geology

Description:
Cliffs and rocky outcrops provide a unique stable habitat and protection to wildlife from predators. These areas allow for the growth of substrate-specific species of plants such as maidenhair fern, mosses, lichens or rare plants, which are specialized to grow in these areas.

During the 2006 windstorm, large sections of the slopes above the cliffs gave way. Trees, soil, and plants fell to the seawall, as seen in the accompanying photo. Following this event, the soil and vegetation was scaled back from the edge of the cliff in unstable areas in order to prevent future slides. These areas were replanted with ferns and shrub species, and fortified swales were installed to redirect runoff water.

Locations in the Park:
These areas of the Park are found primarily along the steep slopes between Prospect Point and Siwash Rock. The cliffs are north facing, perpendicular, and variably vegetated.

Wildlife Usage:
Surficial geology provides habitat for some species of birds, and for reptiles that use the rocks for basking on. While many species such as peregrine falcons may use these locations for only brief periods, others such as cormorants, pigeon guillemots and gulls use them extensively.

The north-facing cliffs below the Prospect Point lookout area are the site of a seabird colony established in the early 1980s (Robertson, 1995). Pelagic cormorants and pigeon guillemots nested here until 1997, when their colonies were abandoned.

Species at Risk that use these areas include the gyrfalcon (Falco rusticolus), pelagic cormorant (Phalacrocorax pelagicus), and peregrine falcon (Falco peregrinus).

Inventory data:
These areas have not been inventoried.
Environmentally Sensitive Areas: 

**Steep Slopes**

**Description:**
Steep slopes are present at the north end of the Park near Prospect Point. Those on the west side of the Point were strongly impacted by the windstorm in 2006 and as a result the forest is sparse. The steep slope area east of the causeway is largely covered by mature conifer forest.

The steepest slopes in the Park, which have slopes in excess of 60%, are found around Siwash Rock and to the east of Prospect Point (TLRC, 1995).

**Locations in the Park:**
These include areas east of Third Beach, north up to the Prospect Point area, and east of the Lions Gate Bridge.

**Wildlife Usage:**
Wildlife usage of these areas is high. The slopes provide a unique and somewhat drier habitat for species of mammals, birds, amphibians, reptiles and invertebrates.

**Inventory data:**
These sites were designated as site association 2.1: Steep and Colluvial (in Beese and Paris, 1989) and the site association Sword Fern (CWHxm 04) was identified at the toe of the west slope during forest inventories in 2008 (CBPR, 2009).

During amphibian surveys conducted on the slopes in the spring of 2007, a very high concentration of western red-backed salamanders was documented. There is still one pair of bald eagles nesting on the slopes and the only recent confirmed sighting of a northern alligator lizard was in this area.
Environmentally Sensitive Areas:

**Intertidal**

**Description:**
Intertidal zones are those areas that are periodically flooded by sea water. They occur around the perimeter of the Park, generally bounded on their upper end by the seawall. The intertidal zones around Stanley Park are dominated by boulders and cobbles but there are also sandy beaches, small mudflats, and exposed bedrock. Often rocks are covered with rockweed, barnacles and mussels.

**Locations in the Park:**
In Stanley Park, the upper limit of the intertidal area is largely the seawall and its width ranges from 30 m (near the Lions Gate Bridge) to 200 m (near Second and Third Beach) offshore (VBPR, 1984).

**Wildlife Usage:**
This area supports diverse communities of algae, invertebrates, fish, migratory and over-wintering waterfowl and shorebirds. Burrowing animals such as clams, worms and some sea anemones live within sand that is constantly shifting due to tidal surges. Mussels and barnacles open their shells underwater to filter feed on tiny marine plankton along the rocky shoreline. Diving ducks eat shellfish, underwater plants and occasionally small fish. There are many Species at Risk occupying intertidal areas and of these, many are water birds such as the great blue heron (*Ardea herodias*), double-crested cormorant (*Phalacrocorax auritus*), and western grebe (*Aechmophorus occidentalis*).

**Inventory data:**
The beaches of the Park are well-used recreational areas but are decreasing in size due to erosion. In 1963, 75,000 m³ of sand was pumped onto Second Beach but by 1973 it had mostly been removed by wave action and the beach had receded by 18 m. The last extensive study of intertidal organisms between Prospect Point, Brockton Point, and Coal Harbour found that there were at least 64 species of invertebrates including 23 polychaetes, 7 molluscs, 3 sea stars, 3 crabs, 6 echinoderms and several species of barnacles and amphipods (Coast River, 1995). The area of highest species diversity was found to be around Brockton Point, which was also home to Porifera (sponges) and Chordates (tunicates) found nowhere else in the study location, as well as one endemic bristleworm species, the Vancouver feather-duster (*Eudistylia vancouveri*) (Coast River, 1995). More recently, small-scale surveys near Figurehead Point have found a preponderance of the sunflower star (*Pycnopodia helianthoides*) and an increase in the giant pink star (*Pisaster brevispinus*), while there was an overall decrease in species diversity (Maria Morlin, pers. comm.).