

“Human activities are generally concentrated in areas of high biodiversity, particularly along rivers, in estuaries and in fertile valleys.”

Status of Biodiversity in British Columbia

## Sustainability by Design Research Roundtable

---

by Sara Fryer

# Habitat

**Introduction** Habitats are environments that provide everything a particular species needs to live. Natural habitat includes the space and resources necessary to meet the different needs for all non-humans species. This means natural habitats are complex, extremely varied, and often overlap. Healthy natural habitats have the ability to support a broad range of species.

The Sustainability by Design Research Roundtable Working Group on Natural Habitat will investigate the amount, distribution and integrity of regional natural habitat. The group will identify trends and drivers and explore key indicators that help to define the relationship between natural habitat and urban form. The group will also identify a 2008 natural habitat baseline, and provide recommendations on how to create healthy natural habitats throughout the region.

**Context** Metro Vancouver is situated in the Georgia Basin sub-region of the Pacific Northwest, or Cascadia Bioregion. Cascadia is an international region including British Columbia, Idaho, Washington, Oregon, and adjoining parts of Alaska, Montana, and California, and is defined by the watersheds that flow through North America’s temperate rainforest zone into the Pacific Ocean. The Georgia Basin includes Puget Sound, and the straits of Georgia and Juan de Fuca. The ecological health of Metro Vancouver and that of the entire basin are inextricably linked, and transcend political boundaries.

### Biogeoclimatic Zone

Metro Vancouver is within the Coastal Western Hemlock Biogeoclimatic Zone. This zone receives the highest average rainfall, and is one of the most diverse ecosystems in the Province, with the greatest number of bird, amphibian, and reptile species of found in the Fraser Lowland. The significant sediment flows, salt and fresh water create a rich edge between land and sea, and fertile habitat for the majority of British Columbia’s coastal, colony-nesting birds.

# Habitat

The Provincial Biodiversity Conservation Strategy identifies thirteen habitat types within Metro Vancouver.

Wetland, Old Forest, Intertidal, Freshwater, Riparian, Ocean, Young forest, Old field, Agricultural forest, Shrub habitats, Open space, Agricultural lands + rural residential grass areas, Urban vegetated areas.



# Current Context

## Threats

Metro Vancouver supports a diverse range of species. However, human activity over the past 150 years has significantly transformed the land and habitat value. Land use planning influences the amount, patch size, connectivity, and spatial distribution of natural habitat. Urban and suburban development in our region has led to loss of natural areas, fragmentation of habitat, impairment of ecosystem function, and an increase in invasive species and species at risk.

Biodiversity is “the variety of plants, animals and microorganisms and the terrestrial, aquatic, and marine ecosystems of which they are a part.” According to the Status of Biodiversity report, “human activities are generally concentrated in areas of high biodiversity, particularly along rivers, in estuaries and in fertile valleys.” This is particularly true of the Metro Vancouver region where high biodiversity areas, such as shorelines, are largely unprotected. This impacts key species of concern, such as the Pacific salmon and the large migratory avian population, which rely on healthy streams, shorelines, and inter-tidal zones.

## Protection Strategies

The **Green Zone** is an important strategy for protecting regional natural habitat. The Metro Vancouver 1991 Livable Region Strategic Plan identified the Green Zone to include about two-thirds (220,000 hectares) of Metro Vancouver’s land base, comprised of watersheds, agricultural lands, major parks and open spaces. Any changes to these lands require the approval of all 22 member municipalities. A background report on Green Zone issues recognizes that the current management and structure of the Green Zone does not adequately address issues of ecological viability and biodiversity. The report indicates that Green Zone management should integrate strategies currently being advanced by municipalities, the GVRD and others, such as integrated watershed management, greenways, environmentally sensitive development and green buildings. The Green Zone includes three categories:

**Recreation/Conservation** (~156,000 hectares) includes parks, recreation areas, provincial/research/community forests, wildlife management areas, ecological reserves, and drinking watersheds. The recreation/conservation areas include 95% conservation area, and 5% recreational use area.

**Agricultural Land Reserve** (~56 000 hectares) includes areas intended for agricultural and agricultural support services. The Agricultural designation reinforces provincial objectives to protect the agricultural land base of the region.

**Rural** (~8,000 hectares) primarily includes low-density residential development with rural character. These lands buffer urban and agricultural uses, protect areas unsuitable for development due to environmental constraints, and contain growth to the urban containment boundary.

The **Metro Vancouver Regional Recreation Greenway Network** identifies the regional recreation greenway network as a key component of protecting natural assets. Greenways primarily provide recreation, and also provide important connectivity between areas of natural habitat. They are “planned, designed, and managed to enhance multiple values” such as recreation, alternative active transportation routes, biodiversity, ecosystem connectivity, and ecosystem function. There are currently four regional greenways in Metro Vancouver, including: Brunette-Fraser, Delta-South Surrey, Pitt River, and Seymour River. These greenways, when complete, will include 100 km of trails. Future expansion of regional greenways will enhance natural habitat connectivity through other portions of the region.

The **Biodiversity Conservation Strategy** is based on a partnership of federal, provincial, and regional governments, research organizations, and numerous non-profit groups. It utilizes biophysical mapping to determine the relative biodiversity across the region. The resulting regional maps of habitat types, reservoirs, refuges, and connectivity identify priority protection areas for conservation, wetlands, old growth forests, and intertidal zones.

**Metro Vancouver Parks** has prioritized field management for raptors, stream habitat for salmon, and wetlands. Metro Vancouver parks recognizes habitat restoration as the best way to support species at risk, rather than previous programs that focused on animal rehabilitation. Influences that have a negative impact on natural habitat include climate change, pollution, invasive species, and human over use or damage.

## POINTS OF CONCERN

### Streams and Wetlands

As recently as 1880, the North Arm of the Fraser River flooded approximately 2900 hectares of wetland habitat. By 1940 only 109 hectares of this habitat remained.

Of all Lower Fraser Valley streams 15% are in culverts, 71% percent are threatened or endangered, and 14% percent are classified as wild.

Impervious surfaces make up more than 15% of the region, significantly altering the hydrologic cycle.

### Forests

Forest cover decreased from 71% in 1827 to 54% in 1990

A CITYgreen tree cover analysis of six watersheds in the region showed that total tree-cover related stormwater management savings ranged from \$1,603 - \$21,107 per hectare.

### Species at risk

Metro Vancouver parks include 56 of 223 endangered or threatened vertebrate animal species identified in British Columbia in 2000.

The region includes 109 provincially listed species at risk.



Metro has identified a **Regional Ecological Health Plan** as a priority item for 2009. The plan will refine existing mapping of ecologically important lands to show both protected and unprotected areas and use this evaluation to inform an acquisition strategy. It will identify ecologically important corridors and provide a framework for valuing ecological services. The plan will build on the Biodiversity Conservation Strategy.

Metro Vancouver has prioritized working with provincial and federal governments to create a **Coastal Zone Management Plan** for marine and intertidal areas to be completed by 2016.

---

**Water**

Natural habitat surrounding the Coquitlam, Capilano, and Seymour reservoirs directly impacts the quality of our region's drinking water. Protection of these areas benefits water quality and contributes to the amount of habitat in the region. Similarly, protection and restoration of stream habitat improves water quality and benefits the natural hydrologic cycle. Urban forests and trees provide valuable stormwater mitigation in areas largely covered by impervious surfaces. Wetlands, marshes, and intertidal areas aid with flood mitigation and stormwater attenuation.

**Agriculture**

Natural habitat and agricultural land uses compete for the same land base; we must strike a balance between protecting natural habitat and providing enough agricultural land to feed our citizens. The way we use agricultural lands impacts the region's habitat: extensive greenhouse food production in our region removes potential habitat from the green zone, while other farm uses contribute to biodiversity and ecosystem function. The health of the natural environment is effected by agricultural runoff, which can result in nutrient loading on streams and rivers. Similarly, some aquaculture practices have been linked to health decline in wild fish stocks.

**Energy**

The damming of rivers to provide energy destroys hectares of forest habitat and obstructs important salmon migration routes. Light pollution uses excess energy and negatively affects the behavior and navigation of animals, which is of particular concern in a region providing important migratory bird habitat. Urban forests absorb and sequester green house gases, reducing the urban heat island effect and energy needs of buildings.

## **Economy**

Typically, the most livable cities have experienced high economic growth, putting development pressure on lands used for natural habitat. This is true in our region where natural habitat and housing often compete for the same land base. Natural habitat is an important draw for tourism, which can result in over use and damage. Other economic drivers also compete with habitat for space, particularly along rivers and shorelines with high habitat value and high value for industrial and shipping uses. For example, salmon once formed an important piece of the regional economy, but habitat loss and degradation is threatening the health of wild salmon populations. Finally, the economic value of ecosystem services remains to be recognized and quantified.

## **Mobility**

Our region's road network bisects habitat areas, presenting a barrier for wildlife movement. Large areas of the region are covered in impermeable surfaces to create our road network, but rivers and streams are generally unable to sustain salmon populations if at least 20% of the watershed has impermeable surfaces that allow direct runoff of water and pollutants into the waterways. On the other hand, active transportation routes such as greenways provide a synergy between natural habitat needs and more sustainable forms of mobility.

---

## Questions

What is the baseline natural habitat for 2008?

What diversity of habitat types should be prioritized?

What would a sustainable regional natural habitat network look like?

What types and scales of natural habitat are most feasible to support in the region?

Are there optimal urban forms or patterns to support natural habitat, and how can the urban fabric incorporate ecological interests and biodiversity opportunities?

How does integrating and preserving natural habitat conflict with or support sustainability goals?

Are there synergies between natural habitat and other land uses that should be developed?

What regulatory/political/social/economic/technological barriers exist to creating optimal region conditions for preserving and increasing natural habitat?

- Austin, M.A., D.A. Buffett, D.J. Nicolson, G.G.E. Scudder and V. Stevens (eds.). 2008. Taking Nature's Pulse: The Status of Biodiversity in British Columbia. Biodiversity BC, Victoria, BC. 268 pp. Available at: [www.biodiversitybc.org](http://www.biodiversitybc.org).
- British Columbia Ministry of Environment. 2008. [www.env.gov.bc.ca/wld/bio.htm](http://www.env.gov.bc.ca/wld/bio.htm)
- Environment Canada. 2006. A Planner's Guide to the Biodiversity Conservation Strategy for the Greater Vancouver Region. <http://www.metrovancouver.org/about/publications/Publications/APlannersGuideToTheBiodiversityConservation.pdf>
- Greater Vancouver Regional District. 2005. Green Spaces, Natural Places: Regional Parks and Greenways Plan. <http://www.metrovancouver.org/about/publications/Publications/ParksGreenwaysPlan.pdf>
- Greater Vancouver Regional District. 2005. Green Zone Issues and Policy Options. [http://www.metrovancouver.org/planning/development/strategy/BackgroundPapersReports/GreenZoneIssuesandOptionsDiscussionPaper-fnl\\_Dec05.pdf](http://www.metrovancouver.org/planning/development/strategy/BackgroundPapersReports/GreenZoneIssuesandOptionsDiscussionPaper-fnl_Dec05.pdf)
- Greater Vancouver Regional District. 2006. Green Zone Issues and Policy Options Workshop Summary. <http://www.metrovancouver.org/planning/development/strategy/BackgroundPapersReports/GreenZoneWkshpSummaryReport.pdf>
- Metro Vancouver. 2007. Regional Growth Strategy Review Backgrounder #8: Climate Change as a 'Driver' for the Regional Growth Strategy. [http://www.metrovancouver.org/planning/development/strategy/BackgroundPapersReports/RGS\\_background8\\_climate\\_change\\_Dec2007.pdf](http://www.metrovancouver.org/planning/development/strategy/BackgroundPapersReports/RGS_background8_climate_change_Dec2007.pdf)
- Metro Vancouver. 2008. Preliminary Draft Our Livable Region 2040: Metro Vancouver Growth Strategy. <http://www.metrovancouver.org/about/publications/Publications/RGS-PreliminaryDraft-Sept30-08.pdf>
- Pojar, J., Klinka, K and Demarchi, D.A. 1991. Chapter 6: Coastal Western Hemlock Zone. Ecosystems of British Columbia. ed. D.V. Meidinger and J. Pojar. Special report series. Ministry of Forests and Range. Pp. 95-111. <http://www.for.gov.bc.ca/hfd/pubs/docs/Srs/Srs06/chap6.pdf>
- White, Gordon. Ed. 2002. Habitat Foundation Paper. CitiesPLUS. [www.citiesplus.ca/cdsubmission/pdf/c@/Habitat-Foundation-Paper.pdf](http://www.citiesplus.ca/cdsubmission/pdf/c@/Habitat-Foundation-Paper.pdf)
- Whitford, Jacques. Axys Ltd. 2008. Burrard Inlet Environmental Indicators Report Public Consultation Document. Prepared for Burrard Inlet Environmental Action Program. <http://www.bieapfrempp.org/bieap/publications/Burrard%20Inlet%20Environmental%20Indicators%20Report%20FINAL%20March%202008.pdf>
- Zevit, Pamela. Adamah Consultants. 2007. Biodiversity Conservation Strategy for the Greater Vancouver Region. <http://www.metrovancouver.org/about/publications/Publications/BiodiversityActionProfiles2007.pdf>