

Chapter 5

Natural Features

Natural Features

Environmental Management Mode

Land Resources

Water Resources

Air Quality

Preparing for Climate Change



5.1 NATURAL FEATURES

BACKGROUND

Maple Ridge encompasses a total of 25,700 hectares of land and water, making it the fourth largest municipality in the Greater Vancouver Region. With its diversity of physiographic regions, ecosystems, natural features and watercourses, Maple Ridge supports many species of animals and plant life.

Maple Ridge is recognized as a leader in the areas of Recycling and Waste Reduction, watercourse and riparian setback mapping, the Municipal Energy Conservation and Green Buildings Program and the civic stewardship and environmental education programs.

Maple Ridge has historically placed a high value on the natural environment. The combination of assets, values, and civic support lends a unique character to Maple Ridge and contributes positively to the quality of life in the community.

PRINCIPLES

A number of principles have been identified to provide an overall context and guidance for decisions regarding the natural environment. The principles reflect many of the values of the community highlighted through numerous community workshops and the Community Visioning Sessions held in Spring 2006.

Principle 6

The community recognizes the need to foster the history of Maple Ridge and enhance historic areas.

Principle 7

Special places and neighbourhoods are valued as significant components of the larger community, each with unique attributes and needs.

Principle 23

The community values the protection of environmentally sensitive areas including, water (for its intrinsic value, habitat and aquifer recharge), areas of natural beauty, forests, etc.

Principle 24

The community recognizes the environmental contribution made by lands within the ALR.

Principle 25

Providing access to nature by way of a trails system is important as a means to optimize recreational resources in an environmentally friendly way.

Principle 26

There is value in integrating natural features of the environment into development through planning and design.

Principle 27

Overall environmental protection demands a comprehensive, 'smart growth' approach.

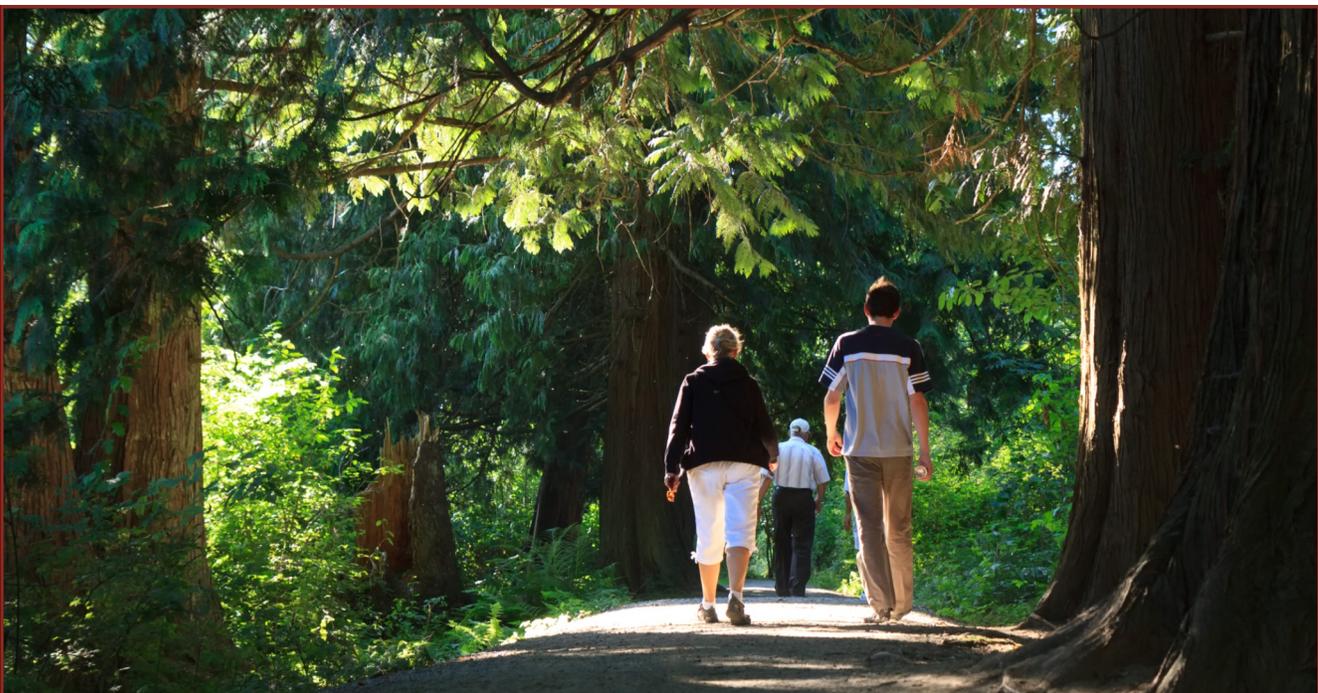
Ecosystem Principles

An integrated set of principles for the management of land, water and biological resources that utilizes accepted scientific methodologies.

OBJECTIVES

In addition to the above principles, the Natural Features section of the Official Community Plan was drafted based on the following objectives:

1. A comprehensive approach based on ecosystem principles incorporating land, water and air into a single framework.
2. A perspective that anticipates climate change and strives to reduce its causes while mitigating its effects.
3. A balanced evaluation process incorporating economic, social and environmental sustainability; and
4. The cultivation and strengthening of community partnerships to help enhance the success of policies and programs.





5.2 ENVIRONMENTAL MANAGEMENT MODEL

BACKGROUND

An ecological planning approach is one that is based upon natural features and systems, rather than political or legal boundaries. To implement this approach, an environmentally sustainable management model that incorporates each component and identifies opportunities for evaluation and review of ecosystems and site-specific issues is required.

The foundation of the environmental management model is the identification and documentation of ecosystem boundaries, watershed areas, environmentally sensitive areas, and hazard lands. The goals of the model are to:

- Protect significant ecosystems in the Municipality;
- Anticipate and respond to the impacts of climate change on land, water, and air resources;
- Determine guidelines and standards that are necessary in and around environmentally sensitive areas;
- Identify situations where additional environmental studies or impact assessments are required as part of the development process; and
- Maintain and improve ecosystem health and human safety.

The model combines watershed management with a land-based planning approach to incorporate each component into a comprehensive ecosystem planning model. The components are as follows:

- **Land Resources** – include areas of conservation, hazard lands (including steep slopes and floodplains), open space, environmentally sensitive areas, and agricultural lands;
- **Water Resources** – include watercourses and wetlands, rainwater and stormwater management and the protection of groundwater resources; and
- **Air Resources** – include air quality management, energy conservation initiatives and transportation and land use alternatives.

Environmentally Sensitive Areas

Areas where the landscape, wildlife, ecological function or historic value is of importance or is endangered.

Conservation Area

Ecologically sensitive lands that require protection in order to ensure their health, diversity and integrity are maintained.

The model also includes goals and objectives aimed at preparing for climate change, recognizing that it has impacts on land, water, and air resources. At the watershed or ecosystem level, and within each of the above categories, some resources will be designated as Conservation where development will not be allowed. This is to ensure that the most important and ecologically sensitive areas will be protected to maintain their health and diversity and will contribute to a District-wide system of connected systems and features.

At the sub-watershed and site-specific level, additional research and study will be required to identify the level of development that is possible without significantly impacting a natural feature or ecosystem. In these instances, development proposals will be required to include proven mitigation techniques in combination with development permit requirements.

ISSUES

- Development reviews often focus on site-specific issues and may not take larger ecosystem-based aspects into consideration.
- There is a shortage of documented information regarding overall ecosystem health, including baseline information on individual components.
- If not managed properly, increasing development may impact the District's ongoing initiatives with respect to natural features and environmentally sensitive areas.

OBJECTIVES

- To incorporate an environmental management model into the land use planning process to enable overall ecosystem evaluation and review to occur.
- To develop and implement consistent guidelines and practices for monitoring, assessing and the management of natural features throughout the municipality.
- To endorse Regional, Provincial, and Federal programs and plans that will support an ecosystem-based model and will contribute to the District's natural features information base.
- To acknowledge and foster the role that agricultural lands have on the environment.

Hazard Land

Lands that have significant development constraints or cannot be developed due to steep slopes, flooding, erosion or other unstable conditions.

POLICIES

5 - 1 Maple Ridge will build upon existing information and practices in the development of an environmental management model that will inform the land use planning process to enable the assessment, monitoring and management of ecosystems and natural features within the municipality.

5 - 2 Maple Ridge will assess the scope of studies necessary to implement the environmental management model and will identify components as part of the annual business planning process.

5 - 3 Maple Ridge will continue to participate in Regional, Provincial, and Federal programs that contribute to the overall health of the District's ecosystems and protection of its natural features, watercourses and open space.

5 - 4 Maple Ridge will incorporate Regional, Provincial, and Federal programs and regulations where appropriate, for the protection of residents with respect to hazard areas, forest fire interface zones, floodplains and areas of standing water.

5 - 5 Maple Ridge will prepare and implement a sustainable West Nile Virus Response Plan for surface waters based on approved Metro Vancouver policy while a threat of West Nile Virus exists.

5 - 6 Maple Ridge will work toward achieving the goal of a positive benefit for the District's natural features by designating Conservation areas and by mitigating the potential for habitat impacts with enhancement, restoration, environmental monitoring and other alternatives that are acceptable to the municipality.

5 - 7 Maple Ridge will work in co-operation with Regional, Provincial, and Federal authorities and plans that contribute to the management and protection of the District's natural features, and may include but are not limited to the Blue Mountain Provincial Forest Recreation Management Strategy, Blaney Bog Regional Park, the Kanaka Creek Regional Park Management Plan, and the policies and regulations of the Agricultural Land Commission.

Floodplain

The land that is adjacent to a watercourse which is subject to regular flooding.

5 - 8 Maple Ridge will continue to protect watercourses by requiring landowners who are either subdividing or rezoning properties within or adjacent to lands or watercourses identified on the Natural Features Schedule C or designated as Conservation on Schedule B of the Official Community Plan, to provide a portion of lands as park land through the development process. At the discretion of Council the following options can be provided:

- a) the area can be dedicated as park land and be designated as Conservation;
- b) land can be protected through a conservation covenant and payment is made to the Municipality in an amount that equals the market value of up to 5% of the land that may be required for park land; or
- c) combination of parkland dedication and conservation covenant.



5.3 LAND RESOURCES

ISSUES

- Increasing development activities may result in a loss of habitat and natural areas.
- Fragmentation of the landscape into small, isolated pockets can have a major impact on the health and survival of terrestrial species and can affect ecological diversity.
 - Development in floodplains and other hazard areas may place people and property at risk.
 - Predicted changes due to climate change may exacerbate risks associated with spring flooding, landslides and forest fires. In addition, the economic contribution of renewable resource lands such as forests and farms may be impacted by extreme weather conditions.
 - Activities on Provincial Crown land, particularly within the Blue Mountain Provincial Forest, are of concern to some local residents.
 - Development in forest fire interface areas may increase the risk of property loss and ecosystem degradation.
 - Agricultural lands make a significant contribution to the environmental values in the community. Agricultural fields and crops provide habitat, a source of food for wildlife, and often function as wildlife corridors. The removal of lands from agricultural production will often have an impact on the environment.

Environmental Impact Assessment

A report that outlines the attributes of an area or natural feature and assesses the level of impact a development proposal may have.

OBJECTIVES

- To identify, protect and enhance ecosystems, sensitive areas and other natural features that have significant ecological value.
- To ensure that soils, vegetation and mature trees are maintained and protected where possible and encourage the use of native species when replanting is necessary.
- To encourage the retention of forest and woodland areas in Maple Ridge.
- To protect persons, property, and landscape from risk or hazards due to flooding, standing water, hazardous terrain, and forest fire while protecting environmental features to as great an extent as possible.
- To preserve agricultural land in support of community values.

POLICIES

5 - 9 Maple Ridge will identify significant ecosystems and natural features throughout the municipality as *Conservation* on the Natural Features Schedule C, Schedule B of the Official Community Plan, or adopted area plans. The Natural Features Schedule will also identify environmentally sensitive areas, open space, floodplains, hazard lands, the Fraser River Escarpment Area, watercourses, and other natural features, to enable their protection and to minimize the risk of injury or damage to residents and to property.

5 - 10 Maple Ridge residents have consistently emphasized the importance of preservation of natural features. A Natural Features Development Permit Area is established for the preservation, protection, restoration and enhancement of natural features within the community. Development Permit guidelines will also be prepared for hazard lands and environmentally sensitive areas identified on the Natural Features Schedule C or adopted area plans, in order to minimize disturbances and negative impacts that may occur as the result of development activities.

5 - 11 Maple Ridge will require environmental impact assessments to be completed where rezoning or subdivision is proposed within or adjacent to natural features or significant lands identified on the Natural Features Schedule C or adopted area plans. The environmental impact assessment must be prepared by a Qualified Environmental Professional.

5 - 12 Maple Ridge will encourage soil retention and will limit activities that contribute to soil erosion, instability and sedimentation by requiring mitigation techniques to be identified as part of the development review process and implemented and monitored during the construction process.

5 - 13 Maple Ridge will promote the retention of urban and mature trees and of natural forests and woodland areas, and ensure that additional trees and plant material are provided as part of all development proposals. To enhance the ecological integrity of the District, the use of native trees, plants and naturescape principles will also be encouraged.

5 - 14 Maple Ridge will continue to pursue initiatives and to co-operate with authorities, agencies and stakeholders in the planning and management of forested areas within the municipality.

5 - 15 Maple Ridge will continue to encourage public access and controlled use of dykes, shorelines, ravines, watercourses and forests and woodland areas on public lands where such activity will not impact the health or functioning of ecosystems or natural areas.

5 - 16 Maple Ridge will identify and promote the enhancement of greenway corridors to improve connectivity throughout the municipality, as wildlife migration corridors, alternative transportation and recreation trail networks, and eco-tourism opportunities.

Greenway Corridors

A system of protected corridors of open space, managed for conservation or recreational purposes.

5 - 17 In recognition of the role that agriculture has on the natural environment and community values, Maple Ridge will work in cooperation with the Agricultural Land Commission to foster and maintain the agricultural land base. The District will also encourage local farmers to prepare Environmental Farm Plans to enhance sustainable agriculture and minimize potential adverse impacts to the natural environment.

Naturescape Principles

A set of principles that enables the restoration, protection and enhancement of wildlife habitat in urban landscapes by providing habitat in our homes and gardens.

5 - 18 Maple Ridge will review the issues concerning forest fire interface areas, flooding, slope stability and other hazards and will consider developing or revising regulations and guidelines for development within these areas.

5 - 19 The following should be considered in evaluating development to minimize forest interface hazards:

- a) the siting of development and construction practices that will not contribute to forest fire risk exposure in forest interface areas;
- b) the selection of appropriate building materials and maintenance practices that will minimize contribution to the spread of fire;
- c) the use of landscaping that minimizes contribution to the spread of fire.



5.3.1 HILLSIDE DEVELOPMENT

ISSUES

- The diverse landscapes and natural features that contribute to the quality of life in Maple Ridge also presents development challenges and can constrain the land available for development.
- With increasing growth and housing demand, there is greater pressure for residential development on hillsides. However, these areas can be difficult to develop safely. Recent climate change research indicates that the risks of slope instability will increase with heavier precipitation, which is associated with warmer, wetter winters.
- To address these concerns, some areas should be evaluated for geotechnical stability prior to allowing development to proceed. Consideration should also be given to appropriate levels of development density on hillsides in order to protect natural vegetation which assists in avoiding erosion effects. Measures must also be taken to manage storm water in order to avoid flooding in adjacent low lying areas.

OBJECTIVES

- To promote safety of hillside design and construction, and minimize flooding, ponding, and potential land movement.
- To minimize soil instability, erosion and downstream siltation.
- To protect rare and critical environments.
- To encourage development densities that are sensitive to and appropriate for the natural grade of land.

POLICIES

5 - 20 Development should be directed in such a manner to preserve large areas of open space, significant features, and environmentally sensitive lands.

5 - 21 Patterns of density should be encouraged to achieve a mosaic of development sensitive to the natural contours of the land, with retention of mid-slope forested areas and density increases towards upland flat or valley bottom areas. The natural crest of a hill should be respected and development should be set back sufficiently to maintain the slope of the crest and the vegetation along it. Denser forms of horizontal development should be permitted along hillsides only where they can be off-set by sufficiently large open areas and where building modules can be broken into smaller units and carefully sited.

5 - 22 Landscape disturbance should be minimized by retaining trees and natural vegetation as much as possible and requiring replanting or enhanced planting as a condition of development; providing a minimum of cuts and fills and limiting their depths, minimizing terracing and earth grading; blending graded areas with

natural slope; and minimizing the amount of exposed raw earth by phased development and on-site controls.

5 - 23 Minimal disturbance of natural ground contours should be incurred with utility and road alignments. On-street parking could be eliminated if impractical with existing topography or where the street serves wholly as an access road.

5 - 24 Maple Ridge will review the issues concerning slope stability and will consider developing or revising regulations and guidelines for development within these areas.

5.3.2 VISUAL CHARACTER

ISSUE

- The abundant hillsides and valleys in the landscapes of the District of Maple Ridge provide views that are valued within the community and contribute to its unique character. An objective of all development proposals should be the protection of these shared natural assets.

OBJECTIVES

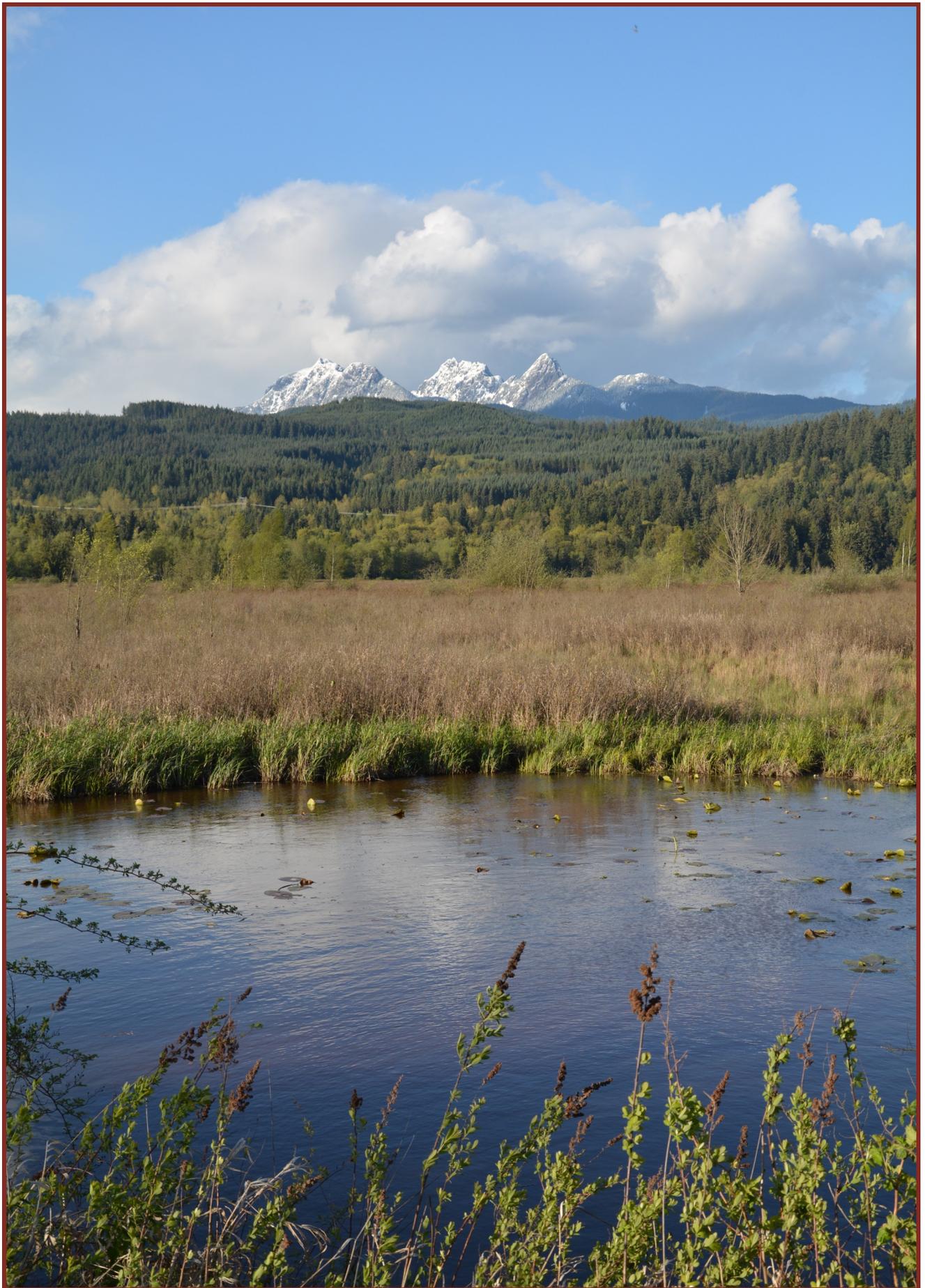
- To maintain the visual quality of hillsides with new development.
- To minimize adverse neighbourhood impacts with new development.
- To maintain and foster the unique natural features of Maple Ridge through sensitive hillside development and the protection of views.

POLICIES

5 - 25 Buildings should blend with the natural hillside terrain and vegetation by choice of building materials, and the location of buildings and parking areas. Landscaping that enhances natural features is to be encouraged.

5 - 26 The scenic qualities of hillside areas should be preserved by limiting change to natural landmarks such as rock outcrops, vegetation cover, intensive replanting of development sites, and preservation of natural drainage channels and encouragement of measures to reduce storm runoff.

5 - 27 The protection of views should be encouraged by sensitive site design that maximizes views beyond and between buildings on the site.





5.4 WATER RESOURCES

ISSUES

- The cumulative impact of development may place a heavy burden on municipal streams, water quality, and watercourse habitat.
 - Development in and adjacent to stream headwater and wetland areas may threaten sensitive ecosystems.
 - The increase of impervious surfaces due to urbanization prevents rainwater from percolating into the ground, which increases storm water rates and volumes and impacts stream hydrology.
 - Water quality of some streams in Maple Ridge is affected by surface runoff from developed areas.
 - Pressure on water supply will likely continue as a result of the growing Regional population and water shortages during the summer months.
 - Predicted weather impacts due to climate change include drier summers which will increase demand on water supply.
 - There is awareness that forestry, recreation, agricultural and industrial activities require groundwater management and protection mechanisms to minimize impacts to groundwater resources.
- Many rural residents rely on groundwater resources for their potable water. These resources are vulnerable to contamination and overuse beyond recharge capacity. Groundwater resources and regulations are the jurisdiction of the Water Management Branch of the [Provincial Government](#).

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OBJECTIVES

- To participate in Regional, Provincial, and Federal programs and projects aimed at protecting and improving the District's water resources.
- To preserve the natural integrity of watercourses, wetlands, and riparian areas through adequate protection, enhancement, and restoration measures.
- To adopt a comprehensive and innovative approach to the management of rainwater and stormwater issues and to manage storm and rainwater in a manner that protects and maintains the ecological features of the District's watercourses.
- To ensure water quality is protected and is made available for residents' consumption.
- To promote wise water consumption throughout the District and to protect groundwater resources as an important source of water supply, especially in non-urban areas.

POLICIES

5 - 28 Maple Ridge will consider the preparation of watershed management plans that integrate watercourse protection, stormwater management, and sediment or erosion controls on an ecosystem basis.

5 - 29 Maple Ridge will identify the watersheds of the District and will protect significant municipal watercourses such as the Alouette River, Kanaka Creek and Whonnock Creek systems, by identifying each on the Natural Features Schedule of the Official Community Plan.

5 - 30 Maple Ridge regards the preservation of creeks and wetlands as important and will identify them on the Natural Features Schedule C of the Official Community Plan. A Natural Features Development Permit Area has been established for the preservation, protection, restoration and enhancement of the natural environment. The Development Permit Area includes all lands designated Conservation on Schedule B or an Area Plan of the Official Community Plan for all lands within 50 metres of the top of bank of watercourses or wetlands as identified on Schedule C.

5 - 31 Maple Ridge will continue to apply adaptive protection measures and the guidelines established through the Streamside Setback Assessment Map, to protect the District's watercourses, ponds and connected wetlands, and will require enhancement and rehabilitation of lands within and adjacent to identified natural features and environmentally sensitive areas as part of the development process.

5 - 32 Maple Ridge will work in partnership with agencies, authorities and stakeholders to consider the identification and protection for stream headwaters, well water supply streams, and wetland areas throughout the municipality and those located on Provincial Crown Lands.

5 - 33 Maple Ridge will adopt Provincial guidelines and standards for integrated rain and stormwater management and prepare an Integrated Stormwater Management Plan (ISMP) to maintain water quality and natural runoff rates in municipal watercourses.

5 - 34 Maple Ridge will participate in Regional, Provincial, and Federal programs aimed at reducing water consumption and will promote further initiatives that promote water conservation and wise consumption.

5 - 35 Maple Ridge will consider developing a municipal-wide groundwater management strategy that will assist the District in resolving issues regarding groundwater quality, quantity and contribution to local ecosystem health.

Riparian Areas

The area of land adjacent to a watercourse, lake or wetland area that links aquatic and terrestrial ecosystems.

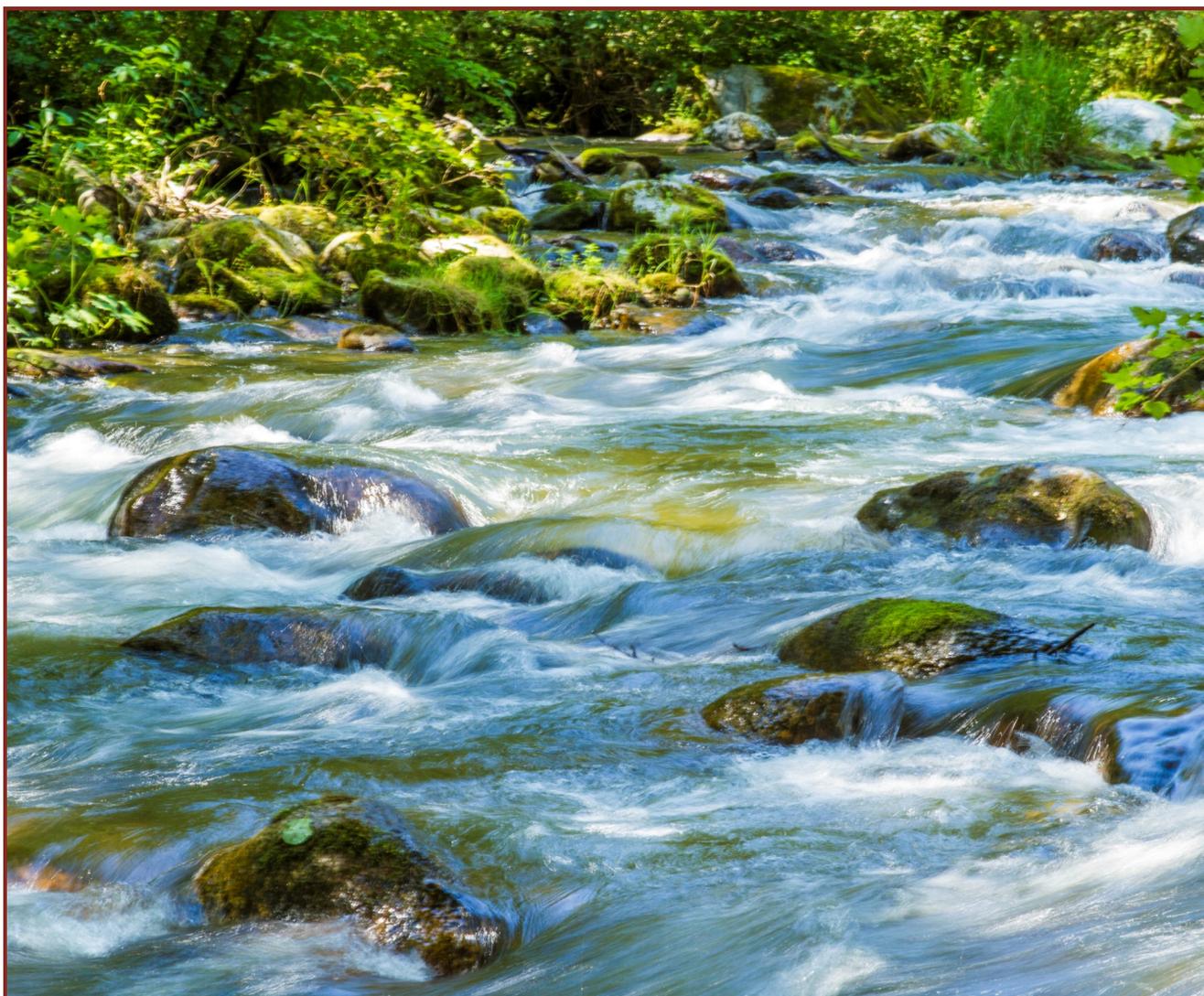
Watershed

The area where precipitation drains to a single body of water such as a river, wetland or lake.

5 - 36 Maple Ridge recognizes the importance of groundwater as a significant source of drinking water in non-urban areas and will promote the protection, maintenance, and restoration of groundwater quality outside the urban area.

5 - 37 Maple Ridge will require an evaluation of groundwater flows, conducted by a qualified environmental professional, for new development that is adjacent to areas reliant on well water. Development proposals that cannot ensure adequate groundwater flows, sufficient water quality or mitigate potential impacts to existing and surrounding well water systems will not be supported.

5 - 38 Maple Ridge will encourage new developments to incorporate Low Impact Development (LID) elements into the design of sites to manage rainfall at the source.





5.5 AIR QUALITY

ISSUES

- Emissions from industries, vehicles, outdoor burning and dust from roads contribute pollutant loadings to the atmosphere.
- Air quality is becoming a problem for the Region as a whole.
- Without a strategy for their reduction, emissions are expected to increase for most pollutants over the long term.
- Predicted climate change impacts include reduced air quality over drier summers as particulates accumulate in the atmosphere.

OBJECTIVE

- To develop an air quality management strategy aimed at reducing harmful air emissions and to promote energy conservation techniques.

POLICIES

5 - 39 Maple Ridge will continue to participate in National, Provincial, and Regional programs aimed at reducing air and greenhouse gas emissions.

5 - 40 Maple Ridge will promote energy efficiency to reduce air and greenhouse gas emissions by:

- a) participating in emissions management programs such as the Greater Vancouver Regional District air quality management program;
- b) encouraging alternative transportation initiatives, promoting 'clean' transportation options, and encouraging the use of public transit;
- c) promoting green space and natural areas;
- d) exploring opportunities for non-fossil fuel energy efficient systems in municipal buildings and infrastructure;
- e) maintaining and enhancing the District's forests and woodland areas; and
- f) encouraging tree retention and tree protection programs.

5 - 41 Maple Ridge will encourage the use of energy efficient site design and building practices in all new developments when appropriate.

5 - 42 Maple Ridge will encourage the use of Leadership in Energy and Environmental Design (LEEDS) standards as part of new development proposals where appropriate.



5.6 PREPARING FOR CLIMATE CHANGE

BACKGROUND

Scientific research indicates an increase in global temperatures, and a likely cause is human activity. A number of gases are known to have heat trapping effects, and are referred to as greenhouse gases. As it is most prevalent, the compound of greatest concern is carbon dioxide, which is released into the atmosphere through the use of fossil fuels.

Climate change should be considered separately from air quality concerns, even though emissions are involved. It is true that initiatives aimed at improving air quality by reducing fossil fuel consumption will have a positive effect on the production of greenhouse gases. However, the effects of climate change are more widespread, and also have direct implications for land and water resources. Climate change can also have adverse economic impacts on agriculture, resource industries, and tourism.

ISSUES

For the District of Maple Ridge, predicted weather trends due to climate change include warmer, wetter winters and drier summers. Wetter winters increase the risk of flooding in low lying areas, and landslides on hilly terrain as the average duration of precipitation events increases, and as soils become saturated and more unstable. Warmer winters lead to lessened snowpack cover which reduces the quantity of available water during drier months, thus exacerbating the problems associated with drier summers. Drier summers in the Lower Mainland are associated with a reduction in air quality, as particulates become trapped in an inversion layer and accumulate over successive days during a heat spell. The risk of forest fires also increases as vegetation and soils lose moisture.

The problem of climate change is likely most effectively addressed through a combined approach that anticipates and plans for its effects while promoting a reduction of greenhouse gas emissions.

OBJECTIVES

Over the next 50 to 100 years, climate change could have significant impacts for the District of Maple Ridge. Proactive measures are required to avert or mitigate increased risks such as:

- spring flooding,
- summer drought,
- air quality impacts,
- forest fire hazards,

- land slide risks, and
- economic impacts such as property damage, reduced agricultural capability, and loss of resources.

In addition, the District of Maple Ridge should take a leadership role in reducing the net production of greenhouse gas emissions through a range of initiatives, including but not limited to:

- public education and information
- procurement policies and facilities design
- encouraging low impact development
- increasing “carbon sink” effects through tree planting and protecting natural vegetation wherever possible.

In consideration of the requirements of Bill 27, the *Local Government (Green Communities) Status Amendment Act*, which have been incorporated into the *Local Government Act*, the creation of greenhouse gas emissions reduction targets is consistent with many of the policies contained in the Official Community Plan. Throughout the Plan there are policies related to containing growth within the Urban Area Boundary, protecting agricultural land, providing a multi-modal transportation network, and protecting natural resources, including trees which remove CO₂ from the environment and also produce oxygen.

Examples of policies in support of emissions reduction in other Sections of the Official Community Plan, include the following:

- Policy 2-2 in the Growth Management Section;
- Policy 5-22 in Natural Features;
- Policy 7-10 in Transportation;
- Policy 6-8 in Agricultural Opportunities; and there are many others throughout this document.

Information on Global Great Weather Disasters compiled over the last 50 years indicates an increase in incidents as well as increased economic losses as a result.

Year	# disasters	* \$ billion lost
1950-59	13	39.8
1960-69	16	52.3
1970-79	29	76.7
1980-89	44	121.8
1990-99	72	410.0

Source: NatCanSERVICE Munich Re, R&D/Geo - February 2001

* Monetary values based on U.S. dollars for the year 2000.

POLICIES

5 - 43 The District of Maple Ridge will use an integrated approach to reduce and mitigate the effects of climate change through the following:

- a) including climate change considerations and outlining proactive suggestions in community information publications;
- b) supporting ongoing federal, provincial and regional initiatives to reduce the production of greenhouse gas emissions;
- c) making low impact purchasing decisions in operations and facilities design;

- d) encouraging where possible water conservation and the reuse of storm water through a number of measures including the use of drought tolerant species, rain barrels, and efficient irrigation techniques;
- e) retaining natural vegetation and planting trees where appropriate;
- f) integrating risk mitigation measures in development permit areas, area planning, special area development policies (such as the Fraser River Escarpment) and environmental planning policies that address problems associated with forest fires, pest infestations, land slides, and flooding;
- g) encouraging low impact development measures where possible.

5 – 44 The District of Maple Ridge will explore undertaking a Community Energy and Emissions Plan that will help the municipality identify indicators to help track community energy emissions and to also provide recommendations on opportunities for reducing community emissions and achieving reduction targets.

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5 – 45 The City of Maple Ridge has a goal to reduce community greenhouse gas emissions to net zero by 2050 from 2010 levels, with an interim target of 45% reduction by 2030, in alignment with the Intergovernmental Panel on Climate Change.

Possible Effects of Climate Change

Between 1895 and 1995, BC's average annual temperature increased by:

- 0.6 degrees Celsius (C) at the coast,
- 1.1 degrees C in the interior,
- 1.7 degrees C in the north.

As a consequence, the following has been observed:

- Lakes and rivers free of ice earlier in the spring,
- At least two southern B.C glaciers have retreated by more than a kilometre each.
- Larger share of Fraser River discharges of total annual flow sooner in the year.
- Average sea levels have risen by 4 to 12 cm.
- Increased high water sea levels in the Vancouver area
- Average coastal sea surface temperatures are 0.9 degrees C to 1.8 degrees C higher.

Source: British Columbia Ministry of Water, Land and Air Protection.

