LAKESHORE GUIDELINES 2004

REGIONAL DISTRICT of Fraser-Fort George

Development Services Department

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DEFINITIONS

Deleterious Substance means anything that degrades the quality of the aquatic environment and is rendered harmful to fish or *fish habitat*. Examples of deleterious substances may be sediment, fertilizers, pesticides and creosote.

Development means affecting a change in the use of land or in the nature of the use of land by means of the subdivision of land, the installation of works and services, the building and placement of structures on land, the alteration of the land surface, or the clearing of vegetation.

Eutrophication is the increase in the rate of organic matter to an aquatic ecosystem. Symptoms of advanced eutrophication may include increased growth and proliferation of aquatic plants and algae, and the possibility of fish kills. Although, *eutrophication* is a natural process it can be greatly accelerated resulting from human activities, such as land clearing and poorly designed and maintained septic systems all within a *watershed.*

Fish Habitat* means spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes.

Littoral Zone extends from the dry land water edge to the depth at which sunlight no longer penetrates to the bottom of the water. It is usually evident as the maximum extent of lakeshore aquatic vegetation. This area can contain up to ninety percent of a lakes productivity, including vital habitat for both juvenile and adult fish.

Natural Boundary means the visible high water mark of any *waterbody* where the presence and action of the water are so common and so long continued in all ordinary years as to mark upon the soil of the bed of the *waterbody* a character distinct from that of the banks thereof, in respect to vegetation, as well as in respect of the nature of the soil itself.

Phosphorous is a naturally occurring mineral component of soil. It is also found in many dish and laundry soaps, fertilizers and animal waste including human waste. Throughout this region phosphorous is generally the limiting agent for primary productivity in freshwater lake systems. Relatively speaking, all other requirements for plant and algal growth (e.g. carbon, nitrogen, light, etc) are available in abundance. So an increase in phosphorous to a system often will result in an increase in plant and algal growth or *eutrophication*.

Riparian Area is the zone adjacent to a *waterbody* that is unique from the upland as a result of the water influence on the soils and the zones influence on the *waterbody*. It is often identifiable by different vegetation types than in either the *waterbody* or the adjacent upland. Vegetation within this zone prevents soil erosion, reduces runoff, shades and cools shallow water, and provides food and shelter for fish and wildlife.

Riparian Vegetation includes plant and tree species that are associated within the *riparian area*.

Tributary is a stream flowing into a larger stream or any larger *waterbody*.

Waterbody includes lakes, rivers, streams and *wetlands*.

Watershed may also be referred to as a drainage area, catchment area or a basin. It is an area of land bounded by topographic features and elevation, draining into any point in a *waterbody*. It is usually identified and measured using maps or aerial photographs.

Wetlands are areas of land that are saturated or flooded for at least a portion of the year. They include, but are not limited to, marshes, bogs and swamps. The vegetation found within wetlands is associated with aquatic habitats and generally they have a shallow mean depth.

* Definition adopted from the *Federal Fisheries Act*.

Figure #1: The Fraser River

LAKESHORE GUIDELINES

INTRODUCTION

In 1978, the Regional District of Fraser-Fort George adopted a set of guidelines for *development* along lakeshores, called the Lakeshore Guidelines. These Guidelines provide direction and guidance to those developing land adjacent to lakes and other *waterbodies*, to the Regional District for assessing *development* proposals, and to other government agencies. Since 1978, the Lakeshore Guidelines document has been revised in 1980 and again in 1994. This document is a revision to the 1994 Lakeshore Guidelines.

These guidelines have two purposes:

1) Direct lakeshore *development* appropriately;
2) Provide information.

Both of these purposes are intended to help protect lake and lake resources from overuse and loss of desirable characteristics.

This document maintains the approach of the 1994 Lakeshore Guidelines with respect to classifying lakes in order to determine the maximum percentage of recommended shoreline subdivision. The lake classification system has been modified slightly as the number of lake categories has been reduced to four from six. In addition, the methods and criteria for classifying each lake have been modified (see Appendix 1 for more details). The four lake categories are **Development, Limited Development, Natural Environment,** and **Special Case.** Lakes for which limited data exist are classified as **Natural Environment** at this time but may be reclassified as more information becomes available.

Goals and Approach

The overall goals from the 1980 and 1994 Lakeshore Guidelines remain the same today:

- **Sustain Environmental Quality** (i.e. water quality, and the conservation of riparian habitats)
- **Protect Property Owners Interests** (i.e. to use and enjoy their properties)
- **Recognize General Public Needs** (i.e. to access lakes for recreation and other purposes)

Trade-offs amongst the above goals are inevitable. However, there will always be a need to have public discussion about balancing environmental protection while incorporating the interest of the general public and the individual property owners.

To achieve the goals, the following approach has been utilized:

- **General Guidelines**. These guidelines apply to all *waterbodies* within the Regional District so that landowners, developers and users of our water resources may be helped and directed to minimize the associated negative impacts that can result from *development* and other uses.

- **Lake Classification**. Lakes are classified according to their perceived sensitivity to development (see Appendix 2). The classification system identifies which lakes are most suitable for subdivision, which are already at maximum subdivision, which lakes should be retained for their natural environment or wilderness qualities, and which lakes have other special qualities that should be taken into account when making consequential decisions.

- **Classification Guidelines**. For each lake classification, a set of guidelines has been developed to direct the use of the lakeshore lands (see Table #1: Summary of Lake Classification Requirements in Appendix 1). These guidelines include maximum allowable percentage of shoreline development, minimum lot size and building setbacks.

Steps for Development and Subdivision

Before beginning our discussion of general development guidelines, we would like to introduce this section. These five steps are aimed at those users who wish to quickly understand the steps involved in subdivision and *development* without necessarily reviewing the general guidelines or the details of the lake classification system.

Step 1:

- If you are only concerned with *developing* an existing lot, not subdivision, proceed to Step 4.

Otherwise for people interested in subdivision:

- Locate the lake(s) in which you have an interest in the Lake Classification Index (Appendix 2).

- If the lake is classified, proceed to *Step 2.*

- If the lake is unclassified, proceed to *Step 3.*

Step 2:

- The classification will tell you the setback requirements and the maximum amount of shoreline development allowed (a concern if you are creating a new lot through subdivision of land). See "Summary of Lake Classification and Requirements".

- Check with Regional District staff to verify that the classification is current and for the amount of shoreline development existing on the lake. This will tell you if the lake is already at a maximum shoreline development and no new lakeshore lots are permitted or if the lake can handle more subdivision.

- Go to *Step 4*.

Step 3:

- Confirm with the Regional District that the lake is still unclassified
- If the lake is still unclassified notify the Regional District that you intend to seek classification.
- The Regional District will seek assistance from Federal and Provincial agencies in its efforts to classify the lake.
- Once a classification has been given, review the sections relevant to that classification and proceed to *Step 2*.

Step 4:

- Check Regional District Zoning Bylaws, Official Community Plans, Agricultural Land Reserve status, and any other special planning policies that may affect the land in which you have an interest.
- Submit application(s) for Development Permit, Building Permit, and Sewage Permit as necessary to the Regional District of Fraser-Fort George.
- Proceed to *Step 5.*

Step 5:

- Check with Fisheries and Oceans Canada, the Ministry of Water, Land and Air Protection and Land and Water BC on whether they require notification of works or permits.
- Once permits are in place, follow these Lakeshore Guidelines for developing your lot.

HUMAN IMPACTS

Lakes, wetlands and rivers provide a variety of social, economic and environmental benefits. Participation in recreation associated with these *waterbodies* contributes to the physical and mental well-being of people. *Waterbodies* provide drinking water for some and industrial or commercial use for others. They support a wide diversity of wildlife from amphibians to waterfowl to large mammals like moose. Significant economic benefits are derived from the recreation-tourism industry, which includes sport fishing and hunting, boating, bird watching and other recreational activities. Many *waterbodies* also have significant values as heritage and native cultural sites. It is these benefits and values that attract people to water and it is this attraction that can also result in its deterioration.

Over time lakes gradually change from open bodies of water to wetlands. In turn, the wetlands eventually fill in and become dry land (terrestrial) ecosystems. This "aging" process is a result of *eutrophication*. Although *eutrophication* is a natural process, the rate at which it occurs can be greatly increased by human activity.

Development anywhere within a watershed has the potential to impact a *waterbody* through physical, biological or chemical alterations. For example, water quality can be negatively affected by many things including:

- Fertilizer and pesticide applications that leach into a *waterbody*;
- Onsite sewage systems leaching into a *waterbody*,
- Land clearing including road construction, mining and forestry activities introducing sedimentation into a *waterbody*;
- Agricultural activities such as manure storage leaching into a *waterbody*;
- Shoreline hardening such as retaining walls and rip-rap.

This document is concerned with the site-specific impacts as well as with the cumulative impact of *development* over time.

RIPARIAN AREAS AND VEGETATION

Riparian areas are formed as the result of water, soil and vegetation interactions along the edge of a *waterbody* that creates an area unique from the adjacent upland. These unique areas provide homes for and are depended upon by a variety of species. Almost two-thirds of Canada's rare and endangered species rely on *riparian areas* for at least part of their life cycle. Benefits of *riparian areas* for lakes and/or streams includes the following:

- Aging vegetation falls into the *waterbody* thus creating valuable habitat for fish, amphibians and other wildlife;
- *Riparian vegetation* stabilizes the banks protecting them from erosion and provides flood control by slowing water velocities;
- *Riparian vegetation* takes up nutrients and filters out sediments improving and maintaining water quality;
- Insects fall into the water from the overhanging vegetation providing a valuable food source for fish;
- *Riparian vegetation* provides shade keeping the water cool for fish and fish prey;

- Annual flooding of riparian areas allows accumulated litter amongst foreshore to be mobilized and distributed within the aquatic system providing a source of energy that eventually works its way up the food chain.

A healthy *riparian area* contains a variety and abundance of plants and animals. It is a mixture of shrubs, trees, and other lush vegetation. The vegetation is structurally diverse containing both high and low vegetation.

For all lakes and *wetlands* a minimum of 15 m (horizontal distance) of *riparian area*, measured from the *natural boundary*, should remain in its natural state. Depending on topography this *riparian area* may be extended. A limited amount of thinning of trees and vegetation is permissible to provide a view of the *waterbody* or provide access by a maximum 3 m wide trail to the water, preferably not in a straight line.

If a lawn is already in place on your lot, allow the growth of natural shrubs and vegetation along the lakeshore by not cutting the lawn down to the water's edge. Planting native shrubs and trees such as aspen, black cottonwood, red-osier dogwood and willows will help re-establish the *riparian area*. This not only will reduce the time spent maintaining your yard and provide some shoreline erosion protection but it will also create some fish and wildlife habitat. Cutting the lawn less frequently and at a higher blade setting allows more moisture to be absorbed and held in the soils therefore the lawn will require less watering and it will reduce the runoff.

AQUATIC PLANTS

The Prince George area contains a variety of aquatic plants (commonly referred to as weeds) that play a vital role in the health of the many aquatic systems. They provide shelter and food for a variety of organisms including fish and waterfowl. These plants can also provide erosion protection by stabilizing the shore zone as they act as a natural wave break reducing the waves energy. When working near or in the water avoid disturbing aquatic plants except where necessary to complete the work. Remember to get approvals from the appropriate agencies before working near the water (see the section on “Jurisdictions and Requirements for Water and Fish Protection”).

Aquatic plants, like all plants, obtain nutrients from their surrounding's. This can be from the surrounding water, the bottom sediments or a combination of the two. If you have noticed an increase in plant abundance and growth over the past few year's it could be the result of an introduction of a new species to the area and/or an increase in available nutrients to the plant.

There are many cases where people have caused the introduction of a new (or exotic) aquatic plant to a *waterbody*. These introductions have resulted in a significant negative impact to the aquatic environment. Never dispose of aquarium plants in a *waterbody* as it can lead to the introduction of exotic species. Also, remember to remove all aquatic plants from boating, fishing and other equipment when leaving or moving between *waterbodies*. This particularly applies to the boat, motor and trailer.

STREAMS

Streams play an important role in a healthy aquatic environment. Many streams provide cool, clean, oxygenated water to lakes and other *waterbodies*. Streams may also provide critical spawning, rearing and over-wintering habitats to fishes such as rainbow trout, sockeye salmon and chinook salmon.

It is recommended that a minimum 30 metre *riparian* buffer or leave strip measured from top of bank be provided for all streams, where the vegetation is left undisturbed.

Fish Wizard, a joint provincial and federal web page, has information on fish presence for many streams and lakes throughout British Columbia: **http://pisces.env.gov.bc.ca/index.asp**.

Figure #2: Healthy Streamside Riparian Vegetation

WETLANDS

Wetlands provide important and critical habitat features for many species of birds, mammals, fish and amphibians. Many of our lakes have extensive *wetlands* associated with their shores. These w*etlands* act as giant sponges as they filter suspended sediments and absorb nutrients that protect water quality throughout the *watershed.* They also regulate water flows to reduce flooding, and recharge groundwater supplies.

The Lakeshore Guidelines are also aimed at protecting *wetland* ecosystems. The activities of those who live on or near *wetlands* are crucial to help protect these biologically rich areas. *Wetlands* play an essential role in protecting biological diversity by sustaining and providing key habitat for a diverse group of fauna and flora throughout the region. They are home to approximately one-third of the wildlife species that have been identified as endangered, threatened or rare in Canada. Unfortunately, *wetlands* are disappearing at an alarming rate not only in Canada but also on a worldwide basis, even though efforts to preserve *wetlands* have increased in the past few decades. Canada has about one-quarter of the world's wetlands; thus, efforts in this country are particularly important.

Wetlands are biologically productive areas and are inherently rich in biting insects. For information on building your own nest boxes or bat houses to provide homes for wildlife that may help control biting insects contact the following web page: **http://www.ducks.ca/nestboxes/index.html.**

DEVELOPMENT ON LAKES

Most lakes within the Regional District of Fraser-Fort George have a lakeshore Development Permit Area requiring a permit before any *development* or alteration of the land, including the clearing of vegetation, begins. Applications to the Regional District go through an environmental review with respect to various regulations, policies and guidelines, particularly these Lakeshore Guidelines.

A site inspection is conducted of the proposed development. Upon issuance, the Development Permit is then registered on the title of the parcel at the Land Titles Office.

Development Permit Applications require the following:

- Site plan showing the location of proposed *development* and/or existing buildings, structures and utilities;
- Field data (description of topography, wildlife and plant species);
- Landscaping scheme that protects the riparian zone and minimizes runoff into the *waterbody*, during and after construction.

For more information on these requirements, contact the Regional District.

Buildings and Lakeshore Setbacks

Landowners and developers are encouraged to place buildings and structures as far from the lake as possible. It is recommended that buildings be setback a minimum of 20 m (horizontal distance) from the high water mark, or as set out by the Ministry of Water, Land and Air Protection flood proofing requirements, if greater than 20 m. This setback will help protect the 15 m *riparian area* while still allowing some *development* or clearing in front of the building.

To protect the aesthetics of the *waterbody* and surrounding area the sitting of buildings should be undertaken to be as inconspicuous as possible when viewed from the lake, taking into account such factors as site topography, vegetation removal or thinning required. This can be achieved by using earth tone colours, such as browns and greens. To protect the vegetation in front of the buildings and still allow a view of the lake, trim the tree branches and/or top the shrubs without completely removing the vegetation.

Docks

There are many different types of docks ranging from suspension docks to floating docks. Generally, floating docks are preferred because they are simple and economical to build. They are also adaptable to fluctuating water levels and because they are floating the impact to the aquatic environments are reduced. In some cases, floating docks can be removed in the fall and

replaced in the spring ensuring the ice does not damage them. Use Styrofoam or washed plastic barrel floats labelled with the owner's name and phone number. Do not use metal barrels as they can rust and become unwanted debris in the lake.

Docks can vary from a rectangle to a "U" shape depending on requirements, budget, and specific shoreline. In addition, the lower and wider a floating dock is the more stable it is. For example, adding another piece of dock to create a T-shape or L-shape increases the docks stability. Generally, the minimum recommended width for a dock is 1 meter (3 feet). This allows people to safely pass each other.

Natural wood products, for example cedar, are the preferred choice for use in or around aquatic environments. Pressure treated material should not be used in the water. Natural woods or plastics can be used as alternatives to treated woods. For more information, see the Treated Woods section below.

Small floating docks with the ability to be removed during the winter may not require a foreshore lease. Contact Land and Water BC for information on foreshore leases and the Canadian Coast Guard for information on the Navigable Waters Protection Act before placing any structure in the water, including a dock.

Treated Woods

Treated woods should not be used in the water; natural woods such as cedar or plastic should be used as alternatives. Oil-born preservatives such as creosote or pentachlorophenol should not be used in or around the water. Oil-borne preservatives can leach into the *waterbody* negatively impacting the water quality and any organism that depends on water including humans.

The sawdust from cutting treated wood is toxic and should be kept away from all *waterbodies.* If treated wood is to be used around water, but not in it, use water-borne preservatives such as ACA (ammoniacal copper arsenate) or ACZA (ammoniacal copper zinc arsenate). In most cases, this treated wood is only available by special order from lumberyards. It is important to note that non-pressure treated wood (painted on) is more likely to leach into the environment and should not be used in or near water. Treated woodcuttings and sawdust are toxic and should be kept away from the water. If you are treating cut ends do not treat them over or near the water.

Boathouses

Boathouses require approval from Land and Water BC if they are located off private property, i.e., over water, and they require a building permit from the Regional District of Fraser-Fort George. Boathouses should be "earthy" in colour and blend in with the natural environment as much as possible to protect the aesthetics of the *waterbody* and surrounding area. Boathouses are not appropriate areas to store fuel because of the proximity to the water. See the section on Fuel Storage for more information.

Community Boat Launches and Beaches

The health of a *waterbody* can be significantly impacted by individual boat launches and beaches. Utilizing community boat launches and beaches allowing private shorelines to remain

in a natural vegetative state will provide a greater r*iparian* area for the lake thus protecting the health of the *waterbody*.

Do not add material to your shoreline, i.e. sand, to create a beach. Introduced material, such as sand, will generally not stay in place due to wind and wave action and will end up eroding away possibly releasing nutrients into the water. These nutrients may promote algal growth, providing rooting opportunities for aquatic plants, and cover fish spawning habitat.

Swimming platforms can be an alternative to a beach. Remember to contact Land and Water BC for information on foreshore leases and the Canadian Coast Guard for information on the Navigable Waters Protection Act.

Roads

Roads can be a major source of sedimentation to a *waterbody* as they can directly accelerate erosion processes and modify natural drainage networks (Furniss *et al*. 1994). As a result, of the environmental impacts, roads should not be located parallel to streams. It is recommended a minimum of 100 m (330 ft) to 200 m (660 ft) road setback from the *natural boundary* of a lake depending on minimum lot depths as determined by soil suitability for sewage disposal. This setback will allow for the creation of future lots between the road and the *waterbody* without a lot being divided or restricted by a road right-of-way and will also help protect the *waterbody* from such things as winter salting and sanding.

Lawn and Garden Chemicals

Absolutely do not spray or apply chemicals and/or fertilizers to shoreline vegetation within the 15 m *riparian area*, and preferably nowhere on your lakeshore property. Fertilizers and other chemicals can leach into a *waterbody* impacting the water quality. Insect and weed killers can be toxic to people, wildlife and fish. Noxious weeds such as Canada Thistle, can be manually cut or pulled when near a *waterbody*. Make sure to follow disposal instructions on the containers carefully.

Garbage

Litter in or near a *waterbody* may be toxic or dangerous to the fish, wildlife and people. Throwing unwanted articles in or around *waterbodies* also spoils the aesthetics of the area. Please properly dispose of all your garbage and any other garbage that you find.

Domestic Pets

Domestic pets can have a major impact upon wildlife. Cats and dogs can be particularly significant in reducing populations of songbirds, waterfowl and small mammals in riparian areas. When near a *waterbody*, pet owners should keep their pets under control to prevent them from harassing fish or wildlife. It is illegal under the British Columbia Wildlife Act for domestic animals to harass wildlife. In addition, animal waste should be removed and prevented from entering a *waterbody* as it contains disease causing organisms and can contribute to the nutrient loading in a *waterbody*, potentially degrading the water quality.

Bare Soils

To reduce sedimentation limit the amount of bare ground on the property and retain natural drainage patterns where possible. Seed or replant vegetation in disturbed areas with native plant species before the end of the growing season. Restoration seed mixes can be obtained from local nurseries and provide an effective method or restoring a disturbed site. Cover temporary fills or dirt piles with polyethylene sheets or tarps. This combined with the use of a silt fence will prevent sediments from entering a *waterbody*. Cover seeded bare soils with straw (minimum of 5 cm) or stapled coconut or straw matting to minimize erosion until vegetation is established. The straw should be held in place by crimping or punching into the soil with a blunt shovel and/or combined with netting or a mixture of wood fibre mulch and tackifier.

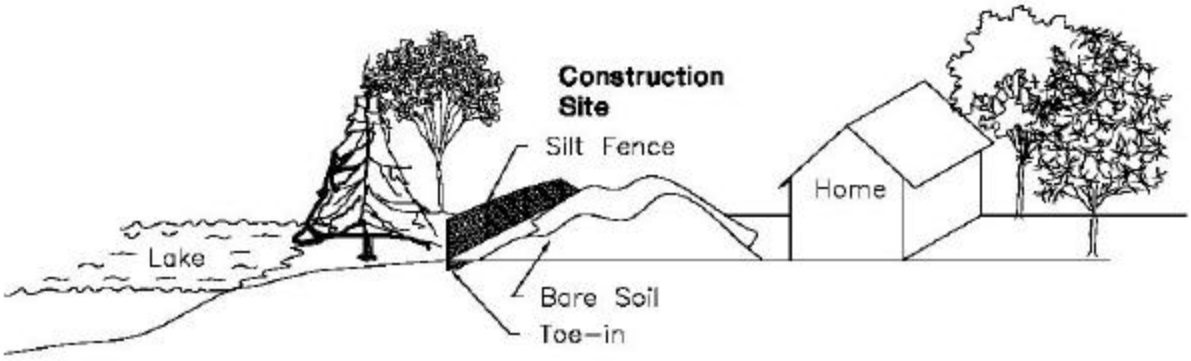
Minimize the flow of water over bare areas by diverting runoff away from development areas using cross or interceptor ditches. The runoff should be diverted into thick vegetation and/or rip-rap to reduce flows. This will filter and reduce suspended sediments prior to entering a *waterbody*.

Sediment Control Structures

Silt fences and related structures provide an effective, short-term filter for sediment-laden runoff from eroded slopes and surfaces. The fine openings in the fabric allow water to pass through but do not allow the passage of coarser suspended sediment. This allows the isolation of the work and contains the sedimentation to a confined area.

Silt fences only work for low energy overland water movement, not stream flow. The filter fabric should be backed by a wire fence and supported by posts not more than 2 meters apart or have the posts not more than 1 meter apart without a wire fence (Canada and British Columbia, 1993). The fabric should also be toed-in to prevent water and sediments from moving underneath the fabric.

Figure #3: A Silt Fence in Use During Construction.



Larger developments or developments with the potential of large amounts of sediments entering a *waterbody* require a professional to design the sedimentation controls and restoration activities. This could include the use of straw bales and matting, silt fences, sediment ponds, drain rock, restoration seed mix, etc…

Sediment and erosion controls must be inspected and maintained on a regular basis for them to perform as intended. Stockpile the required erosion/sediment control materials such as filter cloth, seed, drain rock, staking and polyethylene, so they can be used in any adjustments or repairs that are periodically required.

Topography

Avoid construction areas that have a greater potential for erosion. Work to maximize the distance between a *waterbody* and the construction site retaining as much vegetation as possible. This not only enhances the aesthetics of the property through the retention of natural vegetation but it also protects soil loss through erosion. Steep slopes, small streams, intermittent drainages and gullies should be avoided during construction.

Scheduling Development and the Risk of Erosion

Plan construction during drier periods, avoiding periods of heavy rainfall or rapid snowmelt. Restricting equipment access across wet areas or steep slopes will help to protect the soils from erosion. When working on shorelines (*riparian areas*) limit work to only handwork, avoiding the use of heavy machines, to reduce the impact to the *riparian vegetation*.

Subdivision

Subdivisions should be located in areas that can accommodate them with minimal impact to *waterbody* and associated *riparian areas* by avoiding or protecting the following:

- Steep slopes;
- Poorly drained areas or areas subject to periodic flooding;
- Areas with muddy shorelines, or extensive rooted aquatic vegetation;
- Areas with soils unsuitable for nutrient removal;
- Sensitive ecological areas such as waterfowl breeding or staging areas, fish spawning or rearing habitats etc…

Additional points to consider:

- Lots should be grouped in a compact design;
- Maximum amount of natural foreshore and habitat should be retained for habitat conservation;
- No subdivisions will be approved unless the proper sewage set backs can be met for soil conditions;
- Community sewage collection and treatment systems may be an effective alternative to on site systems. Depending on soils, topography etc… community systems may enable subdivision clustering and remote treatment and disposal of domestic sewage.

AGRICULTURE

Development of land for agricultural purposes is to be done in a manner that minimizes the potential negative impact on a *waterbody*. The clearing of land for agricultural purposes or the agricultural use of the land is to meet or exceed the Provincial and/or Federal Legislation and Guidelines for agricultural uses next to *waterbodies.*

BOATING

Motorized boats can have a number of negative impacts on a *waterbody*. These include oil and fuel leaks, spread of aquatic plants, dumping of litter, churning up of bottom sediments and shoreline erosion due to wave action. It is up to each boat operator to be aware of these impacts and act accordingly. To prevent these negative impacts, remember to:

- Fill fuel containers on shore if possible and clean up all leaks and spills with bilge pads;
- Keep engines maintained regularly;
- Remove all vegetation from boat, trailer and other equipment when leaving a waterbody;
- Never throw unwanted articles into the water, including waste fishing line;
- Reduce your speed when boating in shallow areas and along shorelines;
- Avoid waterfowl breeding or staging areas as boating activities can reduce their success;
- If buying a new boat motor, four-stoke motors generally are quieter, have better fuel economy and have lower emissions therefore making them more environmentally friendly.

The Regional District of Fraser-Fort George has adopted a Bylaw (Bylaw No. 846) that prohibits above water exhaust systems or exhaust systems without a muffler designed to restrict exhaust noise for "power boats" on the following *waterbodies*:

1) Ness Lake
2) Chief Lake
3) Nukko Lake
4) Bednesti Lake
5) Berman Lake
6) West Lake
7) Tabor Lake
8) Purden Lake
9) Eaglet Lake
10) Summit Lake

Recently the Federal Government implemented a number of boating regulations. For example, all operators of craft under 4 m in length, including personal water craft must have proof of

competency by taking an accredited boating safety course. Federal regulations also state a number of safety items required on board at all times for different lengths and types of watercraft. For further information pick up a free copy of the **Safe Boating Guide** from Fisheries and Oceans Canada or visit: **http://www.ccg-gcc.gc.ca/main_e.htm**

Fuel Storage

Care must be taken with respect to the storage and handling of fuels adjacent to a *waterbody*. Adequate precautions must be taken for their containment, particularly in the event of a spill. Above ground stationary fuel tanks must be surrounded by berms capable of containing 110% of the full tanks capacity. Both ends of delivery hoses must be valved. If possible, fill all tanks at least 15 meters from the waters edge to ensure gas does not enter the water.

SHORELINES AND EROSION

Land *development* activities, such as clearing land and grading slopes can lead to soil erosion. The erosion process removes soils from the *development* site and deposits it as sedimentation in lakes, *wetlands*, and rivers. This increase in sedimentation can have a number of negative impacts to the aquatic environment. Increases in sedimentation can create rooting opportunities for aquatic plants and smother fish habitat, eggs and prey.

Natural shorelines erode at a variety of rates depending on soil type and structure, slope, vegetation and root structure, prevailing wave action, etc. In many cases, erosion is greatly increased because of vegetation clearing along the shoreline. One simple method of restoring your shoreline is the planting of natural vegetation. This not only helps to protect your shoreline from erosion but it provides valuable fish and wildlife habitat. Your local garden centre should have a variety of native plants available for you to plant along your foreshore. Landowners can also use cuttings or plantings from plants on their property to establish native *riparian vegetation*. Be sure to avoid using exotic or foreign species such as purple loosestrife.

Before starting any land *development* activities near a waterbody, contact Fisheries and Oceans Canada, and/or the Ministry of Water, Land and Air Protection and/or the Regional District of Fraser-Fort George for regulations and more detailed advice.

For more information on erosion control, reference the **Land Development Guidelines for the Protection of Aquatic Habitat**, published by the Fisheries and Oceans Canada and the Ministry of Water, Land and Air Protection.

Vegetation Planting

To slow or prevent erosion of your shoreline vegetation planting is the most preferred ecological option. A steep bank may have to be re-contoured and planted with native plants to prevent foreshore loss. Your local garden centre can help you with which native plant species will work best in your situation or you can transplant vegetation from other locations on your property. Information on streamside planting is available from the streams-keepers website at **http://www.pskf.ca/publications/handbook.html**.

Figure #4: A Good Riparian Buffer between the Development and the Lake.

Breakwater Devices

Breakwater devices deflect or absorb the wave's energy before the wave hits the shoreline. Aquatic plants are the preferred breakwater devices. Cattails, sedges, and rushes that grow in the *littoral zone* create excellent natural breakwaters and are preferred over rock, concrete, metal, etc., that lack the aesthetic value or the ability to absorb nutrients or filter sediments. These aquatic plants provide excellent fish and wildlife habitat while protecting your shoreline by reducing the wave energy before it reaches the shore.

If anchoring any structure, such as a log, it is preferable to use chain rather than rope or cable as chain will not float away and become a navigational problem or hazard to boaters or swimmers. Before doing any work that has the potential to affect the public's right of navigation and safety, it must be referred to Coast Guard - Navigable Waters Protection Division.

Retaining walls

The "hardening" of shorelines through retaining walls or the use of rip-rap (rocks) is generally discouraged, but in some cases, may be required to protect private property from erosion. Construction debris, road-paving material, tires, car bodies or other metals are all unacceptable hardening material.

Rip-rap (rock) may be used in areas where the erosion process is happening too quickly for vegetation to establish. The rocks can slow the erosion process allowing the natural vegetation to re-establish. Incorporating the planting of native vegetation between the rocks can help mitigate the loss of fish habitat and speed up the re-vegetation process. The vegetation will also help hold the soils behind the rock therefore helping the rip-rap stay in place.

All vertical retaining walls should be set back a minimum 2 meters from the *natural boundary* of the water and be located on private land. This setback will prevent the transferring of wave energy to unprotected areas and reduce the chance of wall failure resulting from frost, ice and wave action undermining the wall. Vegetation should be allowed to grow in front of the wall and overhanging vegetation from above will help protect water quality and the natural aesthetics

of the lake. The 15 meters of *riparian vegetation* still needs to be protected and re-established if disturbed during construction. See the section on Riparian Areas and Vegetation for more details.

The materials used for the retaining wall should be natural looking and blend into the surrounding area, i.e., non-treated wood. The use of smooth, white concrete is not an acceptable material for a retaining wall along the lakeshore based on preserving the natural aesthetics of a *waterbody*. It is important to note that freshly poured concrete can leach into the water, a violation of the Federal Fisheries Act. If concrete is necessary near the shoreline use pre-pored and cured concrete that is coloured and textured. Remember any shoreline work must be isolated from the water and clean up after the work is completed is required. See the Treated Woods section for more information.

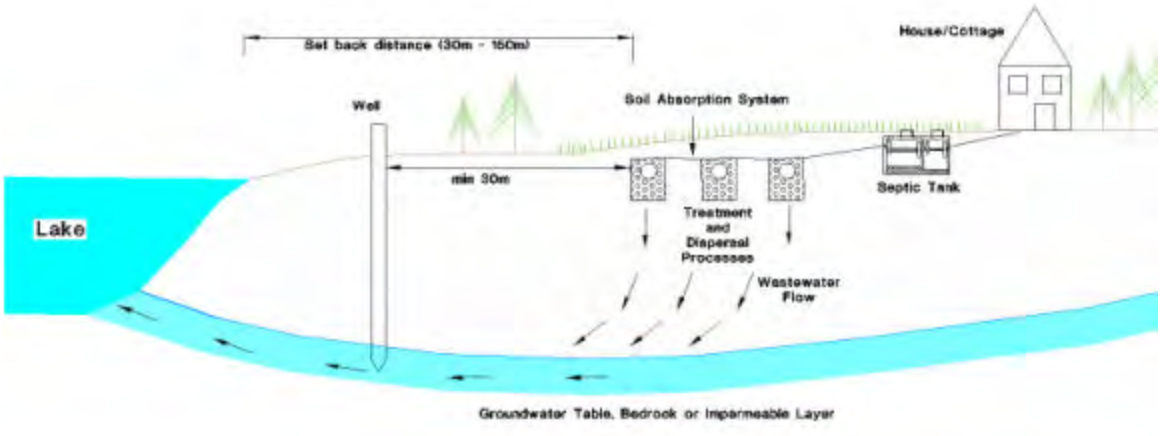
ONSITE WASTEWATER TREATMENT SYSTEMS

Wastewater Treatment and Dispersal Processes

In lakeshore communities, onsite wastewater systems provide an effective and economical method for treating domestic wastewater. Domestic wastewater produced by homes and cottages contains large quantities of organic and inorganic pollutants including disease-causing micro organisms (bacteria, viruses, protozoa) and nutrients (phosphorus, nitrogen). To ensure effective removal of these pollutants, onsite systems must be properly sited, designed, operated and maintained.

Although a wide variety of system designs and technologies are available, most onsite systems utilize two fundamental components, a septic tank and a soil absorption system (Figure #5). The septic tank functions to remove and retain solids as well as to partially digest some of the wastewater pollutants. The partially treated septic tank effluent is then applied to a soil absorption system where the majority of treatment takes place. As septic tank effluent flows into and through the soil, pollutants are decomposed, transformed and removed through a complex array of physical, chemical and biological processes. The treated effluent is ultimately dispersed into the groundwater environment where it is recycled.

Figure #5: Onsite treatment and dispersal of wastewater in a lakeshore environment



Potential Impacts of Onsite Systems

When onsite systems fail to perform effectively, harmful pollutants such as microorganisms and inorganic nutrients can migrate into groundwater and surface water and seriously threaten human health and water quality. The potential impacts associated with these pollutants include:

- Water contaminated with harmful microorganisms can cause a wide range of serious diseases when used as a source of drinking water or through incidental ingestion/contact during recreational activities. Diseases can include gastroenteritis, typhoid fever, cholera, salmonellosis, cryptosporidiosis, giardiasis and infectious hepatitis.

- Drinking water containing high concentrations of nitrogen in the form of "nitrate" can cause a disease in infants known as "blue baby syndrome" wherein the blood's ability to carry oxygen is significantly reduced.

- The addition of nutrients, especially *phosphorus*, can cause excessive growth of algae and aquatic plants which can lead to nuisance or harmful algal blooms, reduced penetration of sunlight and depletion of dissolved oxygen. These conditions can significantly alter aquatic ecosystems, degrade aquatic habitats and dramatically impair or even destroy the recreational value of lakes.

The greatest risks associated with onsite systems occur when untreated wastewater enters the lake from direct discharge or malfunctioning systems.

SELECTING AN APPROPRIATE ONSITE SYSTEM

The first and most important step in selecting an appropriate onsite system involves performing a detailed evaluation of the site characteristics including: soil type and permeability, depth to groundwater table/restrictive layer (hardpan, bedrock), topography (slope), available area and setback distance to the natural lake boundary (see next section). These characteristics strongly influence the design, performance and service life of onsite systems. Other important considerations include the type of development, homeowner needs, operation/maintenance requirements and cost effectiveness. There are many different types of onsite system options available and depending upon the site conditions encountered can range from simple to complex.

Conventional Systems: Conventional septic tank-soil absorption systems are the most common type of onsite system. Although simple, affordable and easy to maintain, conventional systems can be the least effective in removing wastewater pollutants. For this reason the use of conventional systems is restricted to properties exhibiting ideal site conditions.

Lagoon Systems: Lagoon systems consist of a septic tank and a large earthen excavation (lagoon cell) where treatment is accomplished through the activity of diverse communities of micro and macroorganisms. Wastewater is removed from the lagoon primarily by evaporation and to a limited extent through soil infiltration. Lagoon systems are used in heavy clay soils exhibiting very low permeability and require a minimum parcel size of 4.0 acres (1.6 ha).

Alternative Onsite Systems: The land base in lakeshore areas often consists of difficult site conditions such as rapid or low permeability soils, high groundwater table, shallow restrictive

layers, limited available area, challenging topography and sensitive lakeshore environments. In these areas, alternative systems are needed to enhance wastewater treatment and dispersal processes and ensure adequate protection of human health and water quality. Some of the most common and effective alternative systems include:

- Advanced soil absorption systems consisting of gravel-less trenches and pressure distribution systems. Gravel-less trenches utilize pre-manufactured infiltration chambers that provide up to 40% more surface area than gravel trenches and are considerably easier to install. Pressure distribution systems distribute wastewater uniformly throughout the soil system and substantially enhance biological processes and soil aeration. Trenches can be placed on the ground surface (at-grade) or at shallow depths (30 to 60 cm) where treatment and dispersal processes are optimum. To prevent freezing, shallow soil systems are covered with 30 to 45 cm of loamy soil or other suitable material (note: gravel-less trenches and/or pressure distribution systems can be used in a variety of soil systems).

- Sand mounds consisting of special sand (ASTM C33), gravel-less trenches and pressure distribution systems.

- Package treatment plants such as aeration units, rotating biological contactors and packed bed filters (sand, peat, foam, textile). These treatment systems are used in combination with advanced soil absorption systems.

Pit Privies (Outhouses): Pit privies are used to service seasonal/recreational cabins on properties that do not have running water.

Holding Tanks: Holding tank systems are used to replace malfunctioning onsite systems when no other option is feasible. They cannot be used to service new construction unless a local bylaw is in place and other conditions can be met. Holding tanks collect and store wastewater, which is then pumped and hauled by a septic company to an approved disposal facility. Due to ongoing pumping and hauling requirements, holding tanks systems are often the most expensive alternative over the long-term.

Graywater systems: Domestic wastewater can be segregated into black and graywater sources. Blackwater is the waste discharged from toilets whereas graywater includes all non-toilet sources such as sinks, tubs, showers, dish washers and clothes washers. Graywater accounts for approximately 75% of the wastewater volume discharged from the average home and contains substantial quantities of pollutants, in some cases equivalent to blackwater (e.g., organic materials, phosphorus).

Blackwater can be treated separately using composting, chemical or incineration toilets. Eliminating blackwater from onsite systems can provide a number of benefits including improved system performance, longer service life and greater protection of water quality. Graywater must be treated using an onsite system designed in the same manner as for combined black/graywater systems due to the large wastewater volume and quantity of pollutants. One problem associated with the segregation of blackwater is that mechanical toilets are maintenance

intensive and are frequently removed and replaced with flush toilets. Onsite systems designed for graywater only will fail prematurely when mechanical toilets are replaced with flush toilets.

Setback Distances

The horizontal "setback distance" from onsite systems to the *natural boundary* of the lake plays an important role in system design and performance. Setback distances are determined based on the capacity of the site to effectively remove pollutants, especially nitrogen, phosphorus and microorganisms. These pollutants are usually more difficult to remove than others and can travel untreated over great distances in the subsurface soil and/or groundwater environment. Site conditions that limit removal of these pollutant include 1) rapidly permeable soils (gravel, sands), 2) high groundwater tables and shallow restrictive layers and 3) steeply sloping topography. Increasing the setback distance facilitates greater travel time in the subsurface environment and thereby enhances pollutant removal through increased dilution and more prolonged contact with soil particles. Using alternative onsite systems is another effective mechanism to deal with sites having limited capacity to remove pollutants.

The required setback distances for onsite systems are dependent on the type of system, soil type and permeability, and depth of permeable unsaturated soil above the groundwater table or restrictive layer.

TABLE #1: HORIZONTAL SETBACK DISTANCES FOR ONSITE WASTEWATER SYSTEMS

Type of System	**Horizontal Setback Distance,** *metres (feet)*
Conventional and alternative systems	30 to 150 (100 to 500)
Lagoons	60 minimum (200)
Septic tanks	15 minimum (50)
Pit privies (outhouse)	30 to 60 (100 to 200)
Holding tanks	30 minimum (100)

Operation and Maintenance

Onsite wastewater systems must be properly operated and maintained. If not, they will fail prematurely and threaten human health and water quality. In addition, homeowners' are legally and financially responsible for repairing or replacing malfunctioning systems. Operation and maintenance requirements can vary considerably depending on the type of system and technologies utilized. The following do's and don'ts will improve system performance, increase system longevity and minimize expensive system repairs/replacement.

Do's

- Have the septic tank pumped out by an approved sewage hauler on a regular schedule (i.e., every three to five years). If accumulated solids are not periodically removed they

will carry-over into the soil absorption system and clog the soil pores. This will reduce soil permeability and lead to premature system failure.

- Package treatment plants must be routinely sampled, inspected and maintained to ensure they perform effectively. Sampling of wastewater effluent quality, operation inspections and required maintenance should be performed every three months during the first year of operation and at least every six months thereafter.

- Exercise water conservation: this will reduce the amount of wastewater that must be treated and dispersed by the onsite system. Stagger laundry and dishwasher loads throughout the week; Do not over water the lawn, especially over the soil system; Repair leaking faucets and toilets.

- Perform routine visual inspections of the soil absorption system, septic/pump tanks, pumps, floats, alarms and electrical components. Inspections should be performed every spring and fall to determine if there are any problems.

- Minimize the amount of nutrients (phosphorus and nitrogen) discharged into the system. Use phosphate-free and biodegradable cleaning and personal hygiene products.

- Have pit privies pumped out by an approved sewage hauler when full. Pits should be inspected every spring and fall.

Don'ts

- NEVER pour harmful chemicals or non-biodegradable substances into the system: No paints, varnishes, thinners, solvents, antifreeze, waste oil, herbicides, pesticides, cigarette butts, coffee grounds, tampons, condoms, disposable diapers, etc. Minimize use of toilet bowl cleaners, drain cleaners and disinfectants (e.g., bleach).

- Avoid the use of septic tank additives. Onsite systems rely on natural processes and require no additional materials other than what naturally flows into them to work properly.

- Do not plant anything other than grass over the soil absorption system. The roots from trees and shrubs can break and/or clog pipes.

- Do not install garbage grinders (garburators) as they can increase the solids load to system by 30% to 60%. Food wastes should be composted or put them into the trash.

- Do not situate driveways, parking areas or decks over any portion of the onsite system as this can seriously damage system components and impair operation.

For more detailed information pertaining to onsite wastewater treatment systems contact the Health Services Department at the Regional District of Fraser-Fort George, the Public Health Protection Branch at the Northern Health Authority or the Ministry of Water, Land and Air Protection.

DRINKING WATER

It is recommended that all surface water and shallow wells destined for potable use first be treated by a minimum disinfection and regularly tested. For more information, contact the Northern Health Authority.

JURISDICTIONS FOR WATER AND FISH PROTECTION

The following is a summary of who to contact before you begin any works or *development* near a *waterbody*. This is not a complete list; rather it is a starting point. There may be requirements for the listed governments and other governmental agencies not listed within this document. It is up to the proponent to contact the necessary agencies and follow their requirements.

Fisheries and Oceans Canada:

Fisheries and Oceans Canada should be referred to on any works, within 30 meters measured from top of bank, of a *waterbody* that contain fish that move from salt water to fresh water to reproduce, such as Sockeye Salmon and Steelhead. In addition, any activities that may destroy *fish habitat* should be referred to Fisheries and Oceans Canada as well as the Ministry of Water, Land and Air Protection.

For more information contact the Fisheries and Oceans Canada or reference Fisheries and Oceans Canada publications at: **http://www-heb.pac.dfo-mpo.gc.ca/publications_e.htm**

Ministry of Water Land and Air Protection (MWLAP):

The Provincial Water Act requires written notification to the Ministry of Water, Land and Air Protection a minimum of 45 days before starting a number of activities. A few of the more common notifications are:

- Removing any aquatic plants from a *waterbody;*
- Construction, maintenance or removal of docks, wharves or piers;
- Repair or maintenance of existing dykes and erosion protection works.

Please note that beaver dams and lodges are protected under the Wildlife Act. The removal of beaver dams requires authorization by an official with MWLAP. Dams can only be removed if flooding resulting from the dam is threatening buildings, water supplies or other infrastructure.

For more information contact the Ministry of Water, Land and Air Protection or reference the Provincial Water Act at **http://www.qp.gov.bc.ca/statreg/stat/W/96483_01.htm**

Regional District of Fraser-Fort George:

A Development Permit application is required for any development or alteration of land within a Development Permit Area as outlined by the Official Community Plan for that area. This requirement includes most lakes within the Regional District of Fraser-Fort George. Some examples of activities that require a Development Permit Application include the cutting of vegetation, building construction, the creation of a sewage disposal system, and erosion control works.

For more information, contact the Regional District, Planning Department or visit the website at **http://www.rdffg.bc.ca.**

CONTACT INFORMATION

Boating Safety Info line
1-800 267-6687
http://www.ccg-gcc.gc.ca

Ducks Unlimited Canada
954 A Laval Cres.
Kamloops BC V2C 5P5
Tel: (250) 374-8307
Fax: (250) 374-6287
http://www.ducks.ca

Environment Canada
1846 S Quinn
Prince George BC
(250) 561-6902
http://www.ec.gc.ca/

Fisheries and Oceans Canada
3690 Massey Prince George
(250) 561-5366
Fax: (250) 561-5534
http://www.pac.dfo-mpo.gc.ca/

Reporting of Fisheries and Fish Habitat Violations
Vancouver ….1-800 465-4336

Coast Guard-Navigable Waters Protection Division
Vancouver, BC
(604) 775-8866
Fax: (604) 775-8828
http://www.pacific.ccg-gcc.gc.ca/nwpd-lpen/index_e.htm

Land & Water British Columbia
Suite 455 - 1011 Fourth Avenue
Prince George BC V2L 3H9
Tel: (250) 565-6779
Fax: (250) 565-6941
http://lwbc.bc.ca/

Northern Health Authority
150-1011 Fourth Avenue
Prince George, BC
(250) 565-2150
http://www.northernhealth.ca/

Regional District of Fraser-Fort George
155 George Street
Prince George, BC V2L 1P8
(250) 960-4400 / Fax: (250) 960-4466
1-800-667-1959
http://www.rdffg.bc.ca

Water, Land and Air Protection
1011-4th Avenue
Prince George BC V2L 3H9
(250) 565-6135
http://www.gov.bc.ca/wlap/

APPENDIX 1

REGIONAL DISTRICT LAKE CLASSIFICATION SYSTEM

CLASSIFICATION OF LAKES FOR SUBDIVISION

The lake classification system identifies which lakes are most suitable for new lot creation through the subdivision of land. It identifies which lakes are already at a maximum subdivision, meaning the Guidelines do not support any new lot creations that would increase the amount of shoreline subdivision as calculated in Table #2. The classification system also identifies which lakes should be retained for their natural environment or wilderness qualities, which lakes are too sensitive for subdivision, and which lakes have special qualities which should be taken into account in making consequential decisions.

Lakes within the Regional District are classified into one of four categories, reduced from six classifications in the previous Guidelines. The lakes are classified based on the best available information at the time. The BC Volunteer Lake Monitoring Program is actively gathering valuable information on a number of lakes within the Regional District of Fraser-Fort George. This data includes dissolved oxygen, transparency, chlorophyll-*a*, phosphorus, sediment cores and other variables. Although the following Lake Classification System does not directly address all these variables, the Volunteer Lake Monitoring Program provides important information about a lakes history and the lakes sensitivity to *development*. Therefore, as more information becomes available a lake's classification or the allowed subdivision may change to allow lake specific management plans to be created as more information is gathered.

Many lakes within the Regional District will not meet all the criteria listed for a particular classification. These criteria are meant as a guideline in classifying the lakes and should be used as a management tool, not an absolute value.

The Lakeshore Guidelines will overlap some designations developed by the larger land use planning process such as the Land Resource Management Plan (LRMP). In those cases the guidelines are intended to complement and reinforce the broader perspective managed by the other agencies.

It is important to note that prior to subdivision of a parcel, the soils must have the ability to accommodate an on-site sewage disposal system, as determined by the Regional Health Officer.

A useful web page that will give you shoreline length, mean depth, surface area and fish presence in many lakes and rivers is **Fish Wizard**: **http://pisces.env.gov.bc.ca/index.asp**

Shoreline Complexity

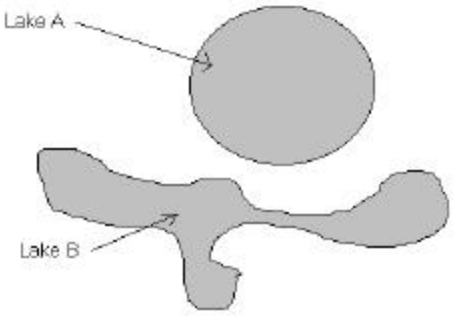
The Shoreline Complexity Index (D_L) addresses the issue that the amount of subdivision supported by the Guidelines is determined by the percentage of potential shoreline subdivision. With the old system, two lakes with the same surface area may not be allowed the same amount

of subdivision. The lake with a longer shoreline length or more complex shoreline will be allowed more subdivisions even through the surface areas are equal between the two lakes.

With the new system, as the shoreline length increases (becomes more complex) the allowed percentage of shoreline subdivision is reduced. This is an important issue because Shoreline Complexity reflects the potential increase of *littoral* associated communities in proportion to the volume of the lake (Wetzel, 1983). These *littoral* associated communities are very important to a lakes productivity and health. Therefore, an increase in the relative *littoral* area in proportion to the volume of the lake indicates an increase in sensitivity to subdivision.

For example, lakes A and B (see figure below) have the same surface area, but Lake B has a much longer shoreline length. Lake A would have a D_L value of "1" and Lake B would have a D_L value of "3+" when using the Shoreline Complexity formula.

Figure #6: Shoreline Complexity



Note: Shoreline Complexity Index (D_L) is the ratio of the length of shoreline (L) to the circumference of a circle having equal area (A) to that of the lake. A value of "1" is a perfect circle compared to a value of "3" that would have a very complex shoreline.

L - meters
ð = 3.1428
A_0 - 1 ha = 10,000m^2

- Islands count in the shoreline length of the lake.
- The associated values with the Shoreline Complexity Index have been developed by the Regional District of Fraser-Fort George's technical committee.

Development Lakes

The purpose of this classification is to identify lakes that can accommodate a variety of uses and subdivision within the watershed without negatively impacting the lake environment. The use and development along the shore zone may include, but not limited to, residential development, agricultural activities, outdoor recreation and commercial-tourism use. Generally, these lakes have existing road access with electricity or potential for electricity within the next five years.

Criteria:

- The surface area of the lake is greater than 100 ha and a mean depth greater than 4.5 meters;

- Mean summer chlorophyll-*a* (gives indication of productivity) is less than 5 mg/m^3 and Secchi Disk (measures transparency) readings greater than 3 meters.

a) If the surface area is greater than 800 ha:

$$D_L = \frac{L}{2\sqrt{\pi A_0}}$$

If D_L = 1-2 50% (Maximum Allowed Subdivision)
2-3 40% (Maximum Allowed Subdivision)

> 3 30% (Maximum Allowed Subdivision)

b) If the surface area is between 100 ha to 800 ha:

If D_L = 1–3 35% (Maximum Allowed Subdivision)
> 3 25% (Maximum Allowed Subdivision)

Limited Development Lakes

These lakes have high aesthetic, recreational, or an ecological importance such as fish or wildlife values that could be negatively impacted by significant development but can handle a limited amount of subdivision. Generally, these lakes have road access (may be seasonal) and no electricity is available.

Criteria:
- The surface area of the lake is greater than 60ha and the mean depth is greater than 4.0 meters;
- Mean summer chlorophyll-*a* is less than 7 mg/m^3 and Secchi Disk readings are greater than 3 meters.

If D_L = 1–3 20% (Maximum Allowed Subdivision)
> 3 10% (Maximum Allowed Subdivision)

Natural Environment Lakes

These lakes are very sensitive to subdivision with the goal of the lake to remain undisturbed and in their natural setting. They may have unique geological/physical features, high recreation, aesthetic or ecological values. These values would undergo an unacceptable degree of deterioration with any significant amount of subdivision. Generally, access is by hiking, horseback, etc… but it may have motorized access. Permanent full-time residences are considered inappropriate for these lakes. Natural Environment lakes are generally located in areas of Crown land, and managed through an interagency approach by provincial and/or federal agencies.

Criteria:
- The surface area of the lake is greater than 60ha and a mean depth of greater than 3m.

If D_L = 1–3 5% (Maximum Allowed Subdivision)
> 3 2% (Maximum Allowed Subdivision)

Special Case Lakes

There are lakes that do not fit into the above Lake Classifications. Generally, subdivision of land or lot creation is not allowed. An interagency and public stakeholder process should review any proposed lot creation(s) and from this process, a proposal should be shown to have no negative impact on the lake and/or surrounding area.

Criteria: They may fall into any one or combination of the following categories:

- Low or decreasing water quality and/or shown negative impacts resulting from past development or land use practices;

- Very slow or no flushing rate;

- High fish/wildlife, recreation, aesthetic values that are particularly sensitive to development;

- Less than 3 meters mean depth;

- High water table in the area surrounding the lake or soils that will not allow for adequate sewage disposal systems;

- History of significant algal blooms and or fish kills;

- Community water storage supply;

- Have overriding heritage, archaeological or First Nations values;

- Conservation Project (i.e. Ducks Unlimited Canada);

- Lake is entirely within a Regional, Provincial or Federal Park.

TABLE #2: SUMMARY OF LAKE CLASSIFICATION REQUIREMENTS

LAKE CLASSIFICATION	**Max. % of Shoreline Subdivision**	**Recommended Min. Lot size**	**Min. Setbacks for sewage disposal**	**Recommended Min. Building setbacks**
Development (D) Greater than 800 ha	D_L = 1-2 50% = 2-3 40% = 3+ 30%	0.4 ha (1 ac)	30-150 m (100- 500 ft)	20 m (65 ft)
Development (D) Between 100 ha and 800 ha	D_L = 1-3 35% = 3+ 25%	0.4 ha (1 ac)	30-150 m (100- 500 ft)	20 m (65 ft)
Limited Development (LD)	D_L = 1-3 20% = 3+ 10%	0.8 ha (2ac)	30-150 m (100- 500 ft)	20 m (65 ft)
Natural Environment (NE)	D_L = 1-3 5% = 3+ 2%	0.8 ha (2ac)	30-150 m (100- 500 ft)	30 m (100 ft)
Special Case	N/A	N/A	N/A	N/A

- Lot size, depth and soil conditions must be sufficient to allow for the setbacks of on-site disposal systems. Minimum setback for sewage disposal systems will be set by the Regional Environmental Health Officer.

- The standard lot width shall be a minimum of 30 m (100 ft) for Development Lakes and 60 m (200 ft) for all other Lake Classifications subject to approval for sewage disposal systems.

- Proposed developments on Special Case lakes require an interagency evaluation that may consist of Federal, Provincial and RDFFG representatives with input from the public and any other potentially impacted stakeholders.

METHOD FOR MEASURING SHORELINE SUBDIVISION

Privately owned land is treated the same whether it is vacant or occupied in calculating the amount of shoreline development. Any subdivision within 50 meters of the shoreline is included in the shoreline subdivision calculation to determine the amount shoreline subdivision.

Table #3: Measuring Shoreline Subdivision

Type of Land	Method of Measuring Shoreline Subdivision
1) Residential or Cottage lots less than 2 ha (5 acres) in size.	Measure the actual lake frontage of each lot, whether occupied or vacant.
2) Private parcels greater than 2 ha (5 acres), but less than 16 ha (40 acres), excluding those uses set out in section (4) below but including agriculture and forestry.	Calculate 90 m (300 ft) for each parcel whether vacant or occupied, or measure the actual shoreline which ever is less.
3) Parcels 16 ha (40 acres) and over.	Calculate 90 m (300 ft) per parcel whether vacant or occupied.
4) Commercial, recreation commercial, industrial, or common area for cluster subdivisions.	Measure the actual frontage of any parcel within 50 meters of the shoreline and count as subdivision.
5) Regional, Provincial, and Federal Parks and camps.	Measure the actual developed shoreline (i.e. beaches).

APPENDIX 2

LAKE CLASSIFICATIONS

The following is a list of lakes within the Regional District of Fraser-Fort George boundary that have a surface area of around 60 ha in size or greater.

TABLE #4: LAKE CLASSIFICATIONS

NE: Natural Environment
SC: Special Case
LD: Limited Development
D: Development
Bold: Lakes at maximum shoreline Subdivision
EA: Electoral Area

Lake	Classification	EA	Comments
Aleza	LD	F	Historical site - Gitskan Portage
Arctic	SC	G	Within Arctic Pacific Lakes Park.
Averil	NE	G	
Azouzetta	LD	G	
Bednesti	**D**	**C**	**Included in noise bylaw; Development at maximum.**
Berg	SC	H	Mount Robson Provincial Park
Berman	SC	C	Included in noise bylaw; Very shallow lake, mean depth 2.6 meters.
Bonnington	NE	G	
Bow	SC	A	Totally within Eskers Provincial Park
Buckhorn	NE	D	Ducks Unlimited - waterfowl potential
Bugle	NE	G	
Burden	NE	G	Remote
Camp	SC	A	Totally within Eskers Provincial Park.
Carp	SC	G	Historical Site; totally within Carp Lake Provincial Park.
Carr	NE		
Chief	**LD**	**A**	**Included in noise bylaw; Development at maximum.**
Circle	LD	A	Partially in Eskers Provincial Park.

Lake	Classification	EA	Comments
Clauminchill	NE	G	Good weather road access
Cranberry Marsh	SC	H	Ducks Unlimited project and wildlife sanctuary
Crescent	NE	A	
Cuddles	NE	H	
Dahl	SC	C	Within Dahl Lake Provincial Park. No Power boats
Darby	NE	A	
Davie	LD	G	
Destilida	NE	G	
Dina #1	NE	G	Engine power restriction - 7.5 Kw (10hp)
Dominion	NE	G	
Eaglet	LD	F	Included in noise bylaw; Ducks Unlimited - waterfowl migration use.
Eena	LD	A	Electric motors only
Firth	NE	G	
Fisher	NE	G	
Flat	NE	A	
Francis	NE	F	
Fyfe	NE	C	
Germaine	NE	G	
Goose	NE	G	Remote
Great Beaver	NE	G	
Grizzly	NE	F	
Gunniza	NE	G	Remote
Hambone	NE	G	
Hammet	NE	G	Remote
Hansard	LD	F	
Hart	SC	G	No power boats; totally within Crooked River Provincial Park.

Lake	Classification	EA	Comments
Heather	NE	G	
Hedrick	NE	F	
Henning	NE	G	
Hoodoo	LD	A	Gravel road access; some existing development
Hourston	NE	G	Remote.
Jake's	NE	G	
Jarvis	NE	F	Alpine lake
Joanne	NE	G	
Kathie	SC	A	Totally within Eskers Provincial Park.
Kay Kay	NE	A	
Kerry	NE	G	
Kinbasket	D	H	B.C. Hydro reservoir
Kinney	SC	H	In Mount Robson Provincial Park.
Knudsen	NE	F	Alpine lake.
Lamb	NE	G	
Lookout	NE	G	Remote
McIntyre	NE	G	
McLeod	LD	G	Historical site: Ft. McLeod. Partially in Whiskers Point Provincial Park.
Merton	LD	G	
Moose	SC	H	Mount Robson Provincial Park
Morfee			Community water supply. Within District of Mackenzie
Mossvale	NE	G	
Murch	LD	A	
Narrow	NE	F	
Ness	**D**	**A**	**Included in noise bylaw Development at maximum.**
Norman	**LD**	**C**	**Development at maximum**

Lake	Classification	EA	Comments
Nukko	**D**	**A**	**Included in noise bylaw; Allowed Development at maximum.**
Opatcho	NE	F	
Otter	NE	F	
Pacific	SC	F	Within Arctic Pacific Lakes Park.
Pass	NE	F	
Peculiar	NE	G	
Pitoney	NE	F	
Punchaw	D	C	On Alexander MacKenzie Heritage Trail.
Purden	LD	F	Included in noise bylaw;
Raccoon	NE	G	
Rack	NE	G	
Redrocky	NE	G	
Reid	LD	A	
Salmon	NE	G	
Saxton	LD	A	Potential for several rustic cabin lots;
Shesta	SC	C	Ducks Unlimited project
Slender	NE	G	
Snail	NE	G	
Ste. Marie	NE	F	Remote
Stony	NE	F	Engine power restriction - 7.5Kw (10 HP)
Summit	**D**	**G**	**Included in noise bylaw; Development at maximum**
Suskeh	NE	G	Remote
Swamp	NE	A	Ducks Unlimited - low enhancement potential
Tabor	**SC**	**D**	**Included in noise bylaw; Development at maximum**
Tacheeda	NE	G	
Taginchill	NE	G	

Lake	Classification	EA	Comments
Terrapin	NE	G	
Toneka	NE	F	
Tudyah	NE	G	
Tumuch	NE	F	Electric motors only
Tureen	NE	G	
Upper Clauminchill	NE	G	
War	SC	G	Totally within Carp Lake Provincial Park
Weedon	NE	G	
West (Nadsilnich)	**D**	**C**	**Included in noise bylaw; Development at maximum**
Williston	D	G	BC Hydro registered
Yellowhead	SC	H	Within Mount Robson Provincial Park
Youngs	NE	G	Remote

REFERENCES USED AND REFERENCES FOR ADDITIONAL INFORMATION

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