



Fundy Model Forest

~Partners in Sustainability~

Report Title: Legislation and Guidelines for Protection of Water Quality in the FMF Annotated Bibliography for the FMF on Best Management Practices. Acts, Regulations and Guidelines in New Brunswick

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Year of project: 1999

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File Name: Soil_and_Water_1999_Wood River_Legislation and Guidelines for Protection of Water Quality in the FMF Annotated Bibliography for the FMF on Best Management Practices. Acts, Regulations and Guidelines in New Brunswick

***The Fundy Model Forest...
...Partners in Sustainability***

“The Fundy Model Forest (FMF) is a partnership of 38 organizations that are promoting sustainable forest management practices in the Acadian Forest region.”

Atlantic Society of Fish and Wildlife Biologists
Canadian Institute of Forestry
Canadian Forest Service
City of Moncton
Conservation Council of New Brunswick
Fisheries and Oceans Canada
Indian and Northern Affairs Canada
Eel Ground First Nation
Elgin Eco Association
Elmhurst Outdoors
Environment Canada
Fawcett Lumber Company
Fundy Environmental Action Group
Fundy National Park
Greater Fundy Ecosystem Research Group
INFOR, Inc.
J.D. Irving, Limited
KC Irving Chair for Sustainable Development
Maritime College of Forest Technology
NB Department of the Environment and Local Government
NB Department of Natural Resources
NB Federation of Naturalists
New Brunswick Federation of Woodlot Owners
NB Premier's Round Table on the Environment & Economy
New Brunswick School District 2
New Brunswick School District 6
Nova Forest Alliance
Petitcodiac Sportsman's Club
Red Bank First Nation
Remsoft Inc.
Southern New Brunswick Wood Cooperative Limited
Sussex and District Chamber of Commerce
Sussex Fish and Game Association
Town of Sussex
Université de Moncton
University of NB, Fredericton - Faculty of Forestry
University of NB - Saint John Campus
Village of Petitcodiac
Washademoak Environmentalists



SECTION 1.0

INTRODUCTION

1.1 The Purpose of the Report

The purpose of this report is to provide the Fundy Model Forest partnership with a list of the Acts, Regulations and Guidelines that have been established to protect and preserve the quality of water, within the Province of New Brunswick from non-point sources of pollution. All Acts, Regulations and Guidelines produced by the Province of New Brunswick have been reviewed and those pertaining to this report have been put into a simplistic format without interpretation of the law. The document is meant to provide the general public with basic information so they may know what is expected and where to go to seek additional information. Land developments, forestry and agricultural activities as well as private land utilization are reviewed.

1.2 Background

Non-point source pollution may be defined as pollution that comes from a source which is not easily pinpointed or controlled. Unfortunately human activity has hampered nature's ability to remove or decrease the impact this type of pollution has on our watercourses. However through legislation and best management practices, the impact this type of pollution causes on watercourses can be reduced.

Some factors that influence non-point source pollution are rainfall, vegetation, soil erodibility and topography. The intensity and duration of a rainfall greatly influence the amount of runoff and the potential for non-point source pollution to enter a watercourse. Vegetation cover intercepts raindrops and surface runoff absorbing their energy. This reduces the impact the raindrop has on soil and the erosion potential of surface runoff. Root systems of plants also improve soil integrity by holding the soil together. In addition, vegetation uptakes nutrients such as nitrogen and phosphorus preventing excess amounts from entering a watercourse. Soil size, shape and arrangement as well as the organic matter content determine the soil's ability to absorb water and resist erosion. Slope steepness and length as well as the size of the drainage area will affect runoff and soil loss due to erosion. In order to prevent contamination from entering a watercourse, these factors must be taken into consideration when conducting any activity near a watercourse.

The major types of non-point pollution are sediment, excess nutrients and chemicals. They may come from various sources including agricultural areas, forestry operations, mining operations and construction sites.

Sediment is a by-product of erosion. Of all non-point pollutants, it is probably the most

detrimental to aquatic habitat and the most visually noticeable. Sediment decreases water's ability to sustain life. By clouding the water sediment reduces light penetration affecting the photosynthesis process. As well, bottom conditions of a watercourse may be changed. Excess sediment may cover up suitable spawning habitat or smother the eggs of fish and other aquatic life. Sediment also transports excess nutrients, organic matter and potentially hazardous chemicals to a watercourse.

Nitrogen and phosphorus are essential nutrients for aquatic plant growth, but in amounts that exceed what can be used by the plants problems occur. With over abundant amounts of nutrients in a system the potential for increased algae growth is present. If excess algae growth occurs detrimental effects on a watercourse may also take place. As with the sediment, light penetration is decreased reducing photosynthesis. This will cause submerged plants to begin to die. In turn this reduces the amount of dissolved oxygen levels available to aquatic life. The oxygen demanding bacteria at the bottom of the watercourse begin to die making way for bacteria that thrive in oxygen depleted environments. These bacteria release hydrogen sulfide and methane which are toxic to fish and other aquatic life.

Nitrate may come from non-point sources such as fertilizers and decomposing plant and animal waste. Phosphorus however is the plant nutrient that is least abundant naturally, in fresh water. When excess amount of phosphorus enter a water system, a rapid growth of algae and aquatic weeds can occur. Therefore it is important to control the amount of nutrients released from point and non-point sources.

Pesticides, fungicides and herbicides can be transported by wind, rain, surface runoff or groundwater leaching to lakes and streams. Once these substances have made their way into a watercourse they may stay in their original form or decompose to a toxic or non-toxic form. Aquatic organisms tend to bioaccumulate these substances in their bodies potentially affecting the entire ecosystem in and around that watercourse.

1.3 Preventing Non-point Source Pollutants

To prevent contamination from a non-point source affecting a watercourse, legislation, along with best management practices (BMP) and guidelines, have been established and implemented. These are presented in Sections 2.0, 3.0 and 4.0 respectively. Acts, such as the Clean Water Act, and regulations are in place to preserve and protect resources for the benefit of the public. They contain rules to accomplish this means but there are other non-regulatory systems, such as BMPs and guidelines which can accomplish protection of property and the environment.

Presented in this report are alternatives to compliance monitoring as well as the pros and cons of each. A course of action is also recommended for implementing the compliance monitoring designs.

SECTION 2.0

ACTS AND REGULATIONS

This section of the report gives a summarization of the acts and regulations that apply to the preservation of water quality in the Province of New Brunswick as of July, 1998.

2.1 Clean Water Act

The Clean Water Act is administered predominately by the New Brunswick Department of Environment, although the NB Department of Health and Community Services are involved when dealing with human health issues.

2.1.1 Preservation of Water Quality

Under the Clean Water Act, the Minister of Health and Community Services may issue a Ministerial Order to a person who is affecting the quality of water. This order will direct the person to whom it was issued, to take the following action or actions to prevent any further degradation to the quality of the water.

1) To control the rate, to reduce the rate or to eliminate the release of any contaminant or waste into or upon water. The elimination of any contaminant or waste into or upon water may be permanently, for a specified period or in the circumstances set out in the order.

2) To alter the manner or to alter the procedures employed in the control, reduction or elimination of the release of any contaminant or waste into or upon water.

3) To install, replace or alter any equipment designed to control, reduce or eliminate the release of any contaminant or waste into or upon water.

4) To install, replace or alter a wastewater treatment facility or waterworks in order to control, reduce, eliminate or remedy the release of a contaminant or waste into or upon water.

This order may also instruct the person to whom it was issued, too carry out any clean-up, site rehabilitation or other remedial action that is necessary.

If a Ministerial Order is issued requiring the installation, replacement or alteration of a wastewater treatment facility or a waterworks, the person to whom the order is issue may have certain requirements to meet. That person may have to supply the Minister with drawings, specifications and other information that pertains to the facility. As well a compliance schedule that provides dates for the completion of specific stages of construction, components or actions may be required by the Minister.

If the Minister is unable to determine the origin of the contamination or waste, the Minister may incorporate the actions above to rectify the problem.

2.1.2 Contaminant

Under this act, a contaminant is considered to be;

- 1) something that affects the natural, physical, chemical or biological quality or constitution of water.
- 2) endanger the health, safety or comfort of a person or the health of animal life
- 3) cause damage to property or plant life
- 4) interfere with visibility, the normal conduct of transport or business or the normal enjoyment of life or property.

A contaminant may be, by a designate order from the Minister of Health and Community Services;

Potable Water - a solid, liquid, gas, micro-organism, odour, radiation or combination of any of them.

Not Potable Water - a solid, liquid, gas, micro-organism, odour, heat, sound, vibration, radiation or combination of any of them.

2.1.3 Drills, Redrills, Bores, Digs a Well

No more than thirty days after a well has been drilled, redrilled, bored or dug a water well driller's report must be filed with the Minister. If the well was drilled, redrilled, bored or dug by another person other than the owner of the well, than the owner of the well must have a sample of the water from the well tested. The water must be tested for the presence of inorganic substances and micro-organisms and the test results must be provided to the intended consumers of the water in accordance to the regulations. This also applies to any owner of a public water supply system. See additional information on the Water Well Regulation in Section 2.2.

2.1.4 Protected Area

Under the Clean Water Act protection is provided for surface drinking water supplies through a designation program developed through public consultation and required measures. With the approval of the Lieutenant-Governor in Council, the Minister may designate a watershed or any portion of it, an aquifer or groundwater recharge area that is used as a source of water for a public water supply system, as a protected area. This would be done through a Designation Order which may contain the following requirements:

- 1) A commencement date would be provided.
- 2) The prohibition, control or limitation of any activity or thing that might impair the quality or the quantity of the water in a protected area.
- 3) The allocation of the use of the water in a protected area.
- 4) The prohibition, control or limitation of the use of land in a protected area.

- 5) The terms and conditions respecting the land or the water in a protected area.
- 6) Standards methods of enforcing the standards for the purpose of protecting the quality and quantity of the water in a protected area.

A Designation Order will contain a schedule of any requirements imposed and a description or plan of the protected area.

The Minister will file a copy of the order and the plan of the protected area with the Department of the Environment and its regional office closest to the protected area. On the plan, the Minister will place the Property Identifier Numbers on each parcel of land that is situated in whole or in part of the protected area. The Minister will publish a notice which will contain a description or a plan of the protected area, as well as, inform the public that they may inquire further about the protected area at their local Department of the Environment office or at the head office of the Department of the Environment.

Once the commencement date of the Designated Order has been reached, an exemption must be granted by the Minister to do or complete any work that is prohibited, controlled, limited or otherwise affected by any requirements imposed by the Designation Order.

2.1.5 Inspectors

Inspectors, which are appointed by the Minister, may enter any area, land, place or premises. They must provide proof of identification and have reasonable belief that a contaminant or waste is being released, has the potential to be released or poses a threat to the allocation, quality or quantity of water. Inspectors may also take samples of discharges, deposits, effluents or emissions and inspect any structure, installation, operation, plant or machinery that poses or has the potential to pose a threat to the allocation, quality or quantity of water. Inspectors may also inspect any raw or manufactured substance or material and take samples of any substance or material that they deem is releasing or has the potential to be released or poses a threat to the allocation, quality or quantity of water.

An inspector shall not enter a private dwelling unless:

- 1) there is an emergency situation
- 2) has the consent of an occupant of the dwelling
- 3) obtains an entry warrant in accordance with the Entry Warrants Act

An inspector may detain for the purpose of evidence:

- 1) any object, substance or material or sample of any object, substance or material
- 2) any document material regardless of physical form or characteristics which the inspector believes may provided evidence of a violation in accordance to the Clean Water Act.

No person shall hinder or obstruct inspectors from carrying out their duties. As well, any person who is in charge of or owns any area, land, place or premises shall cooperate with inspectors to allow inspectors to carry out their duties.

2.1.6 Offences and Penalties

Any person who fails to comply with an order or any terms or conditions that are required when an approval, registration, license or permit is granted or issued under the Clean Water Act, commits an offence and is liable.

In the case of an individual, the minimum fine is *five hundred dollars* and the maximum is *fifty thousand dollars*. If payment cannot be made, then under the Summary Convictions Act, imprisonment is possible.

In the case of more than one person, the minimum fine is *one thousand dollars* and the maximum is *one million dollars*.

2.2 Water Well Regulation - Clean Water Act

If you are going to dig a well, you will need to understand the requirements of this regulation, which is designed to protect wells from contamination.

2.2.1 Permits

2.2.1.1 Well Contractors Permit

Anybody who bores, drills, digs or redrills a well must obtain a well contractors permit from the Minister. If a person undertakes an operational incidental to the reconditioning or abandonment well, they must also obtain a well contractors permit. A well contractors permit is issued to people who are boring, drilling, digging, redrilling, reconditioning or abandoning a well on land that they do not own or are not the lessee. The Minister may issue a well contractors permit to a person who holds a well driller's permit or employs a well driller on a full time basis. As well, a person may obtain a form from the Minister and apply for a well contractors permit. The fee for a well contractors permit is *three hundred dollars* (\$300.00).

2.2.1.2 Well Driller's Permit

Any person who operates a machine for the purpose of drilling, altering or repairing a well must obtain a well driller's permit. This does not apply to any person helping the well driller. The Minister may issue a well driller's permit to a person who holds a valid certificate of qualification in water well driller trade issued under the Apprenticeship and Occupational Certification Act or to a person who was the holder of a valid well driller's permit issued under the Water Well Regulation - Clean Water Act. As well, a

person may apply for a well driller's permit using forms provided by the Minister. The fee for a well driller's permit is *one hundred dollars* (\$100.00). Both permits expire at the end of the calendar year in which they were issued.

2.2.2 Location of a Well

A well must be located in an area that allows easy access to the well for the purpose of cleaning, treatment, repair, testing and inspection. If the well is to be situated next to a building, than the centre of the well must be at least two metres from any portion of the building.

2.2.3 Construction of a Well

Any person constructing a well, must do so in such a manner that surface water will not enter the well. The driller must install casing in standard pipe size and weight in accordance with Schedule A of the Regulation. The casing must be of new material and at least six metres long, unless an exemption is granted by the Minister. To prevent the contamination of the water in the well, the casing sections must be properly connected. Unless an exemption is granted by the Minister, the inside diameter of the casing must be 12.7 centimetres. As well, a drive shoe must be welded or threaded onto the end of the casing that comes in contact with the soil or rock, to provide a suitable seal with the adjacent formation. However, if these measures mentioned above do not prevent the contamination of the water in the well, the casing must be firmly seated into the bedrock at a depth specified by the Minister. As well the casing must be surrounded by a cement grout of at least sixty millimetres in thickness. The well contractor is also obligated to carry out any remedial actions determined by the Minister.

With the construction of a well completed, the well driller is responsible for clearing all the debris away from the well. The well driller must also disinfect the well using a method approved by the Minister before construction. The well driller will also install a well seal, which is approved by the Minister, to the upper open end of the casing to prevent contamination of the well before the pump is installed.

2.2.4 Dug Wells

A dug well must have a casing that extends 150 millimetres above the ground. To further prevent surface water from entering the well, an impermeable apron or some other form of protection approved by the Minister, must slope away from the top of the casing. To stabilize the opening of the well and protect the well water from the infiltration of surface water, concrete rings, steel rings, poured reinforced concrete, brick or some other material approved by the Minister, must be placed from the top of the dug well to at least two metres below the surface. The joints of the material used must be made watertight. The space remaining between the casing and the side walls of the excavation must be filled with clean washed gravel, sand, crushed rock or small boulders. Any space between the casing and the excavation walls that is not

filled with the material mentioned above, must be filled with cement grout, concrete, bentonite, clay slurry or puddle clay. This is to prevent surface waters from getting into the well. If any connection is made to the casing below the immediate ground level, then the connection must be made watertight using a durable non-toxic sealing material. At the point where the connection was made to the casing, a radial distance of at least three hundred millimetres must be filled with cement grout, concrete, bentonite, clay slurry or puddle clay. As well, from the bottom of the excavation where the connection was made to within six hundred millimetres of ground level, must be filled with cement grout, concrete, bentonite, clay slurry or puddle clay.

2.2.5 Protection of Aquifer

To protect the quality of water in an aquifer, wells must be located a certain distance from any source of contamination. The following table, Table 2.1, provides the source of contaminant and the distance a well must be located from that contaminant source.

It should also be noted that a well cannot be located within sixty metres of a cesspool or seepage pit that is more than three and one-half metres deep, unless the well is cased properly. The well must be properly cased, to prevent seepage from the cesspool or seepage pit entering the water within the well. Also, a well may not be located near a sanitary landfill, garbage dump or other massive source of contamination, unless written approval is given by the Minister and the Minister of Health and Community Services.

Table 2.1 Distance of Drilled and Dug Wells from Contaminant Sources

Source of Contaminant	Distance Drilled well	Distance Dug Well
Cesspool receiving raw sewage	30 metres	30 metres
Seepage (leaching) pit, filter bed, soil absorption field, earth pit privy or similar disposal unit	25 metres	30 metres
Septic tank, concrete vault privy, sewer or tightly jointed tile or equivalent material or sewer connected foundation drain	15 metres	30 metres
Sewer of cast iron with leaded or approved mechanical joints, independent clean water drain or cistern	3 metres	3 metres
Pumphouse floor drain, cast iron with leaded or approved mechanical joints, draining to ground surface	600 millimetres	600 millimetres
Right-of-way of any highway or public road unless approved by the Minister	10 metres	10 metres

2.2.6 Well Drilling Advisory Board

The Well Drilling Advisory Board consists of three to nine people appointed by the Minister. The Board's purpose is to advise the Minister on such issues as the location, construction, testing, alteration, repairing, sealing, capping and abandoning of wells. The board may also advise the Minister on the issuing, transfer, suspension, cancellation, renewal and reinstatement of registrations, licenses, permits, and approvals for the construction, testing, altering, reconditioning, repairing, sealing, capping or abandoning of wells.

2.3 Watercourse Alteration Regulation

2.3.1 Purpose

The purpose of the Watercourse Alteration Regulation is to protect watercourses from harmful alterations while permitting development. This regulation establishes a 30m buffer zone adjacent to all watercourses which requires a Watercourse Alteration Permit issued by the Department of Environment. The Clean Water Act defines a watercourse as "the full width, and length, including the bed, banks, sides and shoreline, or any part, of a river, creek, stream, spring, brook, lake, pond, reservoir, canal, ditch, or other natural or artificial channel open to the atmosphere, the primary function of which is the conveyance or containment of water, whether the flow be continuous or not". A watercourse alteration is defined in the Watercourse Alteration Technical Guidelines (DOE, 1997) as " a temporary or permanent change made at, near or to a watercourse or to water flow in a watercourse and includes:

- (a) any change made to existing structures in the watercourse including repairs, modifications or removal, whether the water flow in the watercourse is altered or not,
- (b) the operation of machinery on the bed of a watercourse other than at a recognized fording place,
- (c) any deposit or removal of sand, gravel, rock, topsoil or other material into or from a
- (d) watercourse or within thirty metres of the bank of a watercourse,
- (e) any disturbance of the within thirty metres of the bank of the watercourse except grazing by animals, the tilling, plowing, seeding and harrowing of land, the harvesting of vegetables, flowers, grains and ornamental shrubs and any other agricultural activity prescribed by regulation for the purposes of this paragraph, that occur more than five metres from the bank of a watercourse.
- (f) any removal of vegetation from the bed or bank of a watercourse,
- (g) any removal of trees within thirty metres of the bank of a watercourse."

2.3.2 Watercourse Alteration Permit

A Watercourse Alteration Permit is required in order to carry out a watercourse alteration as per the definition previously provided.

The Minister may waive the requirement for a watercourse alteration permit, if the area where the watercourse alteration is occurring is subject to tidal variations in level and flow. As well, the following activities do not require a permit.

- 1) The harvesting of aquatic plants.
- 2) The removal of aquatic plants by physical means for recreation, navigation or gathering food.
- 3) The use of aquatic plant harvesting equipment in the area of harvesting.
- 4) The repair of a project or structure so long as no modifications are made to the size, shape, materials and alignment of the structure.
- 5) The withdrawal of water at a rate of less than 45 litres per minute for the purpose of drilling exploration work.
- 6) The installation of drainage tile, including outlets, for the drainage of agricultural lands, so long as all the standards have been complied by in relation to the installation by the Minister of Agriculture and Rural Development.
- 7) A person carrying out an activity within 30 metres of the banks of a watercourse and is granted approval under the Water Quality Regulation - Clean Environment Act so long as approval is granted before commencing the activity, any terms or conditions stated in the approval are complied with and the activity is completed while the approval is valid.
- 8) The installation and removal of a seasonal wharf that does not require any construction or excavation during installation.
- 9) The construction of a roadway, railway or agricultural drainage ditch if there is no danger of pollution as a result of the construction and the subsequent operation of the ditch and if the ditch does not break the bank of the watercourse and the alignment of the ditch is not altered.
- 10) On Crown Lands, watercourse alterations undertaken on a watercourse that drains an area of six hundred hectares or less at the site of the alteration, do not require a watercourse alteration permit provided that an operating plan approved by a Regional Resource Manager of the Department of Natural resources and Energy is implemented.

2.3.3 Removal of Material From a Watercourse

No person is allowed to remove or cause the removal of sand, gravel, rock or similar material from a watercourse for sale, gain or commercial use. As well this material may not be removed from a watercourse for the purpose of processing or manufacturing such sand, gravel, rock or similar material into another product.

2.3.4 Permit Requirements

A permit application must be submitted to the Minister on a form provided by the Minister and will be accompanied by copies of the plans and any other documents or information regarding the watercourse alteration, as required by the Minister. If any engineering reports or plans are required by the Minister, they will be provided at no cost to the Minister, by a person who is a member of the Association of Professional Engineers of the Province of New Brunswick or is licensed to practice engineering under the Engineering Profession Act. Consent from neighboring properties that are or may be affected by the watercourse alteration must be provided.

A permit may be applied for either by the person who is planning a project or structure involving a watercourse alteration or by a person acting on their behalf, so long as the latter person is not employed by the Department of the Environment for the Province of New Brunswick.

A permit will:

- 1) Be on a form provided by the Minister.
- 2) Name the person to whom it was issued.
- 3) The watercourse alteration or alterations for which it was issued.
- 4) The date on which it was issued.
- 5) The date on which it expires.
- 6) The terms and conditions imposed on it.
- 7) Any other information which the Minister considers necessary.

Watercourse Alteration Permit application forms are available at any Regional office of the Department of Environment as well as Regional and District offices of the Department of Natural Resources and Energy. The completed applications are forwarded to the Watercourse Alteration Program office in Fredericton for review and issuance of the permit. As previously listed, the permit will have the applicants name and address as well as the location of the alteration, description and conditions which must be met.

A watercourse alteration permit may not be transferred and is only valid for the alteration or alterations identified on the permit.

2.3.5 Suspension or Cancellation of a Watercourse Alteration Permit

Suspension or cancellation of a watercourse alteration permit may occur under the following circumstances;

- 1) In the Minister's opinion there has been non-compliance with the Clean Water Act, the Watercourse Alteration Regulation or terms and conditions imposed on the permit, or any order, direction or demand of the Minister.
- 2) The issuance of a new permit applying to the same watercourse alteration or alterations.

2.3.6 Multiple Permit

If the Minister issues a permit for more than one watercourse alteration, the permit will clearly be marked “*Multiple Permit*”. However, the alterations to which the permit is intended to apply, must have some appropriate factor in common.

2.3.7 Emergency Permit

The Minister may issue an emergency permit for one or more watercourse alterations before the submission of the copies of the plans, documents or any other information required is made to the Minister. The person to whom the emergency permit is issued must within thirty days, unless the Minister states differently, submit copies of the plans, documents or any other information required to the Minister. An emergency permit will be issued for a specific period which will not exceed ninety days.

2.3.8 Provisional Permit

A person may apply for a provisional permit by submitting a notification form to the Minister on a form provided by the Minister. Accompanying the application, will be the prescribed fee and copies of the plans, documents or any other information required by the Minister. Within two weeks of receiving the application for a provisional permit, the Minister will determine whether or not the planned watercourse alteration would or could pose a significant threat to the environment. A written acknowledgment, either granting or denying the person a provisional permit will be delivered to the applicant. If a provisional permit is not granted, a person may apply for a watercourse alteration permit following application requirements as in Section 2.3.4 of this report.

2.3.9 Compliance

Every person who is issued a watercourse alteration permit will commence, make or carry out each watercourse alteration in a reasonable and diligent manner. As well, they must comply with the Clean Water Act, the Watercourse Alteration Regulation, the terms and conditions imposed on the permit and any order, direction or demand of the Minister. If the person to whom the watercourse alteration permit is issued does not comply with the Clean Water Act, the Watercourse Alteration Regulation, the terms and conditions imposed on the permit and any order, direction or demand of the Minister, or the person does not have a permit, the Minister may order the person to:

- 1) Cease and desist from further work of commencing, making or carrying out the watercourse alteration.
- 2) Remove the watercourse alteration and any building, structure, works and chattels used to commence, make or carry out the watercourse alteration.
- 3) Do what is considered necessary by the Minister to make the watercourse alteration conform to the Clean water Act, the Watercourse Alteration Regulation, the terms and conditions imposed on any permit that may have been issued and any order, direction or demand of the Minister.
- 4) Do what is considered necessary by the Minister to render the watercourse alteration in good repair.

If a person does not comply with the above orders issued by the Minister, the Minister, with the necessary people, equipment and materials, may, in addition to any penalties, enter upon any land or premises, using such force as the Minister considers necessary to do the following;

- 1) Possibly remove the watercourse alteration and any building, structure, works and chattels used to commence, make or carry out the watercourse alteration.
- 2) Possibly do what is considered necessary by the Minister to make the watercourse alteration conform to the Clean water Act, the Watercourse Alteration Regulation, the terms and conditions imposed on any permit that may have been issued and any order, direction or demand of the Minister.

The costs and expenses incurred by the Minister, including the costs of all persons, materials and equipment employed and the repairing of any damage done, will be the liability of and paid by the person to whom the order is directed.

2.3.10 Fees

- 1) Application for a permit for one alteration - \$ 25.00
- 2) Application for a permit for more than one alteration - \$ 20.00 to a maximum of \$ 200.00
- 3) Application for an emergency permit - \$ 50.00
- 4) Application for a provisional permit - \$ 10.00
- 5) Application for a renewal of a permit - \$ 10.00

2.4 Health Act

The Minister of Health and Community Services under the Health Act has the authority to create rules, orders and regulations. Rules, orders and regulations may be created and implemented in order to prevent the pollution, defilement, discoloration or fouling of lakes, rivers, streams, pools, springs, wells, and waters, and waterworks.

2.5 General Regulation - Health Act

To protect an aquifer from contamination, the discharging of any sewage, surface drainage, liquid waste, filth or other contaminant into or around any well, abandon well, hole or other opening is prohibited. As well, the filling or replenishing of any existing well, except with water that is safe and sanitary, is not allowed. Also no person will make a direct physical connection between a private water supply and a public water supply.

Septic tanks will be located at least 15 meters from drilled well and 30 meters from a dug well. A septic tank that is going to be placed near any source of water not used as potable water will be located at least 30 meters from the shore or the high water mark. If the water source is used as potable water than the septic tank will be located at least 90 meters from the shore or high water mark.

A septic tank will be placed at least 1.5 meters away from any building.

2.6 Crown Lands and Forest Act

In order to try and preserve the quality of water, holders of Crown timber licenses and who have entered into a forest management agreement with the Minister, must submit a management plan and an operating plan.

2.6.1 Management Plan

A management plan is in place for a 25 year period, with revisions and updates made every five years, and describes the objectives for which Crown Lands and the resources of Crown Lands will be used by the licensee and sub-licensees. As well, the management plan describes the manner in which the licensee will manage Crown Lands with respect to the following:

- 1) silviculture
- 2) timber harvesting
- 3) fire protection
- 4) road construction and maintenance
- 5) forest recreation
- 6) fish and wildlife habitat
- 7) watershed protection
- 8) general land management
- 9) other matters prescribed by regulation

2.6.2 Operating Plan

An operating plan describes the activities that will occur over a one year period. Part of the operating plan must cover the management of the fish and wildlife habitat.

2.7 Pesticides Control Act

In order for a person to apply a pesticide to a body of water, they must hold a Pesticide Operator's License and a certificate issued under the Pesticide Control Act. To prevent the deterioration of the quality of water, no substance used in the mixing or applying of a pesticide, or the washing of a pesticide container, will be discharged into a body of water. As well, no water from a water body will be drawn into a pesticide container or an apparatus used for the mixing or application of a pesticide in a manner which is contrary to the regulations.

2.8 Pesticides Control Act - General Regulation

Water may not be drawn directly from surface water, a well or a public or private water supply system into a pesticide container or apparatus used for the mixing or

application of a pesticide. To draw water directly from any of these sources, the filler hose must have an air gap at its end, or the filling equipment is fitted with a properly functioning mechanical device to prevent backflow.

2.8.1 Classes of Pesticide Applicator's Certificate

The Regulation describes Classes of Pesticide Application Certificates which authorizes individuals to use or apply pesticides in several categories. These are:

- 1) *Class A* - authorizes an individual to apply a pesticide from an aircraft or to supervise the aerial application of a pesticide from an aircraft.
- 2) *Class B* - authorizes an individual to use or apply a pesticide by non-aerial means in or on agricultural crops, Christmas tree plantations, tree nurseries or seed orchards.
- 3) *Class C* - authorizes an individual to use or apply a pesticide by non-aerial means to forests, woodlands, industrial sites, airports, power lines, pipelines, railways, roadsides or other rights-of-way.
- 4) *Class D* - authorizes an individual to use or apply a pesticide by non-aerial means in or on urban or other non-agricultural areas, including lawns, shrubs, trees, parks, school grounds or recreational areas.
- 5) *Class E* - authorizes an individual to use or apply a pesticide for structural pest control.
- 6) *Class F* - authorizes an individual to use or apply a pesticide by non-aerial means to control pests in waste disposal sites.
- 7) *Class G* - authorizes an individual to use or apply a pesticide as an indoor mist, a thermal fog or a fumigant.
- 8) *Class H* - authorizes an individual to use or apply a pesticide by non-aerial means to a body of water for control of aquatic vegetation, biting flies including mosquitoes midges or blackflies or other aquatic pests, including fish, leeches, schistosomes or ectoparasites.
- 9) *Class I* - authorizes an individual solely to mix or load pesticides into equipment, including aircraft, that is used for the purpose of applying pesticides.
- 10) *Class J* - authorizes an individual to handle a pesticide in the course of the individual's employment at a pesticide storage area.
- 11) *Class K* - authorizes an individual to use or apply a pesticide by a method or for a purpose not provided in the classifications mentioned above.
- 12) *Class L* - authorizes an individual to use or apply a pesticide by non-aerial means for the use of the individual or the individual's employer on the property, including any body of water, that is owned by or is under the direct control of the individual or the employer.

2.9 Clean Environment Act

The Clean Environment Act prohibits any person, without approval from the Minister, from leaving, throwing, causing or permitting a source of contaminant to emit, discharge or deposit into or upon the environment in any location so that it may, directly or indirectly, cause water pollution to any waters of the Province of New

Brunswick. As well, approval from the Minister is needed to construct, modify or operate any sewage works or any waterworks. If however, a contaminant does pose a threat to waters in this province through an action mentioned above, certain steps must be taken by the person or persons responsible to minimize the chance of water pollution.

- 1) The person or persons responsible will report the incident to the Minister immediately.
- 2) A description of the contaminant, including its volume and the location of the place where the incident occurred.
- 3) A description of the water pollution which may result, including of the waters affected.
- 4) The cause of the contamination.
- 5) Any remedial action taken or to be taken to minimize the resulting water pollution and to prevent a recurrence.
- 6) The person or persons responsible will also immediately notify the Provincial Mobile Communications Centre by telephone at **1- 506- 453- 7171**.

2.10 Potable Water Regulation

This regulation pertains to the identification of wells and the necessary information that must be included in a sampling plan.

2.10.1 Wells

Any well that has been bored, dug, drilled or redrilled must have a well identifier tag attached to it.

2.10.2 Sampling Plan

Any public water supply system must have a sampling plan that is approved by the Minister of Health and Community Services. The sampling plan must indicate the following:

- 1) frequency of sample collection for testing
- 2) a list of substances the water supply is to be tested for
- 3) location where the samples are to be collected from
- 4) title and training of the person collecting the sample
- 5) name and address of the laboratory testing the sample/samples
- 6) the date that the sampling of the water is to commence
- 7) any other information that the Minister considers necessary

2.11 Fees for Industrial Approvals Regulation

Fees are charged based on the class of the contaminant.

2.11.1 Classes of Contaminants

Under this regulation a source of contaminant is classified as:

- 1) *Class 1* - The permitted rate of discharge of effluent exceeds ten thousand cubic metres per day.
 - BOD matter exceeds four hundred tonnes per year.
 - suspended solids exceeds four hundred tonnes per year.
- 2) *Class 2* - The permitted rate of discharge of effluent exceeds one thousand cubic metres per day but does not exceed ten thousand cubic metres per day.
 - BOD matter exceeds forty tonnes per year but does not exceed four hundred tonnes per year.
 - Suspended solids exceeds forty tonnes per year but does not exceed four hundred tonnes per year.
- 3) *Class 3* - The permitted rate of discharge of effluent exceeds one hundred cubic metres per day but does not exceed one thousand cubic metres per day.
 - BOD matter exceeds one tonne per year but does not exceed forty tonnes per year.
 - Suspended solids exceeds one tonne per year but does not exceed forty tonnes per year.
- 4) *Class 4* - The permitted rate of discharge of effluent exceeds one hundred cubic metres per day.
 - BOD matter exceeds one tonne per year.
 - Suspended solids exceeds one tonne per year.

2.11.2 Fees for Classes

A person who holds an approval to operate a source of contaminant shall pay the following annual fee:

- 1) *Class 1* - \$ 3 000.00
- 2) *Class 2* - \$ 1 000.00
- 3) *Class 3* - \$ 100.00
- 4) *Class 4* - no charge

2.12 Watercourse Setback Designation Regulation

2.12.1 Purpose

Under this regulation, protected areas are portions of land upstream of municipalities surface water supply intakes. This regulation lists the municipalities that are designated protected areas and the activities that may or may not occur within the protected area.

Protected areas are lands within 75 metres of the banks of watercourses located

within the municipalities listed in the Watercourse Setback Designation Regulation. Following are activities that may occur in a protected area , provided certain regulations are adhered to.

2.12.2 Maintenance, Renovations or Additions

Maintenance, Renovations or Additions made to single-family and multiple-family dwellings that have on site sewage disposal facilities must take measures to prevent the discharge or loss of sediment into the watercourse. This may be accomplished by:

- 1) Installing a sediment control device between the construction site and the watercourse before construction begins.
- 2) Storing fill material near the 75 meter line or at a greater distance if practical.
- 3) Stabilize exposed soil within 60 days after the beginning of construction.

2.12.3 Landscaping

Additional landscaping may occur provided that the landscaping is at least 5 metres from the banks of the watercourse and no trees are cut within 15 metres from the banks of the watercourse. Also, the removal of dead or blown down trees within 15 metres of the banks of a watercourse may only take place on residential property containing existing dwellings.

2.12.4 Tree Planting

Within 1 kilometer upstream of a surface water supply intake, tree planting activities may occur between 30 and 75 metres from the banks of the watercourse. At a distance greater than 1 kilometer upstream of a surface water supply intake, tree planting activities may occur between 15 and 75 metres from the banks of the watercourse.

2.12.5 Harvesting

Within 1 kilometer upstream of a surface water supply intake, selection cutting by mechanical or non-mechanical means between 30 and 75 metres from the banks of a watercourse may occur provided that:

- 1) No more than 30 % of the stems , up to 30 % of the volume, on any one property is cut.
- 2) Property, referred to above, may only be cut once every five years.
- 3) Cutting occurs only from November 1 to March 31, inclusive, of the following year north of 46 degrees N. latitude, excluding the Village of Perth-Andover and the Village of Bath.
- 4) Cutting occurs only from January 1 to March 31, inclusive, of each year south of 46 degrees N. Latitude, including the Village of Perth-Andover and the Village of Bath.

At a distance greater than 1 kilometer upstream of a surface water supply intake, selection cutting by mechanical or non-mechanical means between 15 and 75 metres of a watercourse may occur provided that:

- 1) No more than 30 % of the stems , up to 30 % of the volume, on any one property is cut.
- 2) Property, referred to above, may only be cut once every five years.
- 3) The volume of trees cut is cut in accordance with a forestry management plan.
- 4) Cutting occurs only from November 1 to March 31, inclusive, of the following year north of 46 degrees N. latitude, excluding the Village of Perth-Andover and the Village of Bath.
- 5) Cutting occurs only from January 1 to March 31, inclusive, of each year south of 46 degrees N. Latitude, including the Village of Perth-Andover and the Village of Bath.

2.12.6 Agriculture

Within 1 kilometer upstream of a surface water supply intake, agricultural activities may occur between 30 and 75 metres from the banks of the watercourse provided that;

- 1) Plowing or tilling is contoured across the slope.
- 2) Plowing or tilling will not occur on slopes greater than 5 horizontal to 1 vertical, without diversion terraces as specified in Implementation Guidelines for Cooperation Agreement Canada-New Brunswick on Agricultural Food Development.
- 3) Surface runoff from each field does not flow directly into the watercourse.
- 4) Fields utilized for livestock grazing will have a suitable fence constructed along the periphery of the 30 metres in order to prevent the livestock from getting any closer than 30 metres to the watercourse.
- 5) The practice of green manuring will be required in addition to inorganic fertilizing.

At a distance greater than 1 kilometer upstream of a surface water supply intake, agricultural activities between 15 and 75 metres from the banks of a watercourse may occur provided that:

- 1) Plowing or tilling is contoured across the slope.
- 2) Plowing or tilling will not occur on slopes greater than 5 horizontal to 1 vertical, without diversion terraces as specified in Implementation Guidelines for Cooperation Agreement Canada-New Brunswick on Agricultural Food Development.
- 3) Surface runoff from each field does not flow directly into the watercourse.
- 4) Fields utilized for livestock grazing will have a suitable fence constructed along the periphery of the 15 metres in order to prevent the livestock from getting any closer than 15 metres to the watercourse.
- 5) The practice of green manuring will be required in addition to inorganic fertilizing.

2.12.7 Hay Removal

At a distance greater than 1 kilometer upstream of a surface water supply intake, hay removal is permitted up to 5 metres from the banks of a watercourse.

2.12.8 Pesticides

Within 1 kilometer upstream of a surface water supply intake, pesticide application may occur between 30 and 75 metres from the banks of the watercourse provided that any person who sprays pesticides in this area holds a Class B Level 4 or other appropriate certification under the Pesticides Control Act.

At a distance greater than 1 kilometer upstream of a surface water supply intake, pesticide application may occur between 15 and 75 metres from the banks of a watercourse may occur provided that any person who sprays pesticides in this area holds a Class B Level 4 or other appropriate certification under the Pesticides Control Act.

2.12.9 Road Construction at Approved Watercourse Crossings

Off-take Ditches

Off-take ditches will be constructed to help prevent the direct discharge of sediment into a watercourse. They will be constructed along the ditch of the road at spacings determined by dividing 500 metres by the road graded (%).

Sediment Traps

Sediment Traps will be constructed to intercept over-land flow for every hectare of exposed construction area. The traps will have a minimum storage capacity of 190 cubic metres. They will be maintained in ditches until grading and stabilization of the entire construction site is complete.

Exposed Bank Material

All exposed bank material will be immediately stabilized to reduce the siltation of the watercourse through the use of vegetation and/or riprap.

Road Widths

All road surfaces will have a minimum shoulder to shoulder width of 5.5 metres. Logging roads and residential driveways to a single family dwelling will have a minimum shoulder to shoulder width of 3.5 metres.

Road Surface

With the exception of logging roads, all road surfaces will be covered with clean, good draining, coarse granular material, asphalt or chip-seal.

Water Bars

Water bars will be installed on any road that is no longer in use. They will extend at least 300 millimetres above the road surface and 300 millimetres below the road surface and spaced as follows:

Table 2.2 Water Bar Spacing based on Slope

Slope (%)	Distance (metres)
1 - 2	75
3 - 5	50
6 - 10	30
11 - 15	20
> 15	15

Borrow Pits / Topsoil Disposal Piles

Borrow pits and topsoil disposal piles will not be located in a protected area. All borrow pit locations, rights -of-way and landing areas will be pre-cut and standing trees will not be bulldozed.

Hillside Cuts

Hillside cuts will be kept to a minimum on slopes containing loose material and will not exceed slopes that are 2 horizontal to 1 vertical in unstable areas.

Unstable Areas

Any unstable area will be filled with gravel, rock or other suitable material to prevent erosion.

Ditch Run-outs

Ditch run-outs will be constructed so that the flow will be effectively dissipated and not cause erosion away from the road and they will not empty directly into a watercourse.

Culverts

Roadbed culverts will be installed at proper elevations and slopes in order to prevent ponding of water and erosion.

Culvert Size

The following table lists the minimum culvert size for a particular drainage area.

Table 2.3 Minimum CSP Diameter Based On Drainage Area

Minimum Size Circular Corrugated Steel Pipe (mm)	Drainage Area (ha)
750	< 50
900	between 50 - 80
1000	between 80 - 100
1200	between 100 - 170
1400	between 170 - 240
1600	between 240 - 350
1800	between 350 - 475
2000	between 475 - 600

Culvert installation follows the outline supplied in the Watercourse Alteration Technical Guidelines.

2.12.10 Electrical Pump Stations

Electrical pump stations must conform to the following standards:

- 1) Be equipped with a CSA approved device to prevent backflow.
- 2) The intake pipes will be located a minimum of 100 metres downstream or 500 metres upstream of the municipal water supply intake and will not disturb the bed or banks of the watercourse.
- 3) The intake pipes at the pumping station will be screened at the inlet.
- 4) An open area of 0.19 m² of screen will be provided for each 0.028 m³/sec of water being withdrawn.
- 5) The screen will not have openings larger than 57 mm².
- 6) The maximum water withdrawn from the watercourse will not lower the watercourse by more than 25 % of its mean monthly flow.

2.12.11 Gasoline Powered Pumps

These follow the same standards as electric pumps.

2.12.12 Sugar Bush Operation

A sugar bush operation may operate in a Protected Area as long as no mechanical equipment or sap processing occurs within 30 metres of the watercourse.

2.13 Agricultural and Development Act

The Agricultural and Development Act indicates that the Lieutenant-Governor in Council may, or on the recommendation of the Minister and the Minister of Agriculture and Rural Development make regulations regarding setback distances for water protection. This includes distances, regarding buildings used for livestock and manure storage, manure application and manure storage capacity. The following table (Table can be found in the document, "Policy Instruments for Environmental Protection in Agriculture" (Eastern Canada Soil and Water Conservation Centre 1997). The distances indicated in this table are recommended guidelines only.

Table 2.4 Setback Distance for Water Protection

Setback Distances for Water Protection					
Location	Distance - buildings (livestock & manure storage) Water course Wells		Distance - manure application Watercourse Wells		Manure storage capacity
	New Brunswick	100 m	N/A	5 m 15-30 m drinking water	

2.14 Mining Act and General Regulation - Mining Act

The Mining Act and General Regulation, dealing with the protection water quality, must follow legislation established in the New Brunswick Crown Lands and Forest Act and the New Brunswick Regulation 87-83, Environmental Impact Assessment, under the Clean Environment Act. A reclamation and development plan for the area that is going to be disturbed during mining operations must be included in the application to the Minister of Mining.

2.15 Quarriable Substances Act

The Quarriable Substances Act, dealing with the protection of water quality, must follow the legislation established in the Clean Environment Act, the Clean Water Act, the Crown Lands and Forest Act and the Mining Act.

2.16 Topsoil Preservation Act - General Regulation

Topsoil will not be removed from any area that is below the top level of the water table at the time of removal. If an area is subject to flooding then the last day that topsoil may be removed from that location is July 31st. The area must then be seeded with a crop cover before the end of August of the same year. If topsoil is stockpiled in a location that is prone to flooding, then the stockpile must be removed before October 31st of the same year it was piled. The removal of any topsoil must be done in a

manner that prevents any erosional impact or sediment from entering a watercourse.

SECTION 3

GUIDELINES

3.1 Purpose

The section provides a brief summary of several documents used in New Brunswick related to activities which have potential effects on water quality and soil erosion.

3.2 Forest Management Manual For Crown Lands in New Brunswick

This manual outlines the required procedures used in the planning, locating and construction of a harvest area on Crown Lands where a watercourse may be affected. It is a legal document for a companies having a Crown Timber Licence on Crown Land. The Department of Natural Resources and Energy develops, revises and implements the document in a partnership role with the Crown Timber Licensee's. The manual contains the key components in protecting and managing the natural resources on Crown Land with regards to timber harvesting activities.

Planning and Locating of Roads

If a road right-of-way is built parallel to any stream greater than 0.5 metres in width, than a treed buffer of at least 30 metres must be left in place. However the Regional Resource Manager may specify different buffer widths as deemed necessary. Also any alterations made to a watercourse draining an area greater than 600 hectares, at the site of the alteration, requires a Watercourse Alteration Permit from the Department of Environment. Alterations made to watercourses that drain an area less than 600 hectares requires approval from the Department of Natural Resources.

Construction of Roads

To protect watercourses from the infiltration of excess sediment during harvesting, certain construction techniques must applied.

- 1) All harvested wood from a road right-of-way must be landed within the right-of-way and piled at least 15 metres from a watercourse. Also any damaged or merchantable trees along the edge of the right-of-way must be utilized.
- 2) Bullpens or windrows will not be located within 30 metres of a watercourse.
- 3) Tractor work will not be permitted outside the road right-of-way width. This applies particularly to the channelization of natural watercourses, trenching for additional fill and the building of runoffs from culverts.
- 4) Faces of gravel or burrow pits must be stabilized by backsloping the pit to the

original ground contour.

5) For natural watercourses whose channel is 0.5 metres or wider, a 30 meter no-grub zone will be maintained. For natural watercourses whose channel is less than 0.5 metres in width, a 10 meter no-grub zone will be maintained. The exception is if the grub zone immediately underlies the roadbed. Regardless of the watercourse width, no harvesting of nonmerchantable wood will be undertaken in the right-of-way area within 10 metres of a watercourse.

6) Forging equipment will be minimized and confined to a single narrow area, and streambed and / or stream bank restoration will be undertaken as required.

7) Drainage structures and temporary watercourse structures will be installed between June 1st and September 30th unless otherwise approved by the Regional Resource Manager (RRM).

8) Culverts

Drainage structures will be designed to support the design loadings.

Culvert Diameters

The size of the drainage structures will be determined according to the area opening required at peak flow. In a natural watercourse whose channel is 0.5 metres and wider, or in an artificial channel constructed for reasons other than surface drainage, the minimum acceptable culvert is 760 millimetres in diameter or equivalent, unless otherwise approved by the RRM. This requirements also applies to culverts installed as part of a multiple culvert installation. The minimum culvert for a natural watercourse whose width is less than 0.5 metres, is 450 millimetres in diameter or equivalent. The minimum acceptable culvert for installation in an artificial surface drainage channel will be a circular pipe 300 millimetres in diameter.

Multiple Culvert Installation

Multiple culvert installations will be restricted to two culverts in a natural watercourse channel with the culverts being placed a distance of one half the diameter or span apart, or 1 meter, whichever is greater. The bottom of one culvert will be set 15 centimetres into the streambed, with the second culvert set at an elevation equal to the original streambed.

Culvert Slope

Culverts in natural watercourses will be installed on a uniform slope such that the inlet and outlet are set at least 15 cm into the streambed, except in multiple culvert installation. The maximum slope of culverts in fish populated natural watercourses is 0.5%. In cases where the stream gradient does not allow for this requirement then

pipe arches, arches, interior baffling or still basins shall be used to maintain adequate depth of flow and velocity for fish passage.

Culvert Material

Galvanized steel pipe, concrete pipe, plastic pipe (for non-fish bearing streams) or squared timber will be used in culvert and bridge construction.

Culvert Length

The length of the culvert pipe will be determined by the formula $LC = W + 4D$. This achieves a 2:1 slope at the culvert openings.

LC = length of culvert

W = the width of the road from shoulder to shoulder

D = the depth of fill over the culvert from the bottom of the pipe.

Where the culvert has been stabilized by cribbing or shear wall, the 2:1 slope requirement will apply to the area from the top of the cribbing or shear wall to the road surface.

9) Bridges

Drainage structures will be designed to support the design loadings.

Bridge Construction

During bridge construction, excavation for piers, footings and abutments will be conducted in such a manner as to keep the work area separated from the watercourse by cofferdams made of nonerodible material. Excavated materials will not be allowed to enter the watercourse and care will be taken during the removal of the cofferdam. The streambed will be restored back to its original condition. Pollutants such as lime, cement, creosote, deicing agents, etc. and debris will be prevented from entering the watercourse.

Stabilization of Drainage Structures

Drainage structures installed in natural watercourses will require stabilization of the inlet and outlet fill slopes to a height of at least 0.5 metres above the top of the culvert, at the time of installation. The methods to achieve this are as follows:

- 1) rip rap - this will consist of durable quarried or field rock with at least 60 % of the rock 0.03 m^3 or larger.
- 2) shear walls - geotechnical fabric must be placed behind all material other than square timber.

In addition to the above, the inlet and outlet slopes from 0.5 metres above the culvert to the road level will be stabilized by one of the following means:

- 1) vegetated slope - establishment of a vegetated 2:1 slope prior to September 15.
- 2) If a 2:1 slope cannot be stabilized by vegetation by September 15 then other methods will be required : i) raise the shear walls to road level
 - ii) cover the slope with straw 5 centimetres thick along with seeding or clean rip rap with geotechnical fabric up to the road level.

On steep grades, where the soil type is susceptible to erosion, culverts will be skewed across the road so that water will flow through at a uniform rate. Spacing for cross drainage culverts or water diversions will be determined as follows:

$$\text{Spacing} = \frac{500 \text{ m}}{\% \text{ road grade}}$$

On steep grades, groins and diversion ditches will be used to restrict surface drainage flow down ditches and to dissipate this flow away from the road and stream into vegetation and standing timber.

10) *Maintaining*

Where it is necessary to replace an existing bridge or culvert, the Licensee will obtain a Watercourse Alteration Permit and / or DNR approval. Where it is necessary to clear forest road rights-of-way of vegetation by chemical means, the Licensee will acquire a Pesticide Applicator certificate from the Pesticide Advisory Board and permit from the Minister of the Department of Environment.

3.3 Watercourse Alterations Technical Guidelines for New Brunswick

3.3.1 Purpose

This technical guideline provides documentation on proper techniques that are useful in preventing erosion and sedimentation from occurring during a watercourse alteration. Topics covered include:

- 1) Basic Requirements Common to Many Salmonoids
- 2) Erosion and Sedimentation
- 3) Fish Passage
- 4) Activities Which Require a Permit
- 5) Activities Which Do Not Require a Permit
- 6) Types of Permits
- 7) Permit fees
- 8) Documents Required with the Submittal of Watercourse Alteration Applications
- 9) Surface Erosion and Sediment Control
- 10) Guidelines for Specific Watercourse Alteration Types

3.3.2 Activities Which Require a Permit

- 1) Bridge and culvert installation and repair.
- 2) Use or construction of a ford.
- 3) Road construction, landscaping and tree removal within 30 metres of the edge of the bank of a Watercourse.
- 4) Addition of any material including clean fill, sand, gravel or rocks to the bed, shoreline or within 30 metres of the edge of the banks of any watercourse.
- 5) Draining, pumping, excavating or removing, water, soil, mud, sand, gravel, aggregate of any kind or debris from any watercourse or wetland.
- 6) Construction or installation of breakwaters, retaining walls, wharves or groins.
- 7) Operation of heavy machinery within 30 metres of the bank of any watercourse.
- 8) Installation or modification of a dam and / or any water level control structure.
- 9) Pond creation, by-pass or dug out.

3.3.3 Activities Which Do Not Require a Permit

- 1) Repair of a structure if no modification is made to the size, shape, materials and alignment and the repair does not involve any instream work.
- 2) Withdrawing water at a rate of less than 45 litres per minute for exploration drilling as long as permission has been received from the Mining Recorder, and terms and conditions under which the permission is granted is followed.
- 3) Installation of drainage tile for agricultural land, provided standards agreed upon by the Department of Agriculture are followed and the project has been approved by the Department of Agriculture.
- 4) The installation and removal of seasonal wharves that do not require any construction or excavation during installation.
- 5) Any activity within 30 metres of the banks of a watercourse that requires an approval under the Water Quality Regulation - Clean Environment Act, provided the applicant is issued an approval prior to commencing the activity and they complete the activity according to the required conditions within the time frame for which the permit is valid.
- 6) The construction of a roadway, railway or agricultural drainage ditch if there is no danger of pollution as a result of the construction and the operation of the ditch and if the ditch does not break the bank of the watercourse.
- 7) Coastal waters are not under the jurisdiction of the Watercourse Alteration Regulation and therefore do not require a watercourse alteration permit. The Canadian Coast Guard - Marine Navigation Services, the Department of Fisheries and Oceans and the New Brunswick Department of Natural Resources and Energy should be contacted regarding any activities involving coastal waters.
- 8) Unless it is deemed necessary by the New Brunswick Department of the Environment, on Crown Lands, watercourse alterations undertaken on a watercourse that drains an area of six hundred hectares or less at the site of the alteration, do not require a watercourse alteration permit provided that an operating plan approved by a RRM of the Department of Natural Resources and Energy is implemented.

3.3.4 Documentation Required to Apply for a Watercourse Alteration Permit

The following table (Table 3.1) gives a list by watercourse alteration type, of the documents required with the submittal of an application for a Watercourse Alteration Permit.

Table 3.1 Application Review Requirements

Alteration Type	Regulatory & Advisory	Regulatory Only	Required Documentation
Dams	X		Specifications: Engineering scale drawings (plan, profile, X-section)
*Water Control Structures	X		Specifications: Drawings to scale (plan, profile, X-section)
*Causeways	X		Specifications: Drawings to scale (plan, profile, X-section)
Land Extensions	X		Drawings to scale (plan, profile, X-section)
Bridges		X	Drawings to scale (plan, profile, X-section)
Wharves and Piers		X	Drawings to scale (plan, profile, X-section)
Culverts and Pipe Arches		X	Dimensioned sketches showing size, shape, alignment and slope
Dredging	X		Bed material analysis. Drawings to scale (plan, profile, X-section)
*Cutoffs *Channelization *Diversions	X		Bed material analysis. Drawings to scale (plan, profile, X-section)
Channel Cleaning	X		Bed material analysis. Drawings to scale (plan, profile, X-section)
Debris Removal		X	Dimensioned sketches
Tree and Bush Removal		X	Dimensioned sketches
Instrument Pools and Wells		X	Drawings to scale (plan, profile, X-section)
Water Intake Structures		X	Drawings to scale (plan, profile, X-section)
Pipeline/Cable Crossings	X		Bed material analysis. Drawings to scale (plan, profile, X-section)
By-Pass and Dugout Ponds	X		Drawings to scale (plan, profile, X-section)
Erosion Control Works		X	Dimensioned sketches
Flood Protection Works. Flood Water Diversion Channels	X		Bed material analysis. Drawings to scale (plan, profile, X-section)
*Removal of Major Obstructions	X		Drawings to scale (plan, profile, X-section)

Table 3.1 cont'd

Removal of Minor Obstructions		X	Dimensioned sketches
Miscellaneous Drainage Changes		X	Dimensioned sketches
Subdivisions and Alignments	X		Drawings to scale (plan, profile, X-section)

* These plans may be required to bear the seal of a person licensed to practice as a Professional Engineer pursuant to the Engineering Profession Act, depending on the size and/or potential impact of the project.

Further documentation may be required, therefore consulting with the Watercourse Alteration Technical Guidelines may be necessary to complete the application for a permit.

3.3.5 Other Information In Guidelines

Three other key tables located in the Watercourse Alteration Technical Guidelines are:

- 1) Freshwater Habitats and Behavioural Patterns of Some Notable Aquatic Species of New Brunswick
- 2) Migratory Periods of Some Aquatic Species in New Brunswick
- 3) Sensitive Periods of Some Aquatic Species in New Brunswick

3.4 Compliance and Enforcement Policy for the Province of New Brunswick

This document discusses the Province of New Brunswick’s policies on compliance and enforcement dealing with such issues as: 1) Principles Governing Enforcement 2) Measures to Promote Compliance 3) Enforcement Measures to Promote Compliance 4) Cost Recovery 5) Agencies Responsible For Environmental Enforcement 6) Public Participation.

3.4.1 Principles Governing Enforcement

- 1) Compliance with the law is mandatory
- 2) Enforcement officials will apply environmental law in a fair, firm and consistent manner
- 3) Environmental law will be administered with emphasis on the prevention of damage to the environment
- 4) Enforcement officials will examine every suspected violation of which they have knowledge and undertake appropriate action consistent with the Province of New Brunswick’s policies on compliance and enforcement
- 5) The “polluter pay principle” will be applied so that public funds are not a principal source of funding for environmental clean-ups

6) Public education programs will be established to promote compliance with environmental law, and assist members of the public in the reporting of suspected violations

3.4.2 Measures to Promote Compliance

Through education, consultation, new technologies, codes of practice and standards, contingency plans and environmental audits, the Department of Environment hopes to promote compliance measures to industry and individuals involved in activities that are or may be a source of pollution.

3.4.3 Enforcement Measures to Promote Compliance

This section is broken into two components, criteria and enforcement process.

Criteria

The first component deals with the criteria that will be applied by enforcement officials when considering a course of action in response to suspected violations. Inspectors or enforcement officials when dealing with a violation will consider three things;

- 1) Gravity of Violation
- 2) Effectiveness of Achieving Desired Results
- 3) Equitable and Consistent Enforcement

Enforcement Process

Investigations into each alleged violations applying to environmental law in New Brunswick will normally follow these steps:

- 1) Report of Environmental Occurrence
- 2) Inspection
- 3) Administration Options to Compel Compliance
 - Warnings
 - Schedules of Compliance
 - Ministerial Orders
 - Injunctions
 - Government Initiated Remediation
- 4) Verification of Compliance
- 5) Investigation
- 6) Prosecution
- 7) Penalties and Court Directed Orders

A flow diagram of this process is shown in the Compliance and Enforcement Policy

document.

3.4.4 Cost Recovery

The Department of Environment will initiate proceedings in court based on the principals of “polluter pays” and “fairness” to try and recover public funds spent on environmental remediation, from the person responsible.

3.4.5 Agencies Responsible for Environmental Enforcement

The agencies responsible for environmental enforcement come from the Federal and Provincial levels of government.

The federal government administers the Canadian Environmental Protection Act and the Fisheries Act.

The provincial government has two departments which deal with compliance and enforcement policies in the Province of New Brunswick. *The Department of Environment* is responsible for administering the Clean Environment Act, Clean Water Act, Pesticides Control Act, Beverage Containers Act and the Unsightly Premises Act. *The Department of Natural Resources and Energy* enforce certain provisions of the Watercourse Alteration Regulation under the Clean Water Act. As well *Municipalities* have enacted by-laws related to specific environmental concerns within their jurisdictions.

3.4.6 Public Participation

Any member of the public who wishes to report an environmental incident must provide specific dates, times, location and particular events. This information can be either called, faxed or mailed the nearest office of the Department of the Environment. If the person who is reporting the incident wishes to know the outcome, they must provided their name when making the report.

SECTION 4

BEST MANAGEMENT PRACTICES

4.1 Purpose

Best Management Practices, or BMPs, are defined as a practice or combination of practices that are determined to be the most effective and practicable means of controlling point and non-point source pollutants for an individual or industry. Legislation establishes minimum requirements to protect the resources and the people of New Brunswick. The Watercourse Setback Designation Regulation, described in Section 2.12, has converted numerous BMPs into legislation due to their practicality and effectiveness. BMPs provide a practical approach in protecting water quality and quantity while sustainable development continues. This BMP review identifies issues that are relative to the protection of watercourses.

- 1) Buffer Zones
- 2) Stream Management Zones
- 3) Erosion Control Devices
- 4) Sediment Control Devices
- 5) Water Crossings
- 6) Agriculture

One excellent reference is the manual entitled “Best Management Practices Manual For Private Woodlots” (First Edition – April 1998) produced by the SNB Forest Products Marketing Board.

4.2 Buffer Zones

Buffer zones play a vital role in the protection of water quality and any watercourse. They act like a filtration system, removing excess nutrients, sediments and other suspended solids from surface runoff. Buffer zones also provide shade to watercourses helping to maintain the temperature of the water. If trees are allowed to mature in the buffer zone, they will contribute large organic debris and litter material which is essential to the ecosystem in these essential areas. Large organic material is essential to streams and rivers by providing habitat diversity for aquatic life such as fish and insects. Trees also provide shade and cover which are important in maintaining cool temperatures in the summer months.

4.2.1 Buffer Zones as Filtration Systems

Streamside forests have the ability to filter sediments and other suspended solids before they have a chance to reach a watercourse. This is particularly important when trying to protect a watercourse from agricultural runoff. When excess nutrients are

applied to the land in the form of manure or commercial fertilizer, there is a potential for them to be transported into a watercourse. If this happens, then there may be a possibility that an overabundant growth of algae or other aquatic plants may occur. This could lead to depleted dissolved oxygen levels affecting the ecosystem of that watercourse. With the proper buffer strip left in place, nutrients such as phosphorous are retained by the trees and other vegetation. As well, the velocity of the runoff is slowed, creating reduced erosion potential, due to the interception of sediment by the vegetation in the buffer strip. Buffer zones also provide shaded areas which will help keep water temperatures from reaching lethal conditions for aquatic species requiring cool temperatures.

4.2.2 Buffer Zone Widths

In New Brunswick, 30 metre buffer strips are left on the banks of watercourses as required by the Watercourse Alteration Regulation under the Clean Water Act. Buffers vary on Crown Land and in Designated Watersheds based on slope primarily, although soil type and composition (clay, organic, loam, sand, etc) can also be considered. Although it is mandatory in New Brunswick to leave a thirty metre buffer on private land, landowners may opt for wider widths in order to maintain these essential streamside and wetland areas.

4.2.3 Methods of Determining Buffer Zone Widths

The Department of Natural Resources and Energy, Forest Management Branch, has developed a method to verify that this distance has been established. At 80 metre intervals the width of the buffer strip identified by the Licensee, is measured. The bank slope is also measured and categorized as 0 - 5 %, 6 - 10 % or greater than 10 %. If the buffer strip is less than 80 metres in length, three measurements are recorded. One measurement at the beginning of the strip, one measurement at mid-point and one measurement at the end. Once all the measurements have been recorded for the length of the buffer zone, an average is calculated. The average should be 30 metres.

4.2.4 Slope and Soil Type

Determining an appropriate streamside forest buffer width should be highly dependent upon the slope and the erodibility of the soil. The BMP's reviewed for this report give a general indication, as indicated in Table 4.1, that the buffer strip widths may be applied according to the slopes, depending on soil erodibility.

Table 4.1: Minimum Buffer Strips based on Percent Slope

% Slope	Minimum Buffer Strip
0 - 10	30 metres
11 - 20	35 metres
21 - 30	40 metres
31 - 40	45 - 50 metres
41 - 50	50 - 55 metres
51 +	High erosion potential. Activity should be very limited or restricted.

4.2.5 Stream Management Zones

Stream Management Zones (SMZ) can be placed to protect riparian areas. They extend from the banks of a watercourse back into the forest, field or other surrounding habitat. The width of the SMZ varies according to local conditions of slope and soil type. SMZs act as effective filter systems and sediment traps. They provide an excellent source of food for insects, invertebrates and other aquatic life. SMZs provided stream shade and cover for fish, as well as, stabilizing stream banks, protecting them from erosion.

Three Zone Streamside Buffer

Figure 4.1 shows an example of a Three Zone Streamside Buffer (USDAFS, 1992).

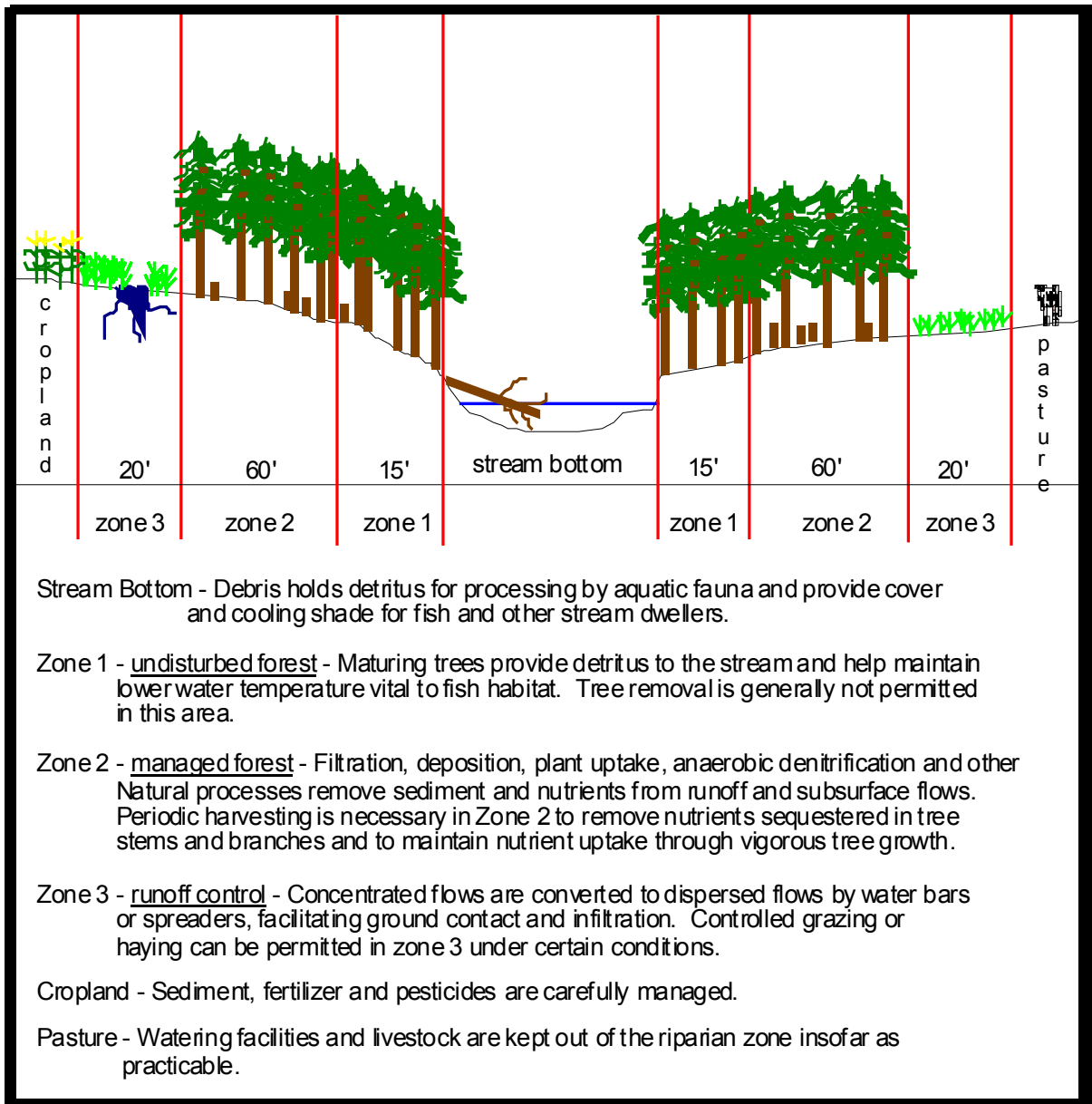


Figure 4.1 Three Zone Streamside Buffer

4.3 Erosion Control Devices

4.3.1 Purpose

Soil erosion is the activity of water causing particles of soil to go in motion. This is caused by rainfall, sheet water flow and concentrated water flow. When land becomes unstable, either by natural causes or by human activity, it becomes susceptible to erosion. Road building and maintenance, whether for highways, agricultural purposes or woodland roads, all generate unstable surfaces which will erode if rain or water comes in contact with the exposed material. It is much easier and cost-effective to manage sites to minimize the potential of erosion than to have the water destroy the roads, wash valuable topsoil away and seriously impact on water quality.

Erosion control devices are essential components to any activity which removes the vegetation cover from a piece of ground. On access roads they can be used to stabilize areas or deflect water of roads into vegetated areas. The following is a list of six erosion control items which can be utilized as BMPs to control erosion.

- 1) Rip Rap
- 2) Broad-Based Dip
- 3) Rolling Dip
- 4) Water Bars
- 5) Water Turnouts
- 6) Mulching and Re-Vegetation

4.3.2 Rip Rap

Rip Rap may be used in many locations such as river bank protection, ditch lining, protection of bridge abutments and culvert inlets and outlets. Rip Rap is large, greater than 15 cm, angular rock (usually blasted material). A slope ratio of 2:1 or flatter is recommended to provide the stability. Wood crib work can also be used.

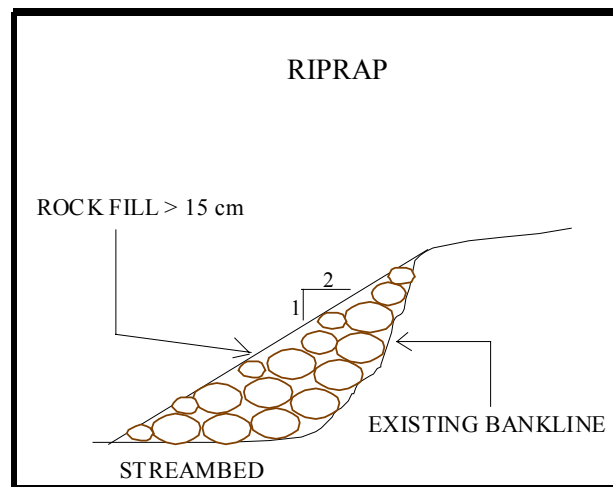


Figure 4.2 A riprapped stream bank

4.3.3 Broad-Based Dips

A Broad-Based Dip is a dip and reverse slope in a road surface with an outslope in the dip for natural cross drainage. These structures are most effective on roads or skid trails that have a gradient which is less than 12 %.

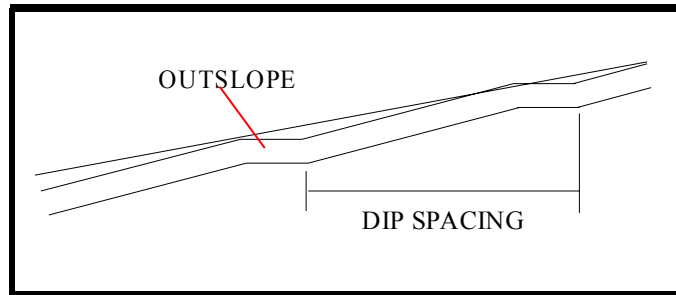


Figure 4.3 Broad-Based Dips

The recommended spacing for Broad-Based Dips are as follows (Delaware Forestry Association, “undated”).

Table 4.2 Broad-Based Dip Spacing

Road Grade (%)	Spacing Between Dips (feet)
2	300
3	235
4	200
5	180
6	165
7	155
8	150
9	145
10	140
12	135

4.3.4 Rolling Dip

The Rolling Dip is a dip and reverse slope in a road surface with an out slope in the dip for natural cross drainage and is may be used on roads with a gradient between 12 % and 15 %. (Figure 4.4)

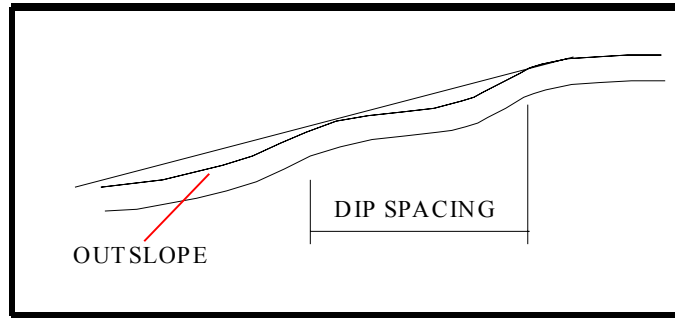


Figure 4.4 Rolling Dip

The Delaware Forestry Association recommends the following spacing for Rolling Dips based on the grade of the road (Table 4.3).

Table 4.3 Rolling Dip Spacing

Grade of Road (%)	Spacing Between Dips (feet)
2 - 5	180
5 - 10	150
10 - 15	135
15 +	120

4.3.5 Water Bars

A Water Bar is a trench constructed across a road or trail. These may be constructed where surface water runoff may cause erosion of the exposed soil.

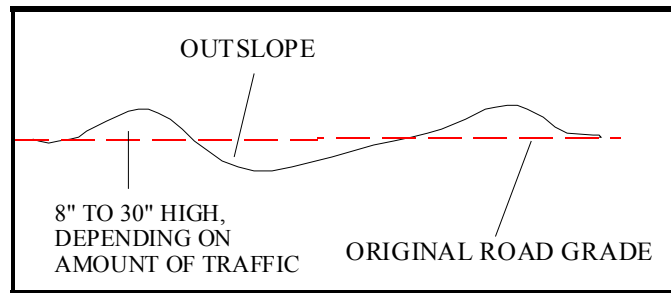


Figure 4.5 Water Bars

The following recommendations, Table 4.4, apply to the spacing of the Water Bars based on the percent grade of the road or trail (Watercourse Alterations Technical Guidelines, 1994).

Table 4.4 Water Bar Spacing

Grade of Road (%)	Spacing Between Water Bars (m)
< 5	38
5 - 10	30
10 - 20	23
20 - 30	15
> 35	7.6

4.3.6 Water Turnouts

A Water Turnout, also known as off take ditches, is a ditch which will divert water away from roadside ditches. They should be designed so that any water is reduced in volume and velocity and is dispersed in a manner which eliminates any erosional impact potential. The recommended spacing is 200 metres divided by the slope in percent. The water is directed into the forest floor to allow sediment to settle and it reduces the amount of water flowing in the ditch, thus reducing erosion of the ditches.

4.3.7 Mulching and Re-Vegetation

Protecting the exposed surface from the forces of rain, can be very economical when considering the costs of erosion and sediment control measures. By placing a cover, such as straw or hay, on the bare ground, erosion is significantly reduced. The advantage of hay is that it contains local seed sources which will greatly assist in the re-stabilization of the surfaces. Other measures such as hydroseeding, hand spreading of seed, erosion control blankets and paper mulches can be an asset to any construction site or eroding area.

4.4 Sediment Control Devices

4.4.1 Purpose

Sediment control is an activity to manage water once it has become muddy. This means that it now contains suspended solids. There are various methods for controlling and preventing excess sediment from entering a watercourse. The following are discussed in this report.

- 1) Check Dams
- 2) Silt Fences
- 3) Straw Bales
- 4) Sediment Trap
- 5) Re-Vegetation

4.4.2 Check Dams

Check Dams are temporary structures used to reduce the velocity and volume of water thereby reducing the potential for erosional damage to occur. The slope behind the check dam should be no more than 2:1. Sediment behind the dam should be removed once it has reached one half the height of the concentrated flow area. They are only in place until permanent stabilization of the area has been established.

4.4.3 Silt Fences

Silt Fences are synthetic fabrics used to trap fine particles before they reach a watercourse. Silt Fences are held in place by posts and the slope behind the silt fence should be no more than 2:1. Sediment behind the fence should be removed once it has reached one half the height of the concentrated flow area.

4.4.4 Straw Bales

Straw Bales work much the same as check dams, they intercept runoff and trap the sediment before it reaches a watercourse. Again the slope behind the barrier should be no more than 2:1 and removal of the sediment should occur when it reaches one half the height of the barrier.

4.4.5 Sediment Trap

Sediment Traps should be used when roadside ditching is steep. Water containing sediment should be diverted through a sediment trap to help remove the particles before they have a chance to enter a watercourse.

4.4.6 Re-Vegetation

The above techniques are temporary and should only be in place until permanent vegetation has stabilized the surrounding soil. The disturbed area should be graded to a slope of 2:1 or lower (6:1 is appropriate) and any stones or debris should be removed. Re-vegetation can be accomplished by using hay as a mulch or ground cover, hydroseeding, by placing an erosion control mat in conjunction with other seeding methods, but care must be taken during installation to ensure proper protection. Straw based blankets have a short life, 3 to 6 months, where as coconut fibers last for two to three years so that if re-vegetation is attempted in the fall or winter stabilization will be provided until the vegetation takes hold the following growing season.

4.5 Water Crossings

4.5.1 Purpose

The BMPs reviewed for this report discussed various types of water crossings.

However, for the purpose of this report, only the following types will be reviewed:

- 1) Fords
- 2) Bridges
- 3) Culverts

The following three documents are produced in New Brunswick and are excellent documents with regards to watercourse crossings: Watercourse Alteration Technical Guidelines for New Brunswick (NBDOE), Working Near Water : Guidelines for New Brunswick Woodlot Owners (NBDNRE) and Best Management Practices Manual for Private Woodlots (SNB). Details are available in these documents so they will not be provided in this text.

4.5.2 Fords

Fords may be used only if no other practical alternative exists. The bottom of the stream should be hard enough to prevent muddy water from occurring. As well the entrance and exit route of the ford should be lined with rock an appropriate distance back from the watercourses banks. All vehicles must be clean of dirt and lubricant so as not to contaminate the water. Water depth should not be greater than the thickness of the tire (ie. just to the rim).

4.5.3 Bridges

Bridges are the preferred method of crossing watercourses over culverts. Proper installation of a bridge should result in the natural watercourse bed remaining intact and the natural cross sectional area of the channel remaining the same. As well bridges do not act as a barrier for fish passage and during construction there should be minimal in-stream activity. Complete details on bridge construction and installation are provided in the Watercourse Alteration Technical Guidelines for the Province of New Brunswick.

4.5.4 Culverts

Culverts are an efficient and inexpensive way of crossing watercourses. They provide an excellent option where bridge construction is difficult. However, certain designing factors must be take into consideration when a culvert is to be installed, as the potential for significant environmental impact is great. Culverts must be made of durable and weather resistant material. As well, they must be strong enough to support the weight of the traffic which will be using the crossing. Culverts must not act as a barrier, but allow for fish passage to occur uninterrupted. Complete details on proper culvert sizing, installation and stabilizing the surrounding area is provided in the Watercourse Alteration Technical Guidelines for the Province of New Brunswick.

4.6 Agriculture

4.6.1 Introduction

Pollution may come from various non-point sources in the agriculture industry. The following (Table 4.5) is a modification of the table taken from the document, "Policy Instruments for Environmental Protection in Agriculture", which lists non-point sources of contamination of surface and groundwater in Atlantic Canada.

Table 4.5 Non-point Sources of Contamination of Surface and Groundwater in Atlantic Canada

Soil sediments from farm fields
Soil sediment from streambank erosion
Nutrients carried with eroded soil sediment
Nutrients leached from fertilizer and manure applied to crops
Runoff and leachate from manure storage
Nutrients leached from forages plowed down early in the season
Pesticides, herbicides, insecticides
Bacteria from livestock manure and septic systems
Land application of wastes
Road salt, soil eroded from roads

Table 4.6 lists allowable limits of contamination based on various guidelines. These values are either legislated or established as guidelines and it is highly recommended that they be utilized when dealing with the quality of drinking water.

4.5.2 Manure

The application of manure should be restricted to times of the year when crops can uptake the nutrients. Applying manure on frozen ground or on the snow may result in run-of contamination

4.5.3 Ploughing

If ploughing occurs late in the summer or too early in the fall residues may breakdown into nitrogen and nitrates. The lack of vegetation to uptake the nutrients may lead to the leaching of nitrates in the groundwater, contributing to groundwater contamination. Erosional problems may also occur after fall ploughing. The soil is left bare over the winter and is fully exposed during snow melt.

Table 4.6 Drinking Water Contamination Listing

<u>Contamination</u>	<u>Guideline</u>	<u>Source</u>
<p>Nitrates (NO₃- N)</p> <p>1) Uncontaminated surface waters</p> <p>2) Most surface streams in Atlantic Canada</p> <p>3) Wells</p> <p>4) Potato cropping areas in NB and PEI</p>	<p>below 1 mg L⁻¹</p> <p>generally lower than 10 mg L⁻¹</p> <p>generally lower than 10 mg L⁻¹</p> <p>10 - 20 mg L⁻¹</p>	<p>Canadian Drinking Water Standard</p> <p>Canadian Drinking Water Standard</p> <p>Canadian Drinking Water Standard</p>
<p>Bacteria</p> <p>Coliform</p> <p>Faecal coliform</p>	<p>potable water < 10 total coliforms/100 ml and should contain none 75% of the time</p> <p>potable water < 2 faecal coliforms/100ml and should contain none 75% of the time</p>	<p>Guidelines for Canadian Drinking Water Quality</p> <p>Guidelines for Canadian Drinking Water Quality</p>
<p>Pesticides</p> <p>1) atrazine</p> <p>2) simazine</p> <p>3) metribuzin</p> <p>4) alachlor</p> <p>5) metachlor</p> <p>6) captan</p> <p>7) chlorothalonil</p> <p>8) dimethonate</p> <p>9) dinoseb</p> <p>10) des-atrazine</p>	<p>5 ppb</p> <p>10 ppb</p> <p>80 ppb</p> <p>5 ppb</p> <p>50 ppb</p> <p>no guideline</p> <p>no guideline</p> <p>20 ppb</p> <p>10 ppb</p> <p>5 ppb</p>	<p>Nova Scotia Dept. Of Environment, 1990</p> <p>“”</p> <p>“”</p> <p>“”</p> <p>“”</p> <p>“”</p> <p>“”</p> <p>“”</p> <p>Milburn, 1994</p> <p>Milburn, 1996</p>
<p>Suspended Solids</p>	<p>< 100 mg L⁻¹</p>	<p>Canadian Guidelines for the Protection of Aquatic Life</p>

SECTION 5.0

CONCLUSION

The previous review dealt with documents which relate to compliance requirements for various activities as they relate to legislative requirements. Acts and Regulations are laid out to assist in protecting valuable resources such as soil, water and our ecosystem. A review of the legislation indicates that the legal capabilities are available to ensure compliance with the objectives of the Act or Regulation. A more practical approach, such as BMPs, are available to be followed as they meet or exceed current legislative requirements. Numerous documents are available to explain methods to minimize soil erosion, protect water quality and reduce impacts on the environment.

Several documents have been referred too during the presentation of this information. They are available at the Fundy Model Forest office in Sussex, New Brunswick. They are also briefly described in the document entitled "Annotated Bibliography For The Fundy Model Forest On Best Management Practices, Acts, Regulations and Guidelines in New Brunswick" (1999)

Compliance monitoring is essential in ensuring the current legislation is implemented effectively and should be part of an educational program.