

Forest Operations Compliance Audit Performance Indicators

**Natural Resources
April 2014
Reference 867-01**

TABLE OF CONTENTS

	Page
INTRODUCTION	5
1. OBJECTIVE: Effective Communication of Forest Operation Information	7
1.1. PERFORMANCE MEASURE: Provision of accurate and timely information required to assess forest operations.	7
1.1.1. Performance indicator: Information necessary for conducting and assessing forest operations has been submitted and follows appropriate standards.	7
2. OBJECTIVE: Effective Use of the Timber Resource	8
2.1. PERFORMANCE MEASURE: Minimization of waste on timber harvest operations.	8
2.1.1. Performance Indicator: There is no waste remaining within the harvest block, or a portion thereof.	8
3. OBJECTIVE: Compliance with Other Prescribed Requirements	9
3.1. PERFORMANCE MEASURE: Harvest operations are done following standards. .	9
3.1.1. Performance Indicator: The harvest operation follows standards and reflects the conditions described in the Operation Plan.	9
3.1.2. Performance Indicator: General requirements for all harvest blocks have been followed.	9
3.2. PERFORMANCE MEASURE: Forest Audit Report requirements are met.	10
3.2.1. Performance Indicator: The requirements of the Forest Audit Report have been met.	10
3.2.2. Performance Indicator: The Compliance Action Plan has been satisfactorily implemented.	11
4. OBJECTIVE: Provision of Safe Access to Crown Land While Reducing The Risks Forest and Logging Roads Pose to the Environment and Other Resource Values.....	12
4.1. PERFORMANCE MEASURE: Proper road location, construction and maintenance provides for safe access to crown land while minimizing the risks to the environment and other resource values.	12
4.1.1. Performance indicator: The location of a new road or a road undergoing major reconstruction is to standard.....	12
4.1.2. Performance indicator: The road is constructed to standard.	13
4.1.3. Performance indicator: The road is maintained to standard.	13

5.	OBJECTIVE: Protection of Water Quality and Aquatic Habitat.....	15
5.1.	PERFORMANCE MEASURE: Establish and appropriately manage riparian and wetland buffers.....	15
5.1.1.	Performance Indicator: The buffer width is appropriate for the wetland, watercourse, and/or special feature.....	15
5.1.2.	Performance Indicator: The buffer zone harvest is to standard.	16
5.2.	PERFORMANCE MEASURE: Watercourse crossing installation procedures minimize erosion, sedimentation and siltation.....	16
5.2.1.	Performance Indicator: A no-grub zone has been left on both sides of the watercourse crossing.....	17
5.2.2.	Performance Indicator: The watercourse crossing location is to standard.....	17
5.2.3.	Performance Indicator: The watercourse crossing structure in a natural watercourse has been installed “in-the-dry”.....	18
5.2.4.	Performance Indicator: The appropriate watercourse crossing structure has been installed while maintaining the integrity of the watercourse and stability of the watercourse banks.	19
5.3.	PERFORMANCE MEASURE: Watercourse crossing structures are maintained to diminish site and/or watercourse degradation.....	19
5.3.1.	Performance Indicator: Existing watercourse crossing structures with identified environmental or liability issues are dealt with in an appropriate manner.	19
5.4.	PERFORMANCE MEASURE: Watercourse crossing removal procedures minimize erosion, sedimentation and siltation.....	20
5.4.1.	Performance Indicator: Watercourse crossing structures requiring removal have been removed in a timely manner and the site has been decommissioned to standard.....	20
6.	OBJECTIVE: Effective Protection of Special Management Areas.....	22
6.1.	PERFORMANCE MEASURE: Minimize impact on sensitive wildlife habitat	22
6.1.1.	Performance Indicator: OFWH harvest is to standard.	22
6.1.2.	Performance Indicator: Deer Wintering Area (DWA) harvest is to standard.	23
6.1.3.	Performance Indicator: Harvesting in and around raptor and heron nesting sites is to standard.....	24

6.2.	PERFORMANCE MEASURE: Ensure old forest communities are maintained.....	24
6.2.1.	Performance Indicator: Old Forest Communities harvest is to standard.....	24
7.	OBJECTIVE: Protection of Forest Soils.....	26
7.1.	PERFORMANCE MEASURE: Minimize damage to forest soils caused by harvest operations.	26
7.1.1.	Performance indicator: Exposed mineral soil has been stabilized.....	26
7.1.2.	Performance indicator: Reasonable efforts have been made to minimize rutting.	26
7.1.3.	Performance Indicator: Forest biomass has been removed only from approved, eligible stands.....	27
8.	OBJECTIVE: Protection of the Environment	28
8.1.	PERFORMANCE MEASURE: Road and harvest operations minimize damage to fish and wildlife habitat.....	28
8.1.1.	Performance Indicator: Forestry activities on steep slopes conform to standards.....	28
8.1.2.	Performance indicator: Forestry activities in Designated Watersheds conform to standards.....	29
8.1.3.	Performance indicator: The forest operation is free of environmental contaminants.	29
INDEX		31

LIST OF FIGURES

	Page
Figure 1. Template for Identification of Audit Items	5
Figure 2. Assessment of a Compliance Action Plan.	11

INTRODUCTION

The overall purpose of a forest management audit is to measure conformance to management objectives, address non-conformance items, and promote continual improvement in management practices. Audits of forest management systems have become increasingly common over the past decade, led initially by ISO's 14001 Environmental Management System initiative and subsequently by a number of comprehensive forest certification programs. The audit processes associated with each of these initiatives share the following main elements:

- Identification of items to be audited,
- Definition of steps involved in audit process,
- Prescribing action for non-compliance, and
- Reporting of audit results.

This basic framework provides a foundation for the Department of Natural Resources' (DNR) audit process for assessing Licensees' operating performance.

A clear definition of the individual audit items is the most critical component of any audit program. It focuses all subsequent audit activity to those areas that will provide some conclusion on whether Licensees' management activities have met established requirements. It also alerts Licensees to the management requirements and expectations of the DNR, thereby providing them the opportunity to develop and implement appropriate operating strategies and actions to achieve them.

A basic template similar to that illustrated in Figure 1 is employed by most forest certification audit systems as a framework for the identification of the various audit items.

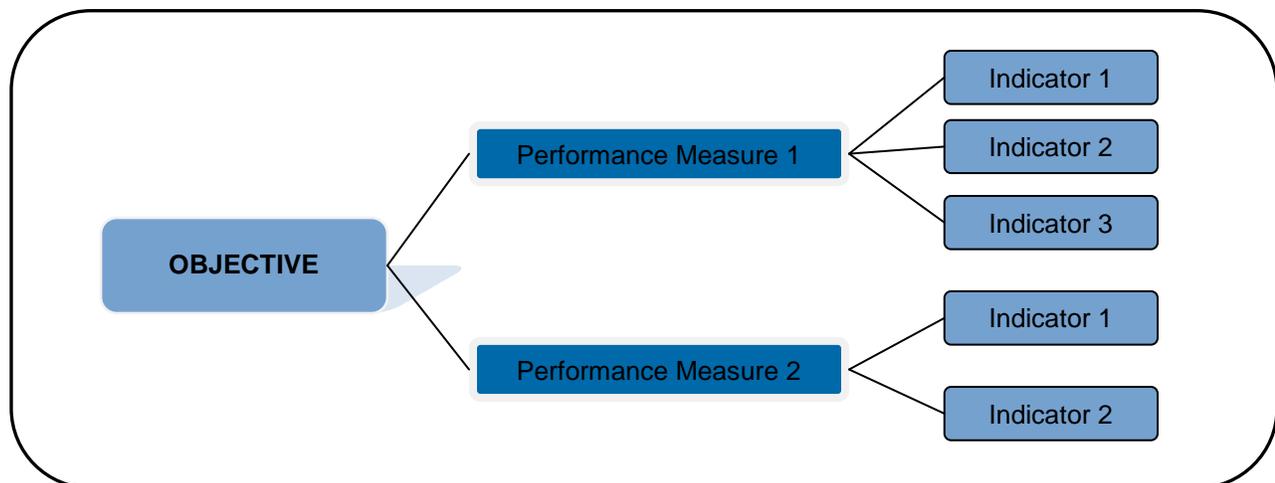


Figure 1. Template for Identification of Audit Items

Every item involved in the DNR forest operations compliance audit is described in this document in terms of the template described above. Specifically, each audit item has the following characteristics.

- An **objective** which reflects the overall Crown forest management direction and as such, defines the desired outcomes of forest management activities applied to the forest,
- A **performance measure(s)** detailing the performance expectations of the objective and linking each objective with criteria by which the objective is evaluated,
- A **performance indicator(s)** which are measured and assessed to determine whether the performance measure and the associated objective have been met. Performance indicators must be **measurable** and have:
 - an **authority** (i.e. act, regulation, policy, manual,) that provides a mandate for the performance indicator,
 - a **measurement methodology** detailing steps used to measure and assess the performance indicator (i.e. what, when, where and how), and
 - **mitigating factors** which may modify how the performance indicator is measured and assessed.

SUBMISSION OF FOREST OPERATION INFORMATION

1. OBJECTIVE: Effective Communication of Forest Operation Information

- 1.1. **PERFORMANCE MEASURE:** Provision of accurate and timely information required to assess forest operations.

Forest operations must be effectively implemented in compliance with the Operation Plan and consistent with the objectives and strategies of the *Forest Management Plan (FMP)*. A communication process must be established between Licensees and DNR that provides DNR with sufficient information to be able to carry out its various duties including efficiently and effectively auditing harvest and road operations on Crown land. Requirements have been set out in the *Planning Forest Operations on New Brunswick's Crown Land* to aid in this process.

- 1.1.1. **Performance indicator:** Information necessary for conducting and assessing forest operations has been submitted and follows appropriate standards.

- **Authority**

- Crown Lands and Forest Act (CLFA)*
 - Interim Forest Management Manual 2004*
 - Planning Forest Operations on New Brunswick's Crown Land 2008*

- **Measurement Methodology:**

- The following criteria will be assessed:

- 1) A work permit has been approved prior to the commencement of industrial operations. The Operation Plan approval letter will be the work permit for Licensee and Sub-Licensee Crown land operations,
- 2) Licensee has maintained a current and accurate operations status report,
- 3) A final harvest inspection report (FHI) has been submitted to standard and within the approved timelines,
- 4) GIS files containing road and watercourse crossing updates have been submitted according to standard, and
- 5) Accurate maps showing harvest block and road location, prescription details and approvals.

- **Mitigating Factors:**

- If block harvesting is not completed within the operating season an FHI is not required at year's end. If no harvesting occurs in the subsequent operating season, an FHI is due at the end of that operating year (March 31). For block harvesting completed in the wintertime, an FHI is only required June 15.

HARVEST OPERATION ELEMENTS

2. OBJECTIVE: Effective Use of the Timber Resource

2.1. **PERFORMANCE MEASURE:** Minimization of waste on timber harvest operations.

Forest operations must operate in a sustainable and economical manner to satisfy the needs of mill operations and the objectives of the land owner. The *Crown Lands and Forests Act (CLFA)*, *Timber Regulation 86-160* states that “wasteful cutting practices are prohibited on Crown land”.

2.1.1. **Performance Indicator:** There is no waste remaining within the harvest block, or a portion thereof.

- **Authority:**

CLFA, Timber Regulation 86-160
Interim Forest Management Manual 2004
Crown Timber Utilization Standards
Scaler’s Act, General Regulation 83-190
Scaling Arrangements

- **Measurement Methodology:**

A visual inspection will verify whether waste is a concern. In the event that waste on the whole block, or a portion thereof, appears to be a problem, a waste analysis may be completed.

The following items are some examples waste:

- 1) High stumps,
- 2) Long butting,
- 3) Large tops,
- 4) Merchantable trees left standing,
- 5) Trees not scheduled for harvest left in a damaged condition, and
- 6) Merchantable wood remaining on the block (full or broken state).

- **Mitigating Factors:**

- 1) Waste may or may not be an issue depending on which of the current utilization options were chosen,
- 2) High stumps:
 - a) Average ground level is affected by slope and physical obstructions,
 - b) Snow depths can affect stump height,
 - c) Letter of permission from DNR to leave high stumps is required,
- 3) Trees left standing:
 - a) DNR approval will be required to leave any trees uncut where the prescription calls for their harvest.

OTHER HARVEST REQUIREMENTS

3. OBJECTIVE: Compliance with Other Prescribed Requirements

3.1. **PERFORMANCE MEASURE:** Harvest operations are done following standards.

The conditions under which a Licensee can operate a harvest block are described by standards set by DNR. This includes block size and location, block prescription and any regeneration protection that is necessary. To verify a successful harvest, the conditions of operation must be clearly defined and easily measurable.

3.1.1. **Performance Indicator:** The harvest operation follows standards and reflects conditions described in the Operation Plan.

- **Authority:**

 - Interim Forest Management Manual 2004*

 - Blocking Size and Adjacency Rules 2009*

 - Planning Forest Operations on New Brunswick's Crown Land 2008*

- **Measurement Methodology:**

 - The following will be assessed:

- 1) The resulting stand(s) will be assessed to determine how well the prescription was implemented and, if applicable, whether the appropriate prescription was applied,
- 2) Block boundaries and opening size will be assessed for consistency with the objectives of the Operation Plan and the Forest Management Plan,

- **Mitigating Factor:**

 - A licensee shall not be held accountable for a partially harvested stand that blows down so long as harvesting adhered to standards.

3.1.2. **Performance Indicator:** General requirements for all harvest blocks have been followed.

- **Authority:**

 - Interim Forest Management Manual 2004*

 - Policy Concerning Harvesting and Silviculture Near Permanent Sample Plots*

 - Policy Concerning Maple Sugary Buffers – July 2011*

- **Measurement Methodology:**

The following are general requirements which Licensees are to respect while conducting harvesting on Crown Land for both regular and restricted forest land bases:

- 1) Crown boundary lines, mining claim posts, and survey monuments are kept intact,
- 2) Boundary lines are kept free of slash from harvest operations,
- 3) Legible sign(s) indicating the appropriate 7-digit harvest block number posted when harvesting activity commences and remains intact until all primary forest products are trucked,
- 4) Approved permanent sample plots (PSP's) are left standing and buffered to standard,
- 5) Crown maple sugar leases are buffered to standard.

3.2. PERFORMANCE MEASURE: Forest Audit Report requirements are met.

An audit report is prepared following completion of an audit. The audit report may require corrective actions to be implemented irrespective of a compliance action plan.

A Compliance Action Plan facilitates the desired improvement of current operating practices. Compliance Action Plans are prepared by the Licensee and approved by the DNR Lead Auditor. It is the responsibility of the Licensee to identify appropriate actions to address the Compliance Action Plan requirements as specified in an audit report. Compliance Action Plans identify the following components:

- 1) Severity and scope of the non-conformance,
- 2) Necessary corrective actions including timeframes, and
- 3) Necessary preventative actions, including timeframes.

3.2.1. Performance Indicator: The requirements of the Forest Audit Report have been met.

- **Authority:**

Crown Lands and Forest Act (CLFA)

- **Measurement Methodology:**

- 1) The corrective action(s) outlined in the audit report will be assessed for completion and whether they were completed within the specified timelines.

3.2.2. Performance Indicator: The Compliance Action Plan has been satisfactorily implemented.

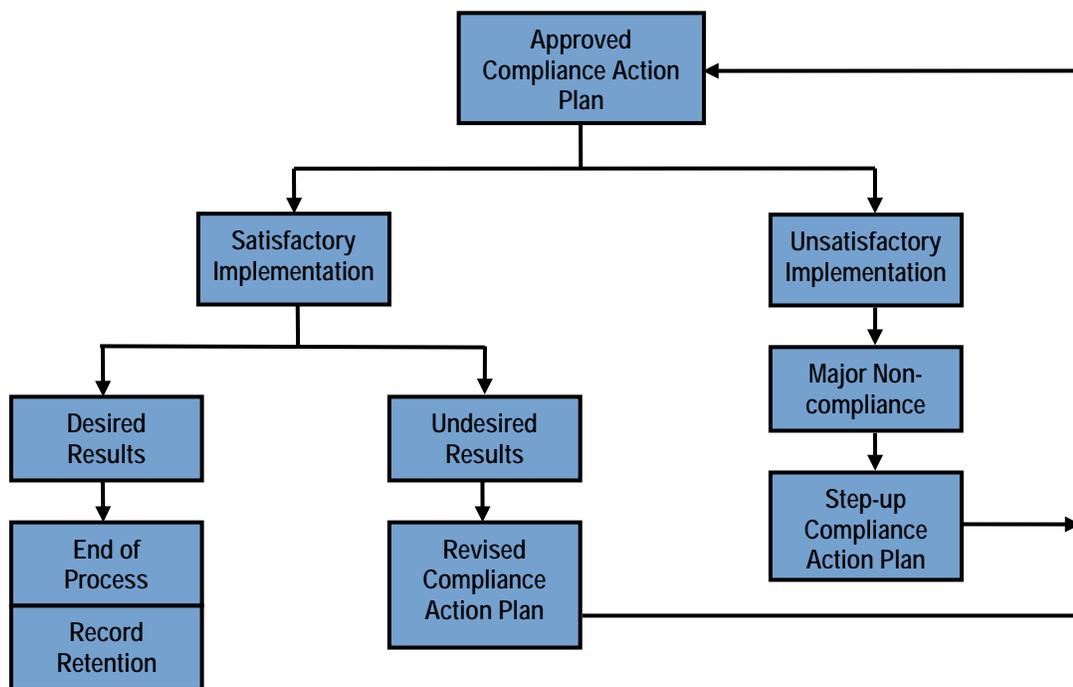
- **Authority:**
Crown Lands and Forest Act (CLFA)
CFLA Timber Regulation 86-160

- **Measurement Methodology:**

A review of all outstanding Compliance Action Plans will be done to determine whether each plan was satisfactorily implemented and whether the desired results were achieved. This review can take place either as a separate exercise or during the current audit, depending on the particular requirements and timelines contained in the individual compliance action plan.

The flow chart in Figure 2 illustrates the process for follow-up assessment of a Compliance Action Plan.

Figure 2. Assessment of a Compliance Action Plan.



ROAD CONSTRUCTION AND/OR MAINTENANCE

4. **OBJECTIVE:** Provision of Safe Access to Crown Land While Reducing The Risks Forest and Logging Roads Pose to the Environment and Other Resource Values

An efficient road network is necessary to support the various management objectives assigned under the *Crown Lands and Forests Act*. This network provides multi-purpose access to the forest resource and is used by a variety of stakeholders including, Licensees and Sub-Licensees, DNR, and the general public. It is critical that this road network provide safe and adequate access while minimizing the risks that forest and logging roads pose to the environment and other resource values.

Government's responsibility in this area lies in the establishment of appropriate road location, construction and maintenance standards, and monitoring to ensure that those standards are followed. The Licensee's responsibility is to plan, construct and maintain the required road network following appropriate standards.

4.1. **PERFORMANCE MEASURE:** Proper road location, construction and maintenance provides for safe access to crown land while minimizing the risks to the environment and other resource values.

4.1.1. **Performance indicator:** The location of a new road or a road undergoing major reconstruction is to standard.

- **Authority:**

- Interim Forest Management Manual 2004*

- Policy Concerning Maple Sugary Buffers – July 2011*

- Loss of Silviculture Areas Policy 2006*

- Planning Forest Operations on New Brunswick's Crown Land 2008*

- **Measurement Methodology:**

- Road location standards are expressed in terms of the minimum distance a forest or logging road is to be located from an identifiable feature. In many cases, beneficial management practices (BMP's) which set standards greater than the minimum distance, are included. Road locations are expected to follow these BMP's wherever feasible.

- Identifiable features include:

- 1) Buffer zones,
 - 2) Watercourses and wetlands,
 - 3) Designated well field protection area,
 - 4) Mapped Old Forest Vegetation Community,
 - 5) Mapped Old Forest Wildlife Habitat,
 - 6) Mapped DWA,
 - 7) Raptor or Heron nests,
 - 8) DNR designated habitat of an endangered species,
 - 9) DNR identified archaeological, historic, or unique site,

- 10) Provincial park,
- 11) DNR designated trail,
- 12) Maple Sugar Lease,
- 13) Silviculture treated area, and
- 14) DNR permanent sample plot.

- **Mitigating Factors:**

When road locations do not follow appropriate BMP's, the Licensee will provide their rationale if requested by DNR.

4.1.2. Performance indicator: The road is constructed to standard.

- **Authority:**

-Interim Forest Management Manual 2004
-Watercourse Alteration Certification Training Manual – March 2011
-2013-14 Timber harvesting standards for Old Forest Communities and Old Forest Wildlife Habitats on New Brunswick Crown Timber Licenses
-2013-14 Timber harvesting standards for Deer Wintering Areas on New Brunswick Crown Timber Licenses

- **Measurement Methodology:**

The following elements will be assessed either during or post construction.

- 1) Road design
- 2) Clearing of road ROW.
- 3) Disposal of debris
- 4) Surface water control
- 5) Traffic safety – sight distance, signage, and
- 6) Required permits and/or approvals have been obtained,

4.1.3. Performance indicator: The road is maintained to standard.

Road maintenance activities are required to protect the structural integrity of the road and ROW, keep drainage systems functional, minimize sediment production and meet safety requirements. Required maintenance should be determined on a priority basis taking into consideration environmental effects and safety. Maintenance issues should be fixed while they are small so they do not become a large scale safety or environmental concern.

- **Authority:**

Interim Forest Management Manual 2004
Watercourse Alteration Certification Training Manual – March 2011

- **Measurement Methodology:**

The following criteria will be assessed:

- 1) Surface water control – road surface, ditching, cross-drainage culverts, erosion control,
- 2) Traffic safety – signs, sight distance, brush removal, road hazards,
- 3) Road closure – barricades, signs, closure approval from DNR, prior warning of closure,
- 4) Condition of road surface, and
- 5) Beaver Dam removals – time of year, stabilization, controlled release, debris disposal.

- **Mitigating Factors:**

It is understood that road damage may occur during an unusual weather occurrence. A reasonable time frame for road maintenance will be allowed for maintenance to be carried out.

WATER QUALITY AND AQUATIC PROTECTION

5. OBJECTIVE: Protection of Water Quality and Aquatic Habitat

5.1. **PERFORMANCE MEASURE:** Establish and appropriately manage riparian and wetland buffers.

On Crown land, buffer zones are left adjacent to all wetland and natural watercourses and a buffer zone objective is assigned consistent with the function the buffer is intended to serve. Timber harvesting may occur within wetland and watercourse buffers as long as the buffer's ability to fulfill its objectives is not compromised.

5.1.1. **Performance Indicator:** The buffer width is appropriate for the wetland, watercourse, and/or special feature.

The width and desired structural features of a wetland or watercourse buffer zone differ somewhat depending on the function (objective) the buffer zone is intended to serve and the influence of modifiers like watercourse size and bank slope, wetland size or designation, and the condition of the adjacent forest. On Crown land, all wetland and watercourse buffer zones are intended to protect water quality and aquatic habitat, while some may also be required for recreation and aesthetic reasons or to provide wildlife travel corridors in heavily harvested areas.

- **Authority:**

Interim Forest Management Manual 2004

*Clean Water Act - Watercourse & Wetland Alteration Regulation 90-80
2012-13 Watercourse Wetland Buffer Zone Standards*

- **Measurement Methodology:**

The following criteria will be assessed:

- 1) The buffer width is appropriate for the bank slope and width of the watercourse or the size or designation of the wetland or special feature, and
- 2) No vehicle has traveled through or in the watercourse.

5.1.2. Performance Indicator: The buffer zone harvest is to standard.

- **Authority:**

Interim Forest Management Manual 2004

*Clean Water Act - Watercourse & Wetland Alteration Regulation 90-80
2012-13 Watercourse Wetland Buffer Zone Standards*

- **Measurement Methodology:**

The following criteria will be assessed:

- 1) Damage to residual trees,
- 2) Shrub and ground layer has been protected,
- 3) Harvest opening size,
- 4) Crown closure,
- 5) Side selection,
- 6) In-stream debris resulting from harvest operations,
- 7) No-track zones,
- 8) Soil disturbance, and
- 9) Type of stand and site harvested.

- **Mitigating Factors:**

A Licensee shall not be held accountable for a partially harvested buffer zone that blows down so long as harvesting adhered to standards for buffer zone stability.

5.2. PERFORMANCE MEASURE: Watercourse crossing installation procedures minimize erosion, sedimentation and siltation.

Road construction and watercourse crossings have the potential to result in harmful alterations to fish habitat and degradation of water quality within the vicinity of the watercourse crossing and downstream. Many problems can be avoided through good planning, properly timing of construction activities to avoid sensitive periods, and application of beneficial management practices before, during, and after construction.

Environmental impacts associated with the construction, installation and use of watercourse crossings can be avoided or mitigated by beneficial management practices that are directed toward meeting the following objectives:

- Providing a safe, sturdy low maintenance and environmentally sound crossing structure with a waterway opening large enough to pass peak flows and ice jams,
- Preventing sedimentation of the watercourse and erosion of the banks and beds as a result of proper construction and installation of a structure,
- Re-vegetating and stabilizing the site to prevent post-construction erosion,
- Maintaining free, unobstructed fish passage through the crossing; and
- Providing regular maintenance of the structure.

5.2.1. Performance Indicator: A no-grub zone has been left on both sides of the watercourse crossing.

Retaining vegetation within the road clearing width is one of the most effective methods of preventing erosion and minimizing disturbance to fish habitat. Therefore, at no time is grubbing permitted within the restricted work zone adjacent to watercourses unless immediately underlying the road surface being constructed.

- **Authority:**

Watercourse Alteration Certification Training Manual – March 2011

- **Measurement Methodology:**

When measuring a no-grub zone, the measurement will be taken from the edge of the watercourse to the outer edge of the no-grub zone. These measurements can be taken any time after the ROW has been completed. The following criteria will be assessed:

- 1) For natural watercourses a 30 m no-grub zone shall be maintained except immediately underlying the roadbed. No ditching is permitted within this no grub zone,

5.2.2. Performance Indicator: The watercourse crossing location is to standard.

- **Authority:**

Watercourse Alteration Certification Training Manual – March 2011
Planning Forest Operations on New Brunswick's Crown Land 2008

- **Measurement Methodology:**

Watercourse crossing location standards are expressed in terms of the minimum distance a crossing is to be located from an identifiable feature. In many cases, beneficial management practices (BMP's) which set standards greater than the minimum distance, are included. Crossing locations are expected to follow these BMP's wherever feasible.

Identifiable features involved are:

- 1) Provincially significant wetland,
- 2) Salmon pool,
- 3) Fish spawning area,
- 4) Crown Reserve Water,
- 5) Shrub wetland,
- 6) Other wetlands, lakes or ponds, and
- 7) Multiple watercourse channels.

- **Mitigating Factors:**

When watercourse crossing locations do not follow appropriate BMP's, the Licensee will provide their rationale when requested by DNR.

5.2.3. Performance Indicator: The watercourse crossing structure in a natural watercourse has been installed "in-the-dry".

Annually, forest and logging roads cross numerous watercourses on Crown lands. On Crown land in New Brunswick all watercourse crossings will be installed "in-the-dry". These types of installations isolate the work area from water flowing in the watercourse and reduce the impact of silt and fines on fish and the aquatic habitat.

- **Authority:**

Watercourse Alteration Certification Training Manual – March 2011

- **Measurement Methodology:**

Auditing "in-the-dry" installations will be done while watercourse crossings are being installed. Therefore, information from the Licensee with regard to where installations are being performed will be required.

The following are some aspects of "in-the-dry" installations that will be assessed:

- 1) The work site must be isolated from stream flow. This includes excavated materials and machinery,
- 2) Measures are in place to control erosion, sedimentation and siltation,
- 3) In fish bearing watercourses, proper procedures are taken to allow safe fish passage,
- 4) Proper procedures are taken to maintain natural water flow above and below the work site,
- 5) The watercourse channel is kept free of slash and other debris resulting from installation procedures,
- 6) Required permits and/or approvals have been obtained.

- **Mitigating Factors:**

The following situations are exempt from the requirements to install watercourse crossings "in-the-dry":

- 1) Driving of pilings for bridge construction, and
- 2) Watercourses that are dry at the time of installation, provided that any sub-surface water that may be encountered remains in the trench and cannot subsequently flow downstream.

- 5.2.4. Performance Indicator:** The appropriate watercourse crossing structure has been installed while maintaining the integrity of the watercourse and stability of the watercourse banks.

The minimum capacity for culverts and bridges in New Brunswick is based on a 100-year return period flow (Q100), which means that the waterway opening should be large enough to accommodate a peak flow or flood which has a 1% chance of occurring in any given year.

The *Fisheries Act* makes it mandatory that safe passage for fish be provided on all “fish bearing” watercourses. Safe fish passage is the free movement of fish in and about streams, lakes, and rivers. All watercourses are to be classified as “fish bearing” unless proven otherwise.

- **Authority:**

- Watercourse and Wetland Alteration Regulation 90-80*
 - Watercourse Alteration Certification Training Manual – March 2011*
 - Fisheries Act*
 - Navigable Waters Protection Act*

- **Measurement Methodology:**

- Once a watercourse crossing has been installed the following aspects will be assessed:

- 1) Type of structure installed,
- 2) Size, length and width of structure,
- 3) Structure and supporting structure material,
- 4) Stabilization of banks and surrounding area,
- 5) Protection of watercourse bed,
- 6) Location, alignment and slope,
- 7) Fill depths and below channel bottom depths,
- 8) Required permits and/or approvals have been obtained, and
- 9) Date of installation or removal, where applicable.

- 5.3. PERFORMANCE MEASURE:** Watercourse crossing structures are maintained to diminish site and/or watercourse degradation.

- 5.3.1. Performance Indicator:** Existing watercourse crossing structures with identified environmental or liability issues are dealt with in an appropriate manner.

Bridges and culverts should be maintained to proper specifications for safety, environmental considerations and design loadings. Ongoing inspection and maintenance of watercourse crossing structures must be conducted to ensure they are functioning properly. Maintenance problems should be rectified as soon as possible to restore normal function and minimize any further damage to the site or watercourse.

- **Authority:**

Watercourse Alteration Certification Training Manual – March 2011
Interim Forest Management Manual 2004

- **Measurement Methodology:**

Assessment of watercourse crossing structure maintenance can be done anytime following installation and the following criteria will be assessed:

- 1) Bridges and culverts are structurally sound and free of damage, decay or signs of weakness, and
- 2) Procedures have been taken to repair or replace structures that have deteriorated to the point of not meeting proper installation criteria.

5.4. PERFORMANCE MEASURE: Watercourse crossing removal procedures minimize erosion, sedimentation and siltation.

Most temporary watercourse crossings are intended to provide short-term access across a stream for the purposes of timber harvesting activities where no further road development beyond the block is planned or can be utilized as a short-term measure in preparation for installation of a permanent crossing structure. It is important that once a temporary crossing is removed, that all materials used in the construction of the temporary crossing are removed and the site has been stabilized to minimize any potential environmental damage.

DNR or Forest Licensees may choose to decommission a watercourse crossing (usually done in conjunction with the closure of a road) due to inherent environmental liability and/or safety concerns. The site will be decommissioned to minimize any environmental impact and restore the watercourse channel as closely as possible to its pre-crossing condition.

5.4.1. Performance Indicator: Watercourse crossing structures requiring removal have been removed in a timely manner and the site has been decommissioned to standard.

- **Authority:**

Watercourse Alteration Certification Training Manual – March 2011

- **Measurement Methodology:**

The removal of a temporary crossing will be assessed based on (but not limited to) the following aspects:

- 1) Temporary bridges are not left in place during the Spring Weight Restriction Period;
- 2) All construction and approach materials are removed from the banks of the watercourse within 3 working days; and
- 3) The site has been stabilized.

Decommissioning and removal of watercourse crossings consisting of a single span bridge or culvert will be assessed based on (but not limited to) the following aspects:

- 1) Type of structure decommissioned and/or removed;
- 2) Stabilization of banks and surrounding area;
- 3) Date of decommission and/or removal;
- 4) Watercourse channel restoration; and
- 5) Required permits and/or approvals have been obtained.

- **Mitigating Factors:**

In some situations, abutments and wing walls may be left in place when they are well stabilized and away from the watercourse bank edges. There may also be instances where “sill logs” could be left on site. This would include logs that are sunken in the watercourse banks which could cause more environmental damage by removing them than leaving them in place.

PROTECTION OF SPECIAL MANAGEMENT AREAS

6. OBJECTIVE: Effective Protection of Special Management Areas

6.1. **PERFORMANCE MEASURE:** Minimize impact on sensitive wildlife habitat

In addition to the protection of specific wildlife habitat, such as raptor and heron nests, DNR has a two-fold management goal related to the maintenance of specific amounts of a variety of old forest wildlife habitats (OFWH) on Crown land. First, to provide the habitat necessary to support white-tailed deer populations at levels that can sustain the desired harvest; and second, to provide the habitat necessary to maintain viable populations of all old-forest vertebrates across the areas of Crown land to which they are indigenous. Objectives have been developed for six old-forest habitats and two deer winter habitats. These include:

- old hardwood habitat (OHWH),
- old tolerant hardwood habitat (OTHH),
- old pine habitat (OPIH),
- old mixed wood habitat (OMWH),
- old spruce-fir habitat (OSFH),
- old forest habitat (OFH),
- Severe Winter Deer Habitat (SWDH), and
- Moderate Winter Deer Habitat (MWDH).

Licensees are required to manage and maintain these habitats at or above the objective levels set in Table 1 of the *2013-14 Timber harvesting standards for Old Forest Communities and Old Forest Wildlife Habitats on New Brunswick Crown Timber Licenses*.

6.1.1. **Performance Indicator:** OFWH harvest is to standard.

Of the 161 vertebrates that use New Brunswick's forest 137 are considered common. The others are either uncommon, or use forest features only at the edge of other ecosystems. Forty-six of the 137 species were identified as being dependant on old forest, and these became the final focus of habitat management efforts. Habitat descriptions were generated for each species, and these were used to generate a set of old-forest habitats with sufficiently broad definitions to encompass the requirements of all 46 species.

The goal of forest habitat management is to ensure that management activities on Crown land produce a forest that can support vertebrate populations at desired levels. For most species, this translates to providing sufficient habitat to maintain viable populations across the area of Crown land to which they are indigenous.

- **Authority:**
2013-14 Timber harvesting standards for Old Forest Communities and Old Forest Wildlife Habitats on New Brunswick Crown Timber Licenses.
- **Measurement Methodology:**
The following criteria will be assessed:
 - 1) Harvest prescription implementation,
 - 2) Harvest is done in eligible stands,
 - 3) Pre-Treatment average basal area,
 - 4) No harvesting of large trees, snags or cavity trees,
 - 5) Rutting and soil disturbance, and
 - 6) Damage to residual trees and shrubs.
- **Mitigating Factors:**
A Licensee shall not be held accountable for a partially harvested stand that blows down so long as harvesting adhered to standards.

6.1.2. Performance Indicator: Deer Wintering Area (DWA) harvest is to standard.

An objective of DNR is to ensure that Crown Land is managed for the sustainable provision of habitat for the province's white-tailed deer population. Harvesting in a responsible and carefully planned manner will provide for a continuous supply of both shelter and food for the deer population.

- **Authority:**
2013-14 Timber harvesting standards for Deer Wintering Areas on New Brunswick Crown Timber Licenses
- **Measurement Methodology:**
The following criteria will be assessed:
 - 1) Harvest prescription implementation,
 - 2) Harvest is done in eligible stands,
 - 3) Pre-Treatment average basal area,
 - 4) Eastern cedar and hemlock trees should not be harvested,
 - 5) No harvesting of large trees, snags or cavity trees,
 - 6) Rutting and soil disturbance, and
 - 7) Damage to residual trees and shrubs.
- **Mitigating Factors:**
Harvesting of cedar and hemlock in a road ROW may be permitted with DNR approval.

6.1.3. Performance Indicator: Harvesting in and around raptor and heron nesting sites is to standard.

The bald eagle, peregrine falcon, osprey, and nine other common species of raptors along with three species of heron, nest in trees on forest lands in New Brunswick. All exhibit a strong affinity for previously used nest trees and territories. Timber harvesting and associated activities (e.g. road construction and location) can influence the availability and viability of nesting sites for these species through: 1) removal of nest trees, 2) disturbance of nesting birds, and 3) alterations to forest structure within a species home range. Buffering nest trees from disturbance during the nesting season will maintain the viability of the nest site.

- **Authority:**

Interim Forest Management Manual 2004

Planning Forest Operations on New Brunswick's Crown Land 2008

- **Measurement Methodology:**

The following criteria will be assessed.

- 1) Criteria specific to three buffers as per Table 2 in FMM, and
- 2) Damage to residual trees.

6.2. PERFORMANCE MEASURE: Ensure old forest communities are maintained.

Old Forest Communities (OFC) are the building blocks of the Province's strategy to supply old-forest conditions on Crown land. Eighteen unique communities, within 7 eco-regions, encompass the full range of naturally occurring old-forest conditions. They are described at the stand level by composition and structure, and at the landscape level by patch size. DNR's strategy to achieve the forest ecosystem goal includes maintaining at least 12 percent of each Old Forest Communities in an old-forest condition on Crown land.

6.2.1. Performance Indicator: Old Forest Communities harvest is to standard.

Old Forest Communities are defined at the stand level by tree species composition and by stand structure, as described by basal area and density of various diameter classes of live and dead stems. They are named for the most abundant tree species (or group of species) and are composed of at least 35% of that species (or group). These forest patches are expected to maintain the characteristics of old-forest for the next 80 years.

- **Authority:**

2013-14 Timber harvesting standards for Old Forest Communities and Old Forest Wildlife Habitats on New Brunswick Crown Timber Licenses

- **Measurement Methodology:**

The following criteria will be assessed:

- 1) Harvest prescription implementation,
- 2) Harvest is done in eligible stands,
- 3) Pre-Treatment average basal area,
- 4) No harvesting of large trees, snags or cavity trees,
- 5) Rutting and soil disturbance, and
- 6) Damage to residual trees and shrubs.

PROTECTION OF FOREST SOILS

7. OBJECTIVE: Protection of Forest Soils

Soil is an essential component of a forest ecosystem. Soils supply all plant life in the forest with nutrients, moisture, gases and physical support for roots. Soils also have an important role in providing clean water to streams, rivers and lakes. Harvest operations can damage forest soils by rutting, erosion, compaction, nutrient loss and the spread of contaminants. Where damage to soil is severe and/or extensive, concerns about tree growth, water quality and forest soil health exist.

7.1. **PERFORMANCE MEASURE:** Minimize damage to forest soils caused by harvest operations.

7.1.1. **Performance indicator:** Exposed mineral soil has been stabilized.

Exposed mineral soil poses the risk of water contamination. While a site may be dry during a forest operation, it may quickly become otherwise when the weather changes. The more exposed soil there is, the higher the risk of sediments ending up in a watercourse causing harm to water quality and aquatic habitat.

- **Authority:**

Interim Forest Management Manual 2004
2012-13 Watercourse and Wetland Buffer Zone Standards

- **Measurement Methodology:**

The following criteria will be assessed:

- 1) Mineral soil exposed through forestry operations, including road building and maintenance, which can enter a natural watercourse, shall be stabilized immediately.

7.1.2. **Performance indicator:** Reasonable efforts have been made to minimize rutting.

The presence of multiple, deep ruts on a site can

- modify groundwater movement within the soil leading to a rise in the water table and possible flooding of the site,
- cause a loss of microsites for tree growth due to the presence of pools of water, and
- alter the local growing conditions on or near trails, plus damage to the roots of advanced regeneration.

- **Authority:**
Interim Forest Management Manual 2004
2012-13 Watercourse and Wetland Buffer Zone Standards

- **Measurement Methodology:**
Reasonable efforts have been made to minimize rutting within harvest and silviculture areas. Rutting and exposure of mineral/organic soil in wetlands (including forested wetlands) and within wetland buffer zones has been avoided.

7.1.3. Performance Indicator: Forest biomass has been removed only from approved, eligible stands.

Forest biomass is an important component of a forest ecosystem, vital to nutrient cycling, wildlife habitat, biodiversity and overall forest health. It includes residual tree tops, branches, foliage, non-merchantable woody stems and flail chipping residue. It does not include pulpwood fibre produced from whole tree chips.

It is the policy of the Department of Natural Resources to permit harvesting of forest biomass from Crown lands while ensuring the sustainable management of Crown forests. Forest stands are considered eligible for biomass removal when the following post-harvest conditions are met:

- No site nutrient deficits results from the removal of forest biomass through harvest activities, and
- No reduction in growth potential of future forest stands results from biomass harvest.

- **Authority:**
2008 Forest Biomass Harvesting Policy
2010-11 Biomass Harvesting Planning and Operating Standards

- **Measurement Methodology:**
The following criteria will be assessed:
 - 1) Forest biomass has been removed only from an approved, eligible stand, and
 - 2) Harvest slash and chipper debris is distributed within harvest block so it does not pose a significant fire hazard or inhibit the achievement of regeneration standards.

PROTECTION OF THE ENVIRONMENT

8. OBJECTIVE: Protection of the Environment

Forestry activities have the potential to cause harm to fish and wildlife habitat and to degrade water quality within the vicinity of a harvest operation. Good planning and preparation and adherence to regulations will allow activities to be implemented with minimal environmental damage.

8.1. **PERFORMANCE MEASURE:** Road and harvest operations minimize damage to fish and wildlife habitat.

8.1.1. **Performance Indicator:** Forestry activities on steep slopes conform to standards.

Steep slopes can provide unique habitat conditions and are often in areas where a diversity of plants and animals may be found. Most areas of steep slope that exist in New Brunswick are along rivers and streams. Disturbance of these areas can cause erosion that will harm water quality and aquatic habitat. Steep slope standards define criteria for harvest that will both prevent soil erosion and minimize any negative aesthetic impact.

- **Authority:**

Interim Forest Management Manual 2004

- **Measurement Methodology:**

The following criteria will be assessed:

- 1) Advanced regeneration protection,
- 2) Soil disturbance,
- 3) Stands meet the following criteria:
 - a) Minimum stocking of 40 % advanced regeneration (30 cm height and 1 m maximum height),
 - b) Maximum opening size is 20 ha,
 - c) Maximum width (perpendicular to the slope) is 200 m,
 - d) Uncut areas of at least 10 ha in size are to be left between harvested areas,
 - e) Site is 90% stocked within one year of harvest.

- **Mitigating Factors:**

Exceptions to the above standard may be approved by DNR where more than 50% of the stand is blown down.

8.1.2. Performance indicator: Forestry activities in Designated Watersheds conform to standards.

To maintain the preservation of New Brunswick's watersheds, the government introduced a regulation known as the *Watershed Protected Area Designation Order*. It defines what Permitted Activities may take place within each zone of a municipal watershed. There are three zones each with a level of permitted activity. *Zone A* consists of the watercourse. *Zone B* is a setback zone or buffer area that comprises the entire area located within 75 m of the banks of the watercourses. *Zone C* defines the land area situated outside the setback zone but inside the watershed boundary.

Under specific conditions laid out in the regulation, road construction can occur in *Zones B and C*. while selection harvest is permitted in *Zone B* and clear cut harvest is permitted in *Zone C*.

- **Authority:**
Clean Water Act Regulation 2001-83 NB's Watershed Protected Area Designation Order
- **Measurement Methodology:**
The following criteria will be assessed:
 - 1) Size and location of harvest area,
 - 2) Prescription,
 - 3) Width of buffer strip between clear cuts,
 - 4) Percent of watershed clear cut,
 - 5) Adjacency and regeneration,
 - 6) Amount of exposed mineral soil,
 - 7) Sedimentation, and
 - 8) Damage to residual trees.

8.1.3. Performance indicator: The forest operation is free of environmental contaminants.

One of the primary sources of environmental contamination on a forest operation is the equipment used in harvesting. It is important to know and comply with the regulations that govern the storage, handling, and application of substances used by the equipment. Standards have been set in place to ensure spills of toxins are cleaned up. Where environmental problems occur, they are to be corrected immediately and DNR notified of the mitigative actions taken.

- **Authority:**
Clean Environment Act
Clean Water Act
Interim Forest Management Manual 2004
Watercourse Alteration Certification Training Manual – March 2011

- **Measurement Methodology:**

The following criteria will be assessed:

- 1) There is no industrial garbage, refuse or hazardous materials found on a forest operation,
- 2) There are no chemicals such as lime, cement, creosote, and de-icing agents being used in a manner other than their prescribed use,
- 3) All spills have been cleaned up to standard,
- 4) All fuels, lubricants and other toxic materials are stored outside any designated buffers, in a location where the material can be contained and prevented from entering a watercourse, and
- 5) Equipment is in good working order with no leaks being observed.

INDEX

- A**
advanced regeneration, 26, 28
- B**
basal area, 23, 24, 25
beneficial management practice
 BMP's, 12, 16, 17
block prescription, 9
boundary lines, 10
bridge, 18, 19, 20, 21
buffer zones, 15, 27
- C**
chipper debris, 27
Compliance Action Plan, 10, 11
Crown Reserve, 17
culverts, 14, 19, 20
- D**
Deer Wintering Area
 DWA's, 13, 23
design loading, 19
designated trail, 13
Designated Watersheds, 29
Designated well, 12
- E**
environment, 12, 28
- F**
final harvest inspection report, 7
fish
 salmon, Crown Reserve, 16, 17, 18, 19, 28
forest biomass, 27
forest operations, 6, 7, 8
forest products, 10
forest soils, 26
- G**
garbage, 30
- H**
habitat
 OSFH, OHWH, OTHH, etc, 12, 15, 16, 17, 18, 22, 23,
 26, 27, 28
harvest operations, 8, 9, 10, 16, 26, 28
heron, 12, 22, 24
high stumps, 8
- M**
merchantable wood, 8
mineral soil, 26, 29
mining, 10
- N**
natural watercourses, 15, 17
no-grub zone, 17
- O**
off-take ditches, 13
Operation Plan, 7, 9
- P**
peak flow, 16, 19
permanent sample plots
 PSP's, 10
- R**
raptor
 bald eagle, peregrine falcon, osprey, 12, 22, 24
regeneration protection, 9, 28
residual trees, 16, 23, 24, 25, 29
road
 construction, maintenance, 7, 12, 13, 14, 16, 17, 18, 20,
 23, 24, 26, 28, 29
rutting, 23, 25, 26, 27
- S**
sedimentation, 16, 18, 20, 29
spills
 oil, fuels, coolants, 29, 30
status report, 7
steep slope, 28
survey monuments, 10
- V**
vegetation community, 12
- W**
waste, 8
water quality, 15, 16, 26, 28
watercourse, 7, 12, 15, 16, 17, 18, 19, 20, 21, 26, 29, 30
watershed, 29
wetland
 provincially significant, PSW, shrub wetland, 15, 17
work permit, 7