# CRITERION 5.0

## Multiple Benefits of Forests to Society

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Indicator 5.5.2
Wildlife (this includes wildlife species (both plant and animals) not previously accounted for such as endangered species of plants and animals)

References

*"Forests provide a multitude of benefits. They are the source of much of Canada's prosperity – contributing to the economy, helping maintain good health, and nurturing our spirits. Maintaining these benefits is an important dimension of sustainable forestry."*

*-CCFM (1997)*

PREAMBLE

The FMF partnership has been working toward the review and assessment of local level indicators, including the collection of baseline data for each of these indicators. A summary report was submitted that identified several information gaps pertaining to the availability of baseline data for working group 5 (Runyon *et al*., 2000). It also noted that in order to properly monitor the chosen indicators, survey data is required (*i.e*. enterprise and household surveys). Working Group 5 took steps to fill the information gaps by reviewing work done within the FMF partnership and extracting relevant information from various organizations and existing literature. Some information was purchased from Statistics Canada. It should be noted that not all of the baseline data needed to monitor Group 5 indicators have been compiled. Many gaps can only be filled by specialized enterprise and household surveys. Due to the cost considerations, Group 5 decided to delay or omit this data. For various reasons, some information is presented at a provincial level rather than the FMF level. Finally, some of the data that is missing because the respective organization(s) could not supply it.

Indicators for this group are presented somewhat differently than those for other Working Groups. To be effective, Working Group 5 decided that there was a need for more specific indicators because most indicators were too broad. This made it difficult to specify protocols and identify knowledge gaps. The need was to assess the status of indicators and to make recommendations regarding further refinement, development of protocols, identifying gaps, and priorities. Subsequently, many indicators were broken-down into sub-sections for more concise monitoring. Altogether, 5 critical elements and 37 indicators were identified. Of these, 14 indicators were omitted because they were deemed non-functional either due to cost and/or the lack of available data. It is important to note that for many indicators, information went beyond the FMF boundary to include the Southern New Brunswick Forest Products Marketing Board (SNB), Crown License 7 and/or the Department of Natural Resources and Energy (NBDNRE) Region 3. To monitor these indicators on a regular interval, data compilation needs to be relatively simple. The FMF boundary is not a functional one and most data needed for these indicators are summarized based on operational borders. The aim here was to provide data that are meaningful, provide continuity, and are efficient to collect.

For the most part, monitoring the chosen set of indicators is achievable providing that resources are allocated to undertake the work. Much of the data is published and/or available directly through the respective agencies. The biggest problem for data retrieval (other than non-market/non-economic values) is marketed non-timber products. Much of the data will be subjective. For example, Christmas tree and maple syrup producers typically prefer not to disclose what they deem to be a private matter. Additionally, producers do not keep good records and there is no agency that tracks sales inside NB or inside Canada. International exports are recorded at Customs and monitored by Statistics Canada under forest industries (*e.g*., Christmas wreath production is generally grouped with other plant exports). Subsequently, a number of assumptions need to be applied when attempting to monitor marketed non-timber product statistics. The best way to fill these gaps (for marketed non-timber, wildlife of economic value and recreation) is through an enterprise survey.

A new corporation has been established called INFOR. It represents a three-way partnership including the NB Federation of Woodlot Owners, the Christmas Tree Growers Co-op Ltd. and the Council of NB Maple Syrup Producer Association. This organization was set-up to fill some of the gaps that were left when the Forest Extension branch of NBDNRE was eliminated. This new entity may be a source of information for non-timber products in the near future.

Another weak area for data collection is secondary wood products. The problem is not that data do not exist. Rather, the problem is that data exist on a provincial scale, and what is available in a more dis-aggregated form tends to be within the Census of Manufacturing where most of the data is protected. A further issue is that this sector sources raw materials internationally, and it is very difficult to track all of the wood flow information accurately. Therefore, monitoring at a FMF level is extremely challenging at best.

Finally, meaningful data on the non-market/non-economic values for the most part does not exist. To monitor these Critical Elements, data must be collected at a FMF and adjourning jurisdictional level using, for example, enterprise and household surveys. The former deals with data from business operations while the latter addresses the general FMF public. The indicators that need to be monitored through the use of a survey are listed in the report by Runyon *et al*. (2000), which also describes the purpose of these surveys and the costs involved.

The reporting of group 5 indicators does not include statements of "management planning objectives" as in other sections of this report. There are no such objectives stated, however some may be established once the baselines for these indicators are determined. This will need to be part of the FMF partnership decision process.

The critical elements (section headings of various indicators) underlined on the title page of this section of the report are explained in Appendix 14.

Indicator 5.1.1a/b/c/d

# Landbase Available For Forest Products And Services By Owner

## Justification for Selection

This indicator is important because it provides a measure of the land or capital reserved or designated for the production of various products and services, whether for timber, recreation, or wildlife. Two elements of this indicator present problems for data collection. For timber, it is important to track not only the area available but also the restrictions. If a larger area is set aside for non-timber uses (*e.g.*, ecological reserve) or the same area becomes more restricted (*e.g.*, green belt) this will obviously impact the timber production potential and possibly the sustainability.

The FMF has some of the information addressing special reserves; however, the location of some of the sites allocated for protection is restricted and is not for public consumption. Another problem is ascertaining the area available for different uses particularly for the small woodlot sector due to uncertainty of owner objectives.

With respect to wildlife, the focus is on those of economic value. This is obviously somewhat subjective. It is proposed that this group consist of deer, moose, bear, and other fur bearing game, which can be trapped under existing legislation. Concern here is with habitat for these species, and in some cases, it may be difficult to specify the exact nature of habitat.

Recreational aspects of this indicator measure what is actually on the ground and monitors to see what is happening over time in terms of development.

## Data Sources

*Timber*

- Land Classification Inventory - Information Services and Systems Branch, NBDNRE
- JDI Annual Report for the Fundy License - Forest Management Branch, NBDNRE (Crown License 7)
- JDI Management Plan for the Fundy Crown License (operating plan every 5 years) - Forest Management Branch, NBDNRE (Crown License 7)
- JDI Freehold - JDI Woodlands (Sussex district)
- SNB
- FNP

*Marketed non-timber products (Christmas trees & wreaths, maple syrup)*

- Christmas Tree Growers Co-op Ltd. (Belleisle Christmas Tree Growers and the Petitcodiac Christmas Tree Growers)
- Council of New Brunswick Maple Syrup Producer Association (Southeastern Maple Sugar Producers)
- SNB (*e.g.*, Christmas tree shipments)
- Enterprise survey of FMF producers

*Wildlife of economic value by habitat (DWA, OSFH for deer, moose, bear, and other fur bearing game)*

- A Vision for New Brunswick's Forests…goals and objectives for Crown Land Management, Fish and Wildlife Branch, NBDNRE (Crown License 7, Region 3)
- SNB
- Wildlife objectives on freehold - JDI Woodlands (Sussex district)

*Recreational assets (parks size, scenic vistas)*

- FNP
- Business New Brunswick
- Crown Lands Branch, NBDNRE (Saint John, Queens, Kings, Albert and Westmorland Counties)
- Poley Mountain Resort
- Enterprise survey

## Monitoring Protocol

*Timber (intensive, restricted)*

Land classification for timber including intensive and restricted uses is summarized either directly from the Land Classification Inventory or, indirectly by contacting the principal landowners. The Land Classification Inventory is conducted every 10 years. All other data sources are available on an annual basis. The data is to be monitored for each defined forest area as defined by the principal landowner and includes the amount of land (ha): 1) available for timber management by species group for natural stands and plantations; 2) potentially available for timber but designated to another use (*e.g*., agriculture, urban planning, riparian zones); and 3) not suitable for timber production (*e.g*., wetlands, rock outcrops). The data for timber can be summarized for the FMF boundary but it would be more meaningful and cost effective to use the defined forest areas for each of the principal landowners (*i.e*., Crown License 7, JDI - Sussex district, SNB, and FNP).

*Marketed non-timber products (Christmas trees and maple syrup)*

The landbase available for marketed non-timber products is tracked by evaluating the number of hectares in production over time. Information pertaining to non-timber products is to be updated every five years through a periodic survey of producers operating within the FMF defined forest area. The respective co-ops and associations may be contacted annually if required.

*Wildlife of economic value by habitat (DWA, OSFH for deer, moose, bear, and other fur bearing game)*

Monitoring the landbase for wildlife of economic value is achieved by summarizing habitat objectives by the amount of land (ha) available by habitat type and by species. On Crown land, this data is readily available annually by license and, therefore, should be collected for Crown License 7. For private land, SNB and JDI freehold (Sussex district) defined forest areas apply. Wildlife objectives on private land differ from those on Crown lands such that they are typically not laid out in terms of OSFH habitat or DWA's.

*Recreational assets (e.g., park size, scenic vistas)*

Assessment of the landbase for recreational assets requires that information on the amount of land (ha) available for recreational opportunities by activity is collected and summarized for the FMF defined forest area. The number and type of recreational facilities that actually exist in the FMF needs to be determined first, which can be accomplished through contact with FNP and Business New Brunswick. It is possible that some of this data may need to be collected through an enterprise survey. Data is available annually, although, a five-year monitoring period is sufficient.

## Baseline Results

*Timber (intensive, restricted)*

Eighty percent (80%) of the FMF landbase is classified as forested land, 10% as agricultural, and 10% as non-productive. Primary FMF stakeholders consist of: 1) small private woodlots (63%), which are represented by SNB; 2) JDI (an integrated forest products company) freehold (17%); 3) provincial Crown land (15%); and FNP (5%). Table 1 illustrates how the landbase is divided among the four major FMF stakeholders from the point of view of producing timber. It should be noted that the figures presented in Table 14 represent the boundaries of the individual land tenures and not the FMF boundary. For example, in total, Crown License 7 is comprised of 403 495 hectares (ha) but only about 63 000 ha are contained within the FMF boundary.

Table 14. Classification of land available for timber production for each principal landowner in the FMF area (ha) (MacGregor and MacFarlane, 2000).

| | Crown License 7 | JDI | SNB | FNP[c] | **Total** |
|---|---|---|---|---|---|
| Available for timber | | | | | |
| Softwood | 82 317 | 30 105 | 168 935.5 | 8 097.6 | 289 455.1 |
| Mixedwood | 82 317 | 15 610 | 60 643.5 | 8 191.2 | 166 761.7 |
| Hardwood | 193 266 | 65 785 | 203 589 | 2 921.1 | 465 561.1 |
| **Sub-total** | 357 900 | 111 500 | 433 168 | 19 209.9 | 921 777.9 |
| Potentially Available | 24 121[a] | 8 000 | 128 046[b] | 469.8 | 160 636.8 |
| Not Suitable (*e.g.*, wetlands/water) | 21 474 | 0 | 26 265 | 604.6 | 48 343.6 |
| **Sub-total** | 45 595 | 8 000 | 154 311 | 1 074.4 | 208 980.4 |
| **Total** | | | | | |
| Land Tenures | 403 495 | 119 500 | 587 479 | 20 284.3 | 1 130 758.3 |
| FMF | 63 000 | 71 400 | 264 600 | 21 000 | 420 000 |

[a] Includes occupied land (0.8%).
[b] Includes alders on a cut or field, agricultural/cultivated uses, airstrip, abandoned railways, railroad, burns, barren land, fields, gravel pit/quarry, mine, roads, transmission lines, pipeline, rock outcrops, and occupied lands.
[c] Danny Crain, Information Services and Systems Branch, Dep. of Natural Resources and Energy, Fredericton, NB.

*Marketed non-timber products (Christmas trees and maple syrup)*

NB has 525 Christmas tree farms of which approximately 30 are located in the FMF. These 30 farms make-up two Co-op's: the Belleisle Christmas Tree Growers and the Petitcodiac Christmas Tree Growers. In 1997, the total amount of land cultivated for Christmas tree production in the FMF was 267.26 ha (Table 15).

Table 15. Land currently available for non-timber products in the FMF (ha) (Fardy et al., 1999).

| Christmas Trees | Maple Syrup |
|---|---|
| 267.26 | 650 |

In NB there are seven maple sugar producers that operate on Crown lands and 90 private producers. Together they utilize 1 160 ha of land. Of these, 44 private maple sugar producers operate in the FMF utilizing 650 ha (Table 14). Most maple syrup producers in the FMF operate in Albert and Westmorland Counties (Matson, pers. comm, 2001).

*Wildlife of economic value by habitat (DWA, OSFH for deer, moose, bear, and other fur bearing game)*

To manage vertebrate wildlife species (*e.g.*, birds, mammals, reptiles, and amphibians) that depend on the forest, NB has differentiated their habitat associations at the stand level resulting in five upland habitat types: 1) hardwood, 2) tolerant hardwood, 3) spruce-fir, 4) pine, and 5) mixedwood. At the stand level, habitats are defined in terms of vegetation communities, successional stages, and peak volume (NBDNRE, 2000a). Habitat objectives serve to maintain viable populations of all species on all areas to which the species are indigenous. The objectives are compiled for each ecoregion and prorated to Crown Licenses.

Because this data overlaps with Working Group 1, it will not be duplicated here. The reader is asked to refer to Table 4 under Criterion 1, indicator 1.2b - Changes In Population And Habitat Levels Of Selected Species And Species Guilds. Table 4 illustrates the management objectives for old and/or large successional stages on Crown License 7 (NBDNRE, 2000a).

All habitat types have spatial criteria. Minimum patch sizes are 375 ha for old spruce-fir habitat (OSFH). For other habitat types, patch sizes may vary between 10 and 60 ha. OSFH blocks must be identified for the entire spatial planning horizon and must meet the following criteria: 1) a minimum of 375 ha must meet stand-level criteria within each block; 2) a minimum of 75% of the area of each block must meet stand-level criteria; and 3) block widths must normally exceed 1 000 metres and always exceed 500 metres.

Habitat management is planned and implemented for specific areas that are called deer wintering areas (DWA). The primary management objective in DWA's is to maximize the long-term sustainable supply of deer winter habitat. Winter habitat is crucial to maintaining deer populations due to the lack of browse. NB has identified two habitat types: moderate winter deer habitat (MWDH) and severe winter deer habitat (SWDH). MWDH provides high food value and some cover for thermal shelter. SWDH provides high snow and thermal cover value and some browse.

Table 16. Deer critical winter habitat objectives for the FMF.

| WMZ | DCWH Objectives (ha) |
|---|---|
| 22 | 8 741 |
| 23 | 10 384 |
| 24 | 4 369 |
| **Total** | 23 494 |

Basically, deer use MWDH when snow and temperature conditions do not restrict mobility and they use SWDH when the snow is deep or in very cold temperatures. For Crown License 7, 26 850 ha have been set aside for DWA. This represents 10% of the provincial total. In the FMF area, priority is given to MWDH. Current deer critical winter habitat objectives for the FMF area are shown in Table 16. In total, 23 494 ha have been allocated for deer management.
Altogether, of the productive land in the FMF, 10% of the land base has been set aside for mature coniferous forest habitat and 6.8% has been set aside for deer wintering area management units on Crown License 7. Approximately 18% of JDI freehold are subject to a primary management objective that is focused on non-timber uses (Brunsdon, pers. comm., 1999). Of this, 6% is devoted to wildlife management areas. SNB has begun surveying deer yards and exploring the idea of habitat queries using indicator species established by the Fish & Wildlife Branch of NBDNRE (Belyea pers. comm., 1999).

*Recreational assets (e.g., park size, scenic vistas)*

The landbase available for recreation in the FMF area is at least 20 877 ha (Table 17). The bulk of the area belongs to FNP (97.6%). Poley Mountain resort represents 0.5% of the landbase and NBDNRE has 1.8% of its land (in the FMF area) committed to recreational leases and permits. In reality, there is more land available for recreational pursuits. For instance, there are private woodlot owners who allow and encourage public access and manage their land accordingly. Some offer unique sites, a place to explore nature and some offer specific activities such as snowshoeing, cross-country skiing or invite people to enjoy the delights of a maple syrup operation.

Table 17. Landbase available for recreational activities.

| Facility/Activity/Lease | Area (ha) |
|---|---|
| FNP | 20 384.2 |
| Poley Mountain Resort | 110.0 |
| Crown Land[a] | 382.6 |
| SNB (*e.g.*, Robinson Conservation Forest)[b] | na |
| **Total** | 20 876.8 |

[a] Landbase includes the counties of Saint John, Westmorland, Albert, Queens, and Kings County).
[b] na = Not available.

## Functionality and Application

Monitoring priority for parts (a), (c), and (d) (*i.e.*, timber, wildlife, and recreation) of this indicator is 1 or functional since the data is readily available. For part (b) (*i.e.*, marketed non-timber products), the priority has been set to 2 or semi-functional because the agency that traditionally monitored non-timber production no longer exists. As such, baseline data exists but there is uncertainty as to who will track these outputs in the future.

For the most part, monitoring responsibility lies with the principal landowners. For the recreational aspect of this indicator (part (d)) monitoring responsibility also lies with the recreational facilities/ clubs that operate in the FMF. It seems logical that summarizing the information gathered from these sources should be coordinated by the FMF every five years.

Tracking non-timber forest products such as Christmas trees, wreaths and maple syrup, is problematic because the Forest Extension branch of NBDNRE no longer exists. Baseline data is available but who will track future production? Thus, until re-structuring is completed within the Department, it is recommended that the respective producers be surveyed in order to obtain the necessary information. Since the FMF has a limited capacity to conduct such a survey (*i.e.*, an enterprise survey), perhaps, SNB would be willing to share the cost. The primary cost of conducting such a survey would include its

development. After that, costs will include administering the survey (either by mail or phone) and summarizing the findings.

Data requirements for part (c) overlap with Working Group 1 – indicators 1.1d and 1.2b. Thus, data for these indicators should be reviewed before any other data collection begins.

The enterprise survey should be developed in conjunction with survey data requirements for indicators 5.1.4, 5.2.1, 5.3.8, and 5.3.9 in order to minimize the overall cost and to increase the response rate (*i.e.*, people are more likely to respond to one survey but not three or four).

Better information is needed on restricted uses (*e.g.*, how does productive forestland allocated to other uses impact the sustainability of timber). Information needed to fill this gap is available through NBDNRE's Land Classification Inventory. SNB currently has all restricted areas classified, defined, and identified for its management area based on data extracted from the inventory. Additionally, the impact of Christmas tree production on timber has been tracked by ecological land classification based on historical and current uses.

## Indicator 5.1.2a/b/c/d

**Resource Stock, Population Level, Assets By Owner**

### Justification for Selection

Sustainability of products and services depends heavily on the quantity and quality of resource stocks whether the inventory of timber, population of wildlife, or capital assets. This is not simply a question of quantity - a park or trail, timber stand that has been left to depreciate might not have the capacity to sustain the benefits.

Two drawbacks in tracking this indicator are that the amount of firewood available is not typically monitored outside of Crown lands and that no population estimates are available for bear or other furbearing animals. For these animals only habitat is monitored via the Land Classification Inventory, which covers the entire NB landbase (including private lands).

### Data Sources

*Timber by species (group, size, quality)*

- Land Classification Inventory - Forest Management Branch, NBDNRE
- JDI Annual Report for the Fundy License - Forest Management Branch, NBDNRE
- JDI Management Plan for the Fundy Crown License - Forest Management Branch, NBDNRE
- JDI Woodlands (Sussex district)
- SNB
- FNP

*Marketed non-timber products (Christmas trees, wreaths, and maple syrup)*

- NB Christmas Tree Growers Co-op Ltd. (Belleisle Christmas Tree Growers and the Petitcodiac Christmas Tree Growers)
- Council of New Brunswick Maple Syrup Producer Association (Southeastern Maple Sugar Producers)
- Crown leases for maple sugar, firewood permits, and tipping permits - Forest Management Branch, NBDNRE
- Enterprise survey

*Population of wildlife of economic value (deer, moose, bear, other furbearers, fish, game birds)*

- A Vision for New Brunswick's Forests…goals and objectives for Crown Land Management, Fish and Wildlife Branch, NBDNRE (License 7, Region 3)
- Fish stock assessments, DFO
- Greater Fundy Ecosystem Research Group, University of New Brunswick
- Breeding pair survey for waterfowl and woodcock singing ground survey - CWS, DOE

*Recreational assets (number of parks, km, trails, scenic vistas)*

- FNP
- Business New Brunswick
- JDI Woodlands - Sussex district (*e.g.*, Unique Areas Program)
- Poley Mountain Resort
- NB Federation of All Terrain Vehicles
- NB Federation of Snowmobiles (Goshen club, Millstream club, and Fundy Trail Riders)
- Bird populations available for viewing - Christmas Bird Survey, Mary's Point Records, and NB Birders
- SNB (*e.g.*, Model Woodlot Program, Robinson Conservation Forest)
- Cottage leases and campgrounds on non-park Crown land - Forest Management Branch, NBDNRE (Kings, Queens, Westmorland, Saint John, and Albert Counties)

## Monitoring Protocol

*Timber by species (group, size, quality)*

The data required on timber stocks include volume ($m^3$) of operable and non-operable growing stock by product, which simply needs to be extracted from the data sources listed. The NBDNRE database also has information for FNP that is based on the Land Classification Inventory. Most of the data is published annually with the exception of the Land Classification Inventory, which is conducted every 10 years. The data for timber can be summarized for the FMF boundary but it would be more meaningful and cost effective to use the defined forest areas for each of the principal landowners (*i.e.*, Crown License 7, JDI freehold – Sussex district, and SNB.

*Marketed non-timber products (Christmas trees, wreaths, and maple syrup)*

To monitor stocks in marketed non-timber outputs, the following information needs to be summarized: 1) the number of Christmas trees & trees available for tipping; and 2) the number of trees tapped by diameter

class and the number of taps. For private operations, this information will have to be gathered via communication with FMF producers. NBDNRE can supply the number of tipping permits and leases for sugar maple that were issued for Crown License 7. This information is available on annually and should be collected on that basis.

*Population of wildlife of economic value (deer, moose, bear, other furbearers, fish, game birds)*

With respect to economic wildlife, populations are not monitored directly. Deer and moose populations are estimated based on a number of factors such as hunter success, post-harvest data, the physical condition of the animal and so on. These estimates are then used as a proxy for wildlife populations. Populations for other animals (such as bear) are monitored through the amount of required habitat that is available. Population estimates for deer and moose are published annually and are to be collected for WMZ 22, 23, and 24. Fish populations are monitored and stock assessments are available. Data for species and river systems present in the FMF can be summarized. Migratory game bird populations are available annually and should be collected on that basis for the southern zone.

*Recreational assets (number of parks, km, trails, scenic vistas)*

Monitoring of recreational stock includes: 1) the availability of birds for birdwatching; 2) the number of parks, recreational facilities, and trails available; and 3) the number of Crown permits and leases for recreational activities on Crown lands other than parks. The availability of birds for birdwatching can be ascertained using the average number of bird sightings by species as a proxy. Data on trails (km) comes from a variety of sources and needs to be segregated by use (*e.g.*, ATV, hiking, snowmobile, biking and cross-country skiing or motorized versus non-motorized. Information for this portion of the indicator is available annually but monitoring over a five-year period is sufficient.

## Baseline Results

*Timber by species (group, size, quality)*

Operable and non-operable volume is considered to be a private matter for JDI freehold and therefore this information is not available. With respect to Crown land, the Licensee prepares a new harvest schedule every five years. Subsequently, non-operable volume does not apply. Assessing the total merchantable volumes instead illustrates that small private holdings exhibit the largest proportion (50%) followed by Crown lands (36%), and freehold (14%) (Table 18). Statistics for FNP have been included for illustration purposes only.

Table 18. Total estimated operable and non-operable growing stock by product and land tenure in the FMF area ($m^3$).

| Land Tenure | Operable Volume | | Non-Operable Volume | | **Total** |
|---|---|---|---|---|---|
| | Softwood | Hardwood | Softwood | Hardwood | |
| Crown License 7[a] (1997-2001) | 12 097 500 | 10 000 000 | na[b] | na | 22 097 500 |
| JDI (1999) | na | Na | na | na | 8 500 000 |
| SNB (1999)[c] | 8 733 374 | 10 068 386 | 5 982 811 | 5 440 562 | 30 225 133 |
| FNP (2001)[d] | 13 274 | 5 903 | 33 | na | 19 210 |
| **Total** | 20 844 148 | 20 074 289 | 5 982 844 | 5 440 562 | 60 841 843 |

[a] na = not available or not applicable.
[b] Joe Gushue, JD Irving Ltd., Woodlands Division, Sussex, NB.
[c] Brian Belyea, Southern New Brunswick Forest Products Marketing Board, Sussex, NB.
[d] Danny Crain, Information Services and Systems Branch, Dep. of Natural Resources and Energy, Fredericton, NB.

*Marketed non-timber products (Christmas trees, wreaths, and maple syrup)*

In the FMF there are 975 000 Christmas trees in production (Table 19). Neither the Christmas Tree Growers Association nor the Province monitors the number of trees available for tipping. An estimate could be made based on the volume of tips that producers are purchasing. Consequently, this data would have to be gathered via an enterprise survey of individual producers. Similarly, the number of maple trees that are being tapped is not available. Again, this data would have to be gathered via an enterprise survey. The number of maple taps can be estimated using the volume of maple syrup produced and the yield per tap, which translates into 133 000 taps in Region 3 for 1999 (Table 19) (Matson, pers. comm., 2001).

Table 19. The number of Christmas trees and trees available for tipping, the number of trees tapped and the number of taps.

| Christmas Trees | Trees for Tipping | Tapped Maple Trees | Number of Taps |
|---|---|---|---|
| 975 000 | Na | Na | 133 000 |

*Population of wildlife of economic value (deer, moose, bear, other furbearers, fish, game birds)*

NBDNRE does not directly track animal populations. They do estimate deer and moose populations using several indicators: 1) age and sex ratios, 2) hunter success rates, 3) body conditions (*e.g.*, antler beam diameters, weight, pregnancy rates), 4) estimated mortality rates, and 5) the number of roadkill. The post hunt deer population, for the FMF was 15 241 animals with an average yarding period of 53 days (Table 20). Currently, there is no hard data for habitat carrying capacity. Basically, NBDNRE uses the physiological condition of deer to provide an indication of how large or small the population is relative to carrying capacity. The notion being that deer exhibit better health if the population remains below the carrying capacity of the land. Critical winter habitat objectives on Crown lands are defined by License, not by WMZ's. For License 7, the objective is 19 644 ha.

Table 20. Post hunt populations for the FMF.

| WMZ | Post Hunt Population | |
|---|---|---|
| | Deer | Moose |
| 22 | 10 800 | 80 - 120 |
| 23 | 2 575 | 700 - 900 |
| 24 | 1 866 | 300 - 500 |
| **Total** | 15 241 | 1 080 - 1 520 |

The average post hunt moose population in the FMF was estimated to be around 1 300 animals (Table 7). It should be noted that because of unreported harvests, these numbers might not reflect the actual moose population; they are only an estimate.

Other animal populations are not estimated; rather, their habitat requirements are monitored.

Fish

The Department of Fisheries and Oceans (DFO) conducts a National Angler Survey every five years. Unfortunately, results for the 2000 survey are not yet available. Results for the 1995 survey were not analyzed by drainages or watersheds nor is there any specific reference made to populations for NB. The

DFO does track fish populations and juvenile stocks; however, attempts in obtaining that information were not successful. Therefore, this section will highlight the 1995 survey findings relating to NB catch data rather than for specific populations for the FMF area. As well as, provide an anecdotal summary given by the Washademoak Environmentalist.

Table II-A in Appendix 9 presents the different fish species that were caught and how many were actually kept by anglers. Altogether, over 3.3 million fish were caught in NB waters in 1995 but only about one-third were actually kept.

The Washademoak Environmentalist have put together a summary of lake activities relating to various fish species known to professional fishermen since 1935 (Appendix 9, Table II-B). Fishermen claim that since the 1930's, most of the fish species caught or observed have declined (Weatherly, pers. comm., 2001). The most notable decline is that of the striped bass. Thirty years ago hundreds of small fish were taken from commercial operations and returned to the lake. By 1997, the striped bass was rarely seen. For 2000 and 2001, information suggests that the striped bass has returned to the lake in considerable numbers. Catfish populations are also increasing. And, although eels are being heavily fished, the juvenile stages of eel appear to be in abundance.

Birds

Migratory game birds are the responsibility of the federal government. In NB, this includes ducks, geese, woodcock, and snipe. Non-migratory game birds are the responsibility of the province. In NB, that includes grouse. Migratory game bird hunting regulations can be viewed at the CWS web site: http://www.cws-scf.ec.gc.ca/pub/summ/index.html. Provincial regulations are available from NBDNRE or from the provincial web site http://www.gnb.ca.

The CWS surveys several breeding waterfowl plots in southeastern NB. These plots, however, are designed to be part of a much larger survey and can be considered relevant only to the survey plot area of 25 square kilometres when looked at for such as small area as southeastern NB (Bateman, pers. comm., 2001). All wetlands in the plots were searched from helicopter using standard operating procedures for this type of survey. All surveys were conducted during the appropriate time for breeding Black Duck, which would between late April and early May. There are seven survey plots located in southern NB. The approximate locations of these plots and a list if bird species that are counted on each of these plots are listed in Table II-C in Appendix 9.

Table 21 presents the collective survey (from all plots) findings for 1996 to 2000. At first glance, the figures are somewhat deceiving. The fluctuation that exists in the data is most likely because the surveys are conducted on a rotation basis (Bateman, pers. comm., 2001). For example, plot 51A was surveyed in 1990 through 1994, and again in 1998 (Appendix 9, Table II-C). Plot 52A was surveyed in 1990 through 1996 and again in 1999 and 2000, and so on. Overall, trends are difficult to identify at this level (from these plots alone) and should be assessed at the provincial scale.

Altogether, 20 plots measuring 25 $km^2$ were flown in NB (Bateman and Hicks, 2000). The most common species of duck in NB are the black duck, ring-neck, green-wing, common and red-breasted mergansers. In 2000, these species numbered 1 216. Of these, black ducks and ring-necks each accounted for 30%. It appears that the number of black ducks has declined somewhat since previous results stated that black ducks made-up 34-50% of the common species present and 23-33% were ring-necks. The 2000 survey findings also reported that 27% of the common species in NB were green-wings and 12% were

mergansers. This might suggest an increase in the number of green-wings and a decrease in the number of mergansers since previous survey findings illustrated that green-wings made-up 7-20% and mergansers made-up 12-32% of common species in NB.

Table 21. Game bird populations from all plots in southern NB (Bateman, pers. comm, 2001).

| Species | Total Number of Birds | | | | | Number of Indicated Pairs | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 1996 | 1997 | 1998 | 1999 | 2000 | 1996 | 1997 | 1998 | 1999 | 2000 |
| Mallard | 6 | 4 | 1 | | 10 | 4 | 4 | 1 | | 3 |
| Black duck | 24 | 4 | 71 | 17 | 67 | 13 | 2 | 31 | 12 | 15 |
| Green-winged teal | 7 | 3 | 24 | 2 | 40 | 4 | 2 | 9 | 1 | 5 |
| Blue-winged teal | | | 2 | | | | | 1 | | |
| Common merganser | 1 | | 2 | 1 | 6 | 1 | | 1 | 0 | 3 |
| Pintail | | | | | | | | | | |
| Wigeon | | | | | | | | | | |
| Unknown merganser species | | | 1 | | | | | 0 | | |
| Wood duck | 3 | | | | 2 | 0 | | | | 1 |
| Hooded merganser | | | 2 | | 2 | | | 1 | | 1 |
| Common goldeneye | | | 8 | | | | | 0 | | |
| Canada goose | | | 2 | | | | | 1 | | |
| Ring-necked duck | 9 | | 25 | 28 | 18 | 1 | | 6 | 7 | 4 |
| **Total** | 50 | 11 | 138 | 48 | 145 | 23 | 8 | 51 | 20 | 32 |

*Recreational assets (number of parks, km, trails, scenic vistas)*

Altogether, they are about 19 facilities that offer recreational experiences in the FMF area (Appendix 9, Table II-D). It should be noted that the facilities listed in Table II-D are not restricted to the FMF boundary. It also includes those recreational activities or facilities that are within close range of the FMF; namely, those that are part of the Fundy Coastal Drive. The most common type of recreation appears to be those associated with outdoor day adventures. There are nine (9) facilities in the FMF area that cater to this type of experience. Activities offered include: 1) rock climbing/rappelling, 2) kayaking/canoeing, 3) interpretative walks and cave tours, 4) horseback riding, 5) biking with an interpretive guide and hiking, 6) boat sightseeing tour and jet boat rides, 7) camping with guides, 8) alpine and cross-country skiing, 9) snowboarding and snowshoeing, 10) tubing, 11) snowmobiling, and 12) outdoor concerts and venues. Additionally, FNP offers discovery tours of the Bay of Fundy's tides, interactive nature program for children, birdwatching, hiking, canoeing, golfing, interpretative trails, camping and saltwater pool, biking, tubing, and alpine skiing. For people who are looking for more than a one-day adventure there are three (3) facilities that cater to the golfer and alpine skier. Learning quests or cultural day adventures represent two other kinds of recreational activities that include things like tours of a micro-brewery or mushroom farm, and instruction on salmon smoking. Family oriented day adventures offer things like feeding farm animals and milking a cow, boat rides, rock hunting and beach combing. Lastly, two facilities cater to the romantic offering packages that include biking and a picnic or mud baths and massage.

Numerous special events typically occur in the FMF on an annual basis, although, the event may differ from year to year (Appendix 9, Table II-E). For instance, the Atlantic Balloon Fiesta is coordinated every year. The Canada Cup National Mountain Bike Championship is a new event that Poley Mountain Resort

is featuring for this year. Next year they will feature a different activity (McShane, pers. comm., 2001). Poley Mountain Resort also hosted the Jamboree 2001, which is an activity for ATV enthusiasts.

In addition to the commercial outings, there are also a number of recreational activities that can occur on Crown lands and for which leases and/or permits are issued. They include:

| | | |
|---|---|---|
| Access roads | fish pond | recreational area |
| Affiliated angling | hunting/fishing lodge | river |
| Campgrounds | Infilling | snowmobile clubhouse |
| Campsites | Lake | storage area |
| Campsite waterfront | Marina | trail |
| Firing range | Parking | wharf |

Recreational opportunities that exist on Crown land in the FMF area are outlined in Appendix 9, Table II-F. In this case, the FMF has been defined to encompass Kings, Queens, Westmorland, Saint John, and Albert Counties. In total, the Crown has granted 336 recreational leases and 316 campsite leases. Additionally, five (5) parks and/or campgrounds and two (2) snowmobile trails have been established on Crown lands in the FMF area.

Trails

Table 22. Recreational trails that exist in the FMF.

| Trails | Km |
|---|---|
| FNP | |
| Cross-country skiing , biking & hiking | 50 |
| Snowmobile | |
| Goshen Club | 180 |
| Millstream Club | 150 |
| Fundy Trail Riders | 210 |
| ATV | na |
| Mud Runners ATV Club | |
| Sussex Valley ATV Club | |
| Petty Trail Blazers | |
| FMF - Hiking | |
| Fundy Footpath, West | 17.9 |
| Catamount | 29 |

The FMF exhibits an extensive trail system for various activities (Table 22). Three (3) snowmobile clubs and at least three (3) ATV clubs exist within the FMF defined forest area. Snowmobile trails make-up 540 km. The number of length of trail that is used by the ATV clubs is uncertain because many clubs are still in the process of building trails. One (1) cross-country ski club operates in the FMF and they utilize the 50 km of trail that is maintained by FNP. The FMF has also supported the development of hiking trails for recreational purposes and education regarding forest management and the FMF. Two specific trails are the Catamount trail (29 km) and the Fundy Footpath (17.9 km) (Table 21). These trails have been designated for walking only. The Fundy Footpath is a wilderness-hiking trail that extends from the FNP boundary to Dustan Brook. The significance of this trail is that it represents one of the last remaining coastal wilderness areas between Florida and Labrador (Frenette, pers. comm., 2001).

Birdwatching

One of the primary sources for bird watching in the FMF is FNP. Although, the park does not track the number of visitors that come to see the birds it does conduct a Spring Bird Survey on an annual basis. The survey found 76 different species of birds for a total population of 1 319 (Appendix 9, Table II-G). Other areas that serve as a proxy for birdwatching in the FMF include the Christmas Bird Count and Mary's Point records. The 1999-2000 count figures for NB indicate that roughly 750 people, from 44 different areas, came to Mary's Point to either observe the birds or participated in feeder counts (Christie, pers.

comm., 2001). The feeder survey is conducted annually. Its aim is to evaluate how many people feed birds in order to attract them to their home.

## Functionality and Application

Collecting information for the timber (part (a)) and recreational aspects (part (d)) of this indicator is the responsibility of the principal landowners. As well, it would be useful if FNP had the co-operation of Business New Brunswick and recreational clubs that operate in the FMF. It is uncertain as to whom monitoring responsibility lies with respect to non-timber products. For now, the respective FMF producers should be able to provide some idea of how much they produce each year to the FMF. NBDNRE is the logical FMF stakeholder to gather and dispense wildlife population estimates by species and, figures on Crown leases, to the FMF. The DFO and CWS can supply fish and game bird populations to the FMF. Personnel at DFO confirm that there is data on fish populations, although, there appears to be uncertainty as to who or what division of DFO is responsible for monitoring fish populations. All data collection and summary is to be co-ordinated by the FMF.

Monitoring priority for parts (a) and (c) (*i.e.*, timber and wildlife) is 1 or functional since the data is readily available. For parts (b) and (d) (*i.e.*, marketed non-timber products and recreational assets), the priority has been set to 2 or semi-functional. Data for non-timber products needs to be obtained from the individual producers. Given the type of information that is to be requested, some producers will view them as private matters and therefore will not wish to disclose that information. A number of assumptions will likely be required, which will have to be noted. The required information that is to be collected for recreational assets comes from a variety of sources, which demands time for compiling all the data. Also, information on scenic sites may be difficult to sort out because most likely these types of sites are being classified under another category such as “unique” or “representative”.

# Indicator 5.1.3a/b/c/d

Sustainable Levels Of Utilization By Owner

## Justification for Selection

This indicator is a function of the previous two - the land base and population/asset quantity and quality. The indicator is relatively straightforward; however, there may be problems with estimating AAC for the small woodlot sector due to changing objectives and difficulty estimating management inputs. This indicator is also problematic for benefits other than timber. Non-timber products, wildlife and recreational uses do not usually have sustainable levels of production/utilization calculated or associated with them. Carrying capacity for some recreational activities such as trails, and parks also present problems.

## Data Sources

*AAC of timber by species/group*

- JDI Woodlands (Sussex district)
- JDI Management Plan for the Fundy Crown License – Forest Management Branch, NBDNRE

- Forest Management Branch, Dep. of Natural Resources
- SNB

*Marketed non-timber products*

- Christmas Tree Growers Co-op Ltd. (*e.g.*, Belleisle Christmas Tree Co-op)
- Council of New Brunswick Maple Syrup Producer Association (*i.e.*, Southeastern Maple Sugar Producers)
- Best management practices - NBDNRE

*Wildlife, fish, fur, birds of economic value*

- A Vision for New Brunswick's Forests…goals and objectives for Crown Land Management - Fish and Wildlife Branch, NBDNRE
- NB Big Game Harvest Reports - Fish and Wildlife Branch, NBDNRE
- NB Furbearer Harvest Report - Fish and Wildlife Branch, NBDNRE
- National Angler Survey – DFO or Fish and Wildlife Branch, NBDNRE
- Hunting and fur harvesting regulations and license information - Fish and Wildlife Branch, NBDNRE
- Angling regulations and license information - Fish and Wildlife Branch, NBDNRE
- Game bird regulations and license information – CWS, DOE and Fish and Wildlife Branch, NBDNRE
- Fish harvest and catch data - Indicator 1.4

*Recreation (visitors, use)*

- FNP
- Poley Mountain Resort
- Business New Brunswick
- SNB (*e.g.*, model woodlot program)

## Monitoring Protocol

*AAC of timber by species/group*

Principal landowners need to be contacted to supply AAC ($m^3$) for softwood and hardwood. It should be noted that the AAC for Crown land is calculated slightly differently than AAC for private land. AAC for Crown land is scheduled and blocked. The AAC for private land is not spatial and represents the potential cut available. To determine trends in AAC and/or to compare actual use with sustainable use, AAC figures are readily available from as far back as 1982. It would be possible to go back farther but it would be costly because the data would have to be retrieved manually (*i.e.*, data prior to 1982 is not in GIS (Geographic Information System) format. Data is available every five years in conjunction with the development of the operating plans.

*Marketed non-timber products*

No volume calculation/levels are available here. There are, however, best management practices (BMP) that are aimed toward sustainable use. Christmas tree and maple sugar production is basically driven by

demand. NBDNRE records: 1) the number of leases for maple syrup production; 2) the number of firewood permits per zone and $m^3$ of wood harvested; and 3) the number of tipping permits per zone and kg of tips harvested. Using what is available, comparisons can still be made (*i.e.*, indicator 1.5) between use levels over time. These comparisons will at least provide some idea as to the sustainability of these land uses. Non-timber data is available annually and should be reported by the NBDNRE to the FMF every five years. For production on private land, only those producers that operate within the FMF should be contacted if necessary. The defined forest areas to be applied are Crown License 7 or Region 3 and the FMF.

*Wildlife, fish, fur, birds of economic value*

Sustainable harvest levels for wildlife in NB are defined by: 1) bag limits and quotas by species, for wildlife and fish; and 2) applicable restrictions (*e.g.*, closed zones, shorter seasons, number of tags) on hunting, angling, and trapping. This information is published annually by NBDNRE and simply needs to be assessed every five years for WMZ 22, 23, and 24, and by watershed or drainage.

*Recreation (visitors, use)*

In theory, sustainable levels of utilization for recreational activities are monitored via carrying capacity. These calculations, however, are not available in NB. Participation rates by activity and the number of visitor days over time can be used as a proxy. Carrying capacity by facility is available with respect to how many people a given facility can accommodate. The information is to be monitored for FNP and other facilities (including the model woodlot program) that exist within the FMF defined forest area. JDI and NBDNRE do not track the visitor access or public use of their lands for recreational purposes.

## Baseline Results

*AAC of timber by species group*

The annual allowable cut (AAC) serves as a tool for assessing whether current harvest levels are sustainable. Table 23 illustrates the AAC for FMF stakeholders. Altogether, the FMF has supported an AAC of 553 367 $m^3$, which represents roughly 37% of the overall AAC for the three land tenures.

Table 23. Annual allowable cut (AAC) for the FMF by species group and ownership ($m^3$) (MacGregor and MacFarlane, 2000).

| | Crown License 7[a] | JDI | SNB | Total |
|---|---|---|---|---|
| Softwood | 345 566 | 106 000[b] | 473 766 | 925 332 |
| Hardwood | 151 317 | 106 000 | 301 018 | 558 335 |
| Total<br>(Amount in FMF)[c] | 496 883<br>(77 514) | 212 000<br>(127 200) | 774 784<br>(348 653) | 1 483 667<br>(553 367) |

[a] The AAC figures for License 7 represent 25 year averages.
[b] Joe Gushue, JD Irving Ltd, Woodlands Division, Sussex, NB.
[c] The proportion of the AAC for the FMF was estimated based on what proportion of the individual, productive forest land lies within the FMF boundary (*i.e.*, Crown License 7 = 15.6%, JDI = 60%, and SNB = 45%).

## Best Management Practices

Sustainable levels of utilization do not apply to parts (b), (c), or (d) of this indicator (*i.e.*, marketed non-timber products, wildlife, fish, fur of economic value, or recreation (visitors, use)). There are, however, BMP's in place that are aimed toward the sustainable production and/or use of these resources.

*Marketed non-timber products*

To maintain the production of maple syrup and ensure that the trees are not stressed, NBDNRE limits the number of taps per tree based on the tree's diameter. For syrup production on Crown land, leases are issued based on the current need for other land uses. The rule of thumb for Christmas tree plantations is typically to harvest 10% and plant 10% on annual basis (Albert, pers. comm., 2000). There are guidelines governing the tipping of balsam fir for Christmas wreath production that prohibit the harvest of the top third of the tree (*i.e.*, crown) and a maximum harvest of one-third of the tips from a single tree. More concise specifications and/or guidelines on these uses can be obtained from NBDNRE.

Firewood is typically not part of forest management objectives and should not be part of this indicator. It is feasible only to track the amount of firewood that is being utilized; and even that is limited since NBDNRE is the only landowner tracking firewood through the number of permits issued for Crown land. Permits are issued for residual wood after a harvest operation. The Energy Secretariat does collect data biannually on firewood consumption that may serve as proxy for the FMF (see indicator 1.4).

*Wildlife, fish, fur of economic value*

Wildlife, fish and game bird regulations are aimed toward sustainability but there are no concrete policies in effect. Current restrictions are based on factors such as post-harvest levels and hunter/angler success. Sustainable harvest levels for wildlife in NB are defined by: 1) bag limits and quotas by species, for wildlife and fish; and 2) applicable restrictions (*e.g.*, closed zones, shorter seasons, number of tags) on hunting, angling, and trapping. Specific details on hunting and fishing regulations can be reviewed by referring to the Hunt 2001 and Fish 2001 booklets, which are distributed by the NBDNRE and are available for viewing on the Provincial web site www.gnb.ca/0078/f&w/index.htm.

*Recreation (visitors, use)*

Carrying capacity has not been calculated in NB. FNP and private woodlot owners, who allow public access to their woodlot, restrict access to certain areas when they deem it necessary. Basically, the level of physical degradation (*e.g.*, erosion, soil compaction) that has or is occurring is subjectively assessed and human traffic is controlled accordingly.

## Functionality and Application

Monitoring priority for parts (b), (c), and (d) (*i.e.*, non-market products, wildlife, and recreation) is 3 or non-functional because the data is not available. For part (a) (*i.e.*, timber), the priority has been set to 1 or functional. Currently, information on sustainable levels does not pertain to non-timber products or to recreation. There are no explicit policies or methods in place to calculate sustainability. Instead, these items are managed on a demand basis in conjunction with best management practices that are aimed toward sustainability.

The principal landowners are the logical choice for forwarding the AAC, for their respective defined forest areas, to the FMF every five years.
With respect to recreation, JDI (Sussex district) and NBDNRE do not track visitors.

NBDNRE has never assessed recreational use of Crown land (*i.e.*, leases/permits) for potential or efficiency (*e.g.*, carrying capacity). Similarly, it would be useful to define carrying capacity for the various types of trails.

FNP has offered two definitions of carrying capacity: 1) the number of visitors/users that a given facility can accommodate given that it is built to a specific standard based on projected use; and 2) the ability of the ecosystem to maintain integrity while supporting human use. Current simulation models are limited and only provide revenue and attendance. Links to cumulative effects are not well understood and the model does not forecast impacts on a landbase level. What is unclear is the ability to measure interactions between these two definitions and how to mitigate against standards based strictly on bottom line objectives.

A pilot project is currently underway that is looking at human impacts on National Parks and GIS modeling will be further tested to see if an improved model can be developed. FNP is a candidate for use as the case study.

FNP with cooperation of the Parks Canada should continue to invest in an effort to enhance current models by facility and/or /recreation type/use.

Indicator 5.1.4a/b/c/d

Actual Production/Use Of Products By Owner

## Justification for Selection

This indicator is simply an estimate of the output or level of service provided by the capital stock or asset. A possible problem area is with respect to timber production, specifically small woodlots and estimating quantities of exported wood.

## Data Sources

*Timber production by species/group/product*

- Timber Utilization Report - Forest Management Branch, NBDNRE

*Marketed non-timber products*

- NB Christmas Tree Growers Co-op Ltd. (Belleisle Christmas Tree Growers and Petitcodiac Christmas Tree Growers Co-op)
- Council of New Brunswick Maple Syrup Producer Association (Southeastern Maple Sugar Producers)
- Forest Management Branch, NBDNRE (Crown License 7, Region 3)
- Energy Survey, Energy Secretariat, NBDNRE (Southeastern region)
- Enterprise survey

*Wildlife, fish, fur, bird harvests*

- NB Big Game Harvest Reports, Fish and Wildlife Branch, NBDNRE (WMZ 22, 23, 24)
- NB Furbearer Harvest Report, Fish and Wildlife Branch, NBDNRE (WMZ 22, 23, 24)
- National Angler Survey, DFO
- Game bird harvest data and license sales – Canadian Wildlife Service, DOE
- Game bird license sales - Fish and Wildlife Branch, NBDNRE

*Recreation use (park visitors, hikers, snowmobilers, birdwatchers)*

- FNP
- Poley Mountain Resort
- Business New Brunswick
- NB All Terrain Vehicles Federation
- NB Federation of Snowmobiles
- Chignecto Ski Club
- Outfitters and Guides
- Service New Brunswick, DOT
- Spring Bird Survey - FNP
- Christmas bird survey and Mary's Point data
- Report on the "Importance of Nature to Canadians" - Federal-Provincial-Territorial Task Force
- Enterprise survey for outfitters and guides

## Monitoring Protocol

*Timber production by species/group/product*

Timber production by species group and by product is to be extracted from the Timber Utilization Report on an annual basis. The data should be summarized every 5 years for the defined forest areas as defined by each principal landowner (*i.e.*, Crown License 7, JDI-Sussex district, and SNB).

*Marketed non-timber products*

Tracking the utilization of non-timber products requires: 1) litres of syrup produced; 2) the number of trees harvested; 3) the number of wreaths produced; and 4) the volume of firewood harvested on Crown land. Producers that operate within the FMF defined forest area will have to be contacted to report on maple syrup, Christmas tree, and wreath production on an annual basis. Typically firewood harvest is not tracked by most landowners. NBDNRE does, however, issue firewood permits for residual wood on Crown land. Accounting for residual wood harvest would constitute double counting since this would volume is already included in timber harvest volumes. Therefore, data on firewood consumption is to be

obtained from the energy surveys. These surveys are conducted bi-annually and information on the other non-timber uses is available annually. All data is to be compiled for the FMF defined forest area except for firewood, which is tracked for the southeastern part of the province.

*Wildlife, fish, fur, bird harvests*

Participation rates for hunting, angling and trapping provide an indication of the demand for wildlife and fish. Demand can be monitored through license sales or the number of licenses issued for hunting and trapping. To get an idea of actual use, catch or harvest data serve as a proxy for evaluation. Since the sale of wild meat and fish are prohibited, it is assumed that all animals and fish harvested are for domestic use. The information that needs to be collected includes: 1) the number of animals/fish/birds harvested by species; 2) the number of participants by species (*i.e*., deer, moose, bear, other furbearers, fish, birds); and 3) the number of moose hunting registrations. Most of this information simply needs to be extracted from the NBDNRE annual reports and is best summarized by WMZ 22, 23, and 24 where applicable. Fish data is compiled from the National Angler every five years and may serve as a proxy for the FMF. Game bird data can be obtained from the CWS and NBDNRE on an annual basis and compiled for southern NB and Crown Region 3, respectively.

*Recreation use (park visitors, hikers, snowmobilers, birdwatchers)*

Actual recreational use can be monitored by evaluating: 1) participation rates by activity; 2) visitor days by facility; 3) registrations and memberships for ATV's and snowmobiles; 4) memberships in cross-country ski clubs; and 5) participation rates for birdwatching. The number of visitors is not tracked on JDI freehold or on Crown land. NBDNRE does, however, track the number of leases or permits issued for recreational activities on Crown lands, which can provide some idea of demand and provide a trend over time. ATV and snowmobile registrations can be obtained and monitored by district (*e.g*., Hampton, Saint John and Moncton). It should be noted that these registrations represent the number of ATV's and snowmobiles combined. Birdwatching is a non-consumptive use and therefore more difficult to monitor. In this case, records on the number of people who visit Mary's Point or the Christmas Bird survey can be used as a proxy for participation rate and/or use. The number of clients that FMF Outfitters and Guides process should also be accounted for to give an indication of participation rates by activity.

FNP with the cooperation of Business New Brunswick could summarize the tourist data and forward it to the FMF. It will then be the responsibility of FMF to co-ordinate the summation of this data, including contacting the individual clubs and outfitters. Information on recreational use is available annually but updating every five years is sufficient.

## Baseline Results

*Timber production by species group/product*

Monitoring wood flow allows for a sustainable wood supply to meet the demand and supply for timber from businesses operating within and outside the FMF. Wood flow patterns, on the other hand, monitor the impacts of harvesting and manufacturing forest products (*i.e.*, employment and income). In 1998, MacFarlane *et al*. integrated wood flow information, for a period covering 1992 to 1996, for all landowners in the FMF. For the purpose of their report the FMF was defined to encompass all of SNB and Crown License 7 boundaries.

Receiving and processing wood derived from the FMF area accounts for an average annual supply of almost 1.3 million $m^3$ (Appendix 9, Table II-H). The primary roundwood harvested in the FMF, between 1992 and 1996, was spruce and fir for pulp, studwood, and sawlogs. These products accounted for 77% of the total harvested volume or roughly 990 000$m^3$. JDI in Sussex and JDI Pulp & Paper accounted for nearly 64% of the volume extracted from the FMF. The majority of the wood from industrial freehold was also destined for Irving mills.

Eighty-one percent (81%) of the species sought by sawmills and planing mills was spruce and fir logs. Of the 81%, a little over half of the volume going to sawmills and planing mills was destined for JDI in Sussex. For pulp and paper, JDI consumes nearly 95% of spruce and fir pulpwood harvested from the FMF. MacFarlane *et al*. (1998a) concluded by stating that export volumes, primarily to Maine, should be accounted for and added to current volumes, in order to obtain a more complete picture of wood flow in the FMF.

*Marketed non-timber products*

Estimates for Christmas trees and maple syrup represent producers operating in the FMF defined forest area in 1997. The production of Christmas wreaths was based on the number of permits issued by NBDNRE for Region 3 in 1999.

Altogether, FMF producers shipped 22 770 Christmas trees and 112 000 wreaths (Table 11). Since 1993, the number of maple sugar producers in the FMF has more than doubled from 20 to 44 with the majority of producers operating in Albert and Westmorland Counties (Matson, pers. comm, 2001). In total, Region 3 yielded 80 000 litres of maple syrup in 1999. Of this, 57 732 litres of syrup (123 760 pounds) was produced by operators within the FMF defined forest area in 1997 with the average tap yielding 0.59 litres (1.3 pounds) (Table 24).

Firewood figures refer to the southeastern part of the province. Approximately 39% of households in the FMF used wood as a heat source. In total 20 688 cords of wood were harvested (Table 11). Fardy *et al*. (1999) assumed that all firewood consumed was supplied by FMF sources.

Table 24. Actual production of non-timber products in the FMF (Fardy *et al*., 1999).

| Christmas Tree Harvest | Wreaths | | Maple Syrup (lbs.) | | Firewood Harvest (cords) |
|---|---|---|---|---|---|
| | Tips (lbs.) | Total | Yield/Tap | Total | |
| 22 770 | 560 000 | 112 000 | 1.30 | 123 760 | 20 688.19 |

*Wildlife, fish, fur, bird harvests*

The FMF supported over 14 557 hunters for deer, moose, and bear and harvested a total of 3 119 animals in 1998 (Appendix 9, Table II-I). Compared to the 1993, provincial license sales for hunting have decreased slightly by about 2 600 licenses. With respect to the FMF, a decrease is evident for deer hunting where the number of hunters has decreased from 16 089 to 13 750. The number of people hunting moose and bear in the FMF, however, has increased from 184 to 348 moose hunters and from 159 to 459 bear hunters. Consequently, the number of animals harvested has also increased. Altogether, 27.6% of the provincial deer harvest, 0.06% of the moose harvest and 11.5% the bear harvest occurred in the FMF (Appendix 9, Table II-I). These figures represent increases of 2.1% and 4.4% for the number of deer and bear harvested, respectively. The moose harvest, on the other hand, has decreased by 3.4%.

Fur Harvest

In the FMF (*i.e.*, WMZ 22, 23, and 24), people are permitted to harvest rabbit, coyote, fox, raccoon, mink, muskrat, otter, beaver, fisher, skunk, squirrel and bobcat. In NB overall, for the 1998-1999 trapping season, license sales declined from 1 300 in the previous season to 1 154. Subsequently, harvest levels for most furbearers also decreased, with the exception of beaver and mink. In total, 12 018 beavers and 889 mink were harvested (Appendix 9, Table II-J). The number of mink harvested represents a low in comparison to figures over the last 20 years. Concurrently, the number of fishers harvested was considered to be high at 648 animals, eventhough, this figure represents a 17% decrease. Fur exports from NB declined from 65 635 to 51 275 animals, which is primarily attributed to the lower number of muskrat harvested (Appendix 9, Table II-J). Altogether, 51 275 pelts were collected in NB.

Game Birds

NB does not track the annual harvest of game birds. The province does not have a large enough hunter effort that would make hunting an additive mortality for grouse (Lawlor, pers. comm., 2001). The current hunter effort is low and is only compensatory mortality on grouse populations. They do, however, have a record of the number of licenses issued for (Appendix 9, Table II-K). Licence sales for game birds are not compiled by WMZ but by region. The following data represents Crown Region 3. NB issues hunting licenses that allow hunting of two (2) species of game birds: ruffed grouse and spruce grouse. These birds can be hunted under the authority of two (2) types of hunting licenses: the small game licence and deer licenses. Migratory game birds such as woodcock and waterfowl are the responsibility of the CWS division of the Department of Environment (DOE). Therefore, anyone wishing to hunt migratory birds requires a migratory bird-hunting license in addition to their Provincial license (either a small game or deer license). Federal regulations concerning the hunting of migratory birds can be obtained from NBDNRE or viewed on the CWS web site: www.cws-scf.ec.gc.ca.

NBDNRE issued 24 097 hunting licenses in Crown Region 3 for the 2000 hunting season which represents 31% of the Provincial total (Appendix 9, Table II-K).

Angling

The Department of Fisheries and Oceans (DFO, 1997) conducts a National Angler Survey every five years. Unfortunately, for the 1995 survey, data was not analyzed by drainages or watersheds. Survey information by river systems will, however, be available at a later date in conjunction with the year 2000 survey. Therefore, the data presented here relates to NB anglers rather than to FMF anglers.

The number of people participating in fishing as a recreational pastime has declined on a national level. The participation rate of active anglers in NB represents two percent (2%) of the national rate. Altogether, NB waters supported 86 304 anglers, of which 11% were non-residents. The majority of non-resident anglers originated from Ontario and the Maritime Provinces. Of the total number of participants, 21 289 resident anglers participated in ice fishing. Less than one percent of non-resident angler's (127) showed interest in ice fishing.

Altogether, over 3.3 million fish were caught in NB waters in 1995 but only about one-third were actually consumed. Of the fish that were caught, NB residents kept twice as many fish (40%) as compared to non-NB residents (24%) (Appendix 9, Table II-A).

Although, the DFO (1997) survey only provided information on a provincial basis, the number of angling licenses sold and revenue generated are tracked by the NBDNRE. Looking at the Region 3 figures, shows that 20 098 angling licenses were sold in 1999, which represents 23% of the provincial total (Appendix 9, Table II-L). Of this, two percent (2%) signify non-resident anglers. It is also of interest to note that next to Moncton, Hampton purchased the most licenses. The bulk of the licenses were sold to residents for angling non-salmon species (78%).

*Recreation use (park visitors, hikers, snowmobilers, birdwatchers)*

Table 25 illustrates the participation rate, the average number of days spent, and the average number of trips made, by New Brunswicker's and Canadians, for the various nature related activities. Roughly 83% (slightly below the national average of 84.6%) of New Brunswicker's participated in some kind of nature related recreation. The most popular nature related recreation were those that are indirect (see Appendix 13 for definitions), followed by residential wildlife, and outdoor activities in natural areas.

Table 25. Participation, the number of days, and the number of trips taken by NB residents to partake in nature related activities in 1996 (national average in brackets) (Leigh *et. al.*, 2000). a = not available.

| Activity | Participation (%) | Average No. of Days Spent Participating | Average No. of Trips Taken |
|---|---|---|---|
| Outdoor activities | 44 (57) | 15 (16) | 15 (na) |
| Wildlife related activities | 46 (38) | 159 (140) | na |
| Wildlife viewing | 19 (19) | 17 (1) | 15 (13) |
| Recreational fishing | 17 (18) | 17 (17) | 15 (13) |
| Hunting | 13 (5) | 17 (17) | 16 (13) |
| Indirect nature related activities | 71 (75) | na | na |

Figure II-A in Appendix 9 shows the participation rate of New Brunswicker's as compared to Canadians. For five out of the 17 activities surveyed, the NB participation rate was higher than the Canadian rate. Namely, in descending order of participation: 1) camping, 2) gathering nuts, berries, and firewood, 3) Canoeing, kayaking or sailing, 4) off-road vehicle use, and 5) snowmobiling. Of the Day Adventure operators that reported, average attendances for 1998 are illustrated in Table II-M in Appendix 9 by activity. The majority of visitors took part in those activities that fell into the "other" category (42%) and walking (38%). What constitutes "other" was not stated by the DEDT.

Three snowmobile clubs operate in the FMF or use FMF terrain. The number of all terrain vehicles (ATV) and snowmobiles registered by the end of March in 1999, was 7 563 (Table 26) (West, pers. comm., 2000). In fact, ATV sales in NB were the highest per capita in the country (Keith, pers. comm., 2000). Information on ATV use in the FMF was available on a provincial level only.

Table 26. ATV and snowmobile registrations for the FMF and vicinity (West, pers. comm., 1999).

| District | Number of Vehicles Registered |
|---|---|
| Sussex | 1 290 |
| Hampton | 380 |
| Saint John | 2 192 |
| Moncton | 3 701 |
| **Total** | 7 563 |

The NBATV Federation (NBATVF) was formed in 1999 and they represent seven (7) regions within NB. Region 5 would include the FMF area. There are three (3) ATV clubs in the FMF area not including those in Moncton (Table 27). Altogether, there are almost 25 000 ATV participants in NB (NBATVF, 2001).

Other popular outdoor recreation that takes place in the FMF includes biking, downhill and cross-country skiing. Unfortunately, no data was gathered for biking, although, it is a sport which seems to be increasing in popularity. Poley Mountain primarily caters to alpine skiing, snowboarding and tubing. On an annual basis is attracts between 54 500 and 57 500 visitors (McShane pers. comm., 2001). The resort is still undergoing the transformation of becoming multi-seasonal featuring things like mountain bike trails and outdoor concerts and special events in the summer months (Table 26). Cross-country skiing is a popular outdoor activity and there is one club operating in the FMF. Unfortunately, the Chignecto ski-club membership has suffered over the last few winters due to a lack of snow (Table 26).

Table 27. Summary of participation rates for recreational facilities/activities in the FMF.

| Facility/Activity | Annual Visits/Memberships |
|---|---|
| FNP | 268 000 |
| Day use areas | |
| Camping | 44 000 |
| Poley Mountain Resort | |
| Skiing/snowboarding/tubing | 50 000 |
| Mountain biking | 2 000 |
| Hiking | 500 |
| Concert participants | 2000 - 5000 |
| Kings County Museum | 1 825 |
| Snowmobile Clubs | |
| Goshen Snowmobile | 254 |
| Millstream Snowmobile | 243 |
| Fundy Trail Riders | 330 |
| ATV Clubs | NB = 25 000 |
| Mud Runners ATV Club | |
| Sussex Valley ATV Club | |
| Petty Trail Blazers | |
| Chignecto Cross-Country Ski Club | 15 - 20 |
| Birdwatching | |
| FNP Spring Bird Survey | na |
| Christmas Bird Survey | na |
| Mary's Point | 66 |

*na = not available

The FMF area is host to a variety of attractions. Sussex, for example, hosts the Antique Auto Flea Market and the Atlantic Balloon Fiesta, both of which are top events and attract visitors to the FMF. The balloon fiesta includes 25 hot air balloons that are launched twice a day. Parachute demonstrations and helicopter rides are also available. The three-day flea market begins right after the balloon fiesta and involves roughly 700 vendors featuring everything from a car auction to crafts to antiques. The Kings County Museum is another attraction averaging 5 visitors per day (1 825 per year) in 1998 (Table 27).

Another recreational benefit for many hunters is NB's outfitters and guides. There are approximately 200 outfitters operating in NB with the majority being located in the southwestern part of the province (McCallum, pers. comm, 2001). NBDNRE does monitor these operations to some degree but the information collected is deemed confidential. Therefore, participation rates for those that use the services of Outfitters and Guides is not readily available and may only be obtained through an enterprise survey of the individual operations.

## Functionality and Application

Monitoring priority for this indicator is 1 or functional since the data is readily available.

The timber Utilization Report is not available in digital format. As such, summarizing timber utilization data for this indicator will be costly if an outside firm needs to be contacted.

Baseline information is available on maple syrup, Christmas trees and wreaths but collecting data in the future may be problematic now that the Forest Extension Branch of NBDNRE has been disbanded. For example, the Belleisle Christmas Tree Co-op does not record the volume of sales or stems cut. Producers in the FMF may have to be contacted individually, which could still present a problem because generally producers prefer not to disclose this type of information. NBDNRE used to estimate the number of trees harvested using export data for NB. Perhaps, based on NBDNRE methods, this calculation could be duplicated.

Indicator 5.1.5a/b/c/d

Sustainable Levels Of Production/Use Compared To Actual

## Justification for Selection

This comparison will provide a direct estimate of sustainability. One problem, however, is interpreting the results. For example, what is an appropriate time frame for assessing actual timber harvest with the AAC? One year? Five years?

## Data Sources

*Timber production as a percent of AAC by species, group, and product*

· Figures presented in the foregoing for part (a) of indicators 5.1.3 and 5.1.4.

*Marketed non-timber products production as a percent of sustainable*

· Figures presented in the foregoing for part (b) of indicators 5.1.3 and 5.1.4.

*Wildlife, fish, fur, bird harvest as a percent of sustainable*

· Figures presented in the foregoing for part (c) of indicators 5.1.3 and 5.1.4.

*Recreation participation levels as a percent of carrying capacity*

· Figures presented in the foregoing for part (d) of indicators 5.1.3 and 5.1.4.

## Monitoring Protocol

*Timber production as a percent of AAC by species, group, and product*

The calculated AAC is to be compared with actual timber utilization. Both are presented in the foregoing for indicators 1.3 and 1.4, respectively. That is, timber production as a percent of AAC (*i.e.*, weigh scale processing). This calculation can be performed annually by FMF staff for the Crown license 7, JDI, and SNB defined forest areas.

*Marketed non-timber products production as a percent of sustainable*

Calculating the production of non-timber products, as a percentage of the total amount that can be sustained is not possible here because sustainable levels for non-timber products have not been defined (*i.e.*, indicator 1.3 - part (b)).

*Wildlife, fish, fur, bird harvest as a percent of sustainable*

Calculating harvest, as a percent of the total population that can be sustained is not possible because tracking sustainable levels of wildlife and fish is not feasible at this time (*i.e.*, indicator 1.3 - part (c)).

*Recreation participation levels as a percent of carrying capacity*

Calculate participation rates as a percentage of carrying capacity (*i.e.*, how many visitors can be tolerated before the recreational experience is diminished). Again, this comparison cannot be made because recreation does not have sustainable levels of production associated with it (*i.e.*, indicator 1.3 – part (d)).

## Baseline Results

*Timber production as a percent of AAC by species, group, and product*

Harvest levels on private lands were within their calculated AAC (Table 28). The harvest level for softwood on Crown land, however, was exceeded by 19 566 $m^3$ but fell below the AAC for hardwood by 86 062 $m^3$. It is not possible to evaluate the harvest across the landbase because the AAC is not known for industrial freehold. JDI in Sussex, however, has provided an AAC of 106 000 $m^3$ for both softwood and hardwood on their freehold. The firm also stated that they harvest 100% of their AAC and do not exceed it (Gushue pers. comm., 2000).

Table 28. Summary of actual utilization and AAC by landowner in the FMF ($m^3$). *na = not available.

| Land Tenure | Softwood | | Hardwood | | **Total** | | |
|---|---|---|---|---|---|---|---|
| | AAC | Harvest | AAC | Harvest | AAC | Harvest | % of AAC |
| Crown License 7 | 345 566 | 365 132 | 151 317 | 65 255 | 496 883 | 430 387 | 86.6 |
| SNB | 473 766 | 351 444 | 301 018 | 31 487 | 774 784 | 382 931 | 49.4 |
| Industrial Freehold | na | 273 123 | na | 79 172 | na | 352 295 | na |
| Other Industrial Freehold | na | 41 705 | na | 72 666 | na | 114 371 | na |
| **Total** | 819 332 | 1 031 404 | 452 335 | 248 580 | 1 271 667 | 1 279 984 | |

## Functionality and Application

Monitoring priority for part (a) of this indicator is 1 or functional. The remaining parts (*i.e*., (b), (c), and (d)), however, are given a priority of 3 or non-functional because data is only available for actual use (*i.e*., indicator 5.1.4) and not for sustainable levels (*i.e*., indicator 5.1.3). Thus, no comparisons between actual and sustainable use can be made at this time.

Comparing sustainable levels of production to actual timber utilization may be a sensitive area for JDI. If so, then an estimate can be calculated for the FMF defined forest area rather than for the individual land tenures.

Better information is needed with which to assess the sustainability of non-timber products and recreational use. Currently, no sustainable levels of production are available (*i.e*. indicator 5.13). Monitoring sustainability for these items are only achieved through evaluation of Best Management Practices.

Indicator 5.1.6

Percent Of Timber Utilization In Logging

## Justification for Selection

This indicator is listed because it might provide information regarding an emerging problem (*i.e*., increased waste and therefore, diminishing sustainability) or serve as a possible mitigating factor.

## Data Sources

- JDI Woodlands (Sussex district)
- Timber Utilization Reports – Forest Management Branch, NBDNRE (Crown License 7)
- NB Forest Management Manual for Crown Lands (*i.e*., Utilization Standards) - Forest Management Branch, NBDNRE
- SNB

## Monitoring Protocol

The data to be monitored include: 1) changes in net downs of AAC by species group for the principal land tenures; 2) product flow for end uses; and 3) product sorts.

The information needed for AAC is presented in the foregoing for indicator 1.3 (a) and should be evaluated every five years in accordance with the operating plan. Past utilization surveys should also be

compared to determine trends in product flow for end uses (*i.e.*, JDI's obligations to sub-licensees). Looking at product sorts at roadside also provides a proxy for timber utilization. Utilization surveys and standards are available for comparison as far back as 1982. It would be a tedious task, though, to retrieve information prior to 1982 because most of it is anecdotal.

## Baseline Results

Table 29 illustrates the net-downs in AAC that have occurred since 1982. Modeling wood flow was first put into practice in 1982. At that time the model was considered to be quite crude. By 1987 the model had been refined to include buffers but they were not site specific. In 1992 buffers were defined to include watercourses and account for things like DWA and MCFH. The 1997 AAC reflects the emergence of biodiversity issues. The 2002 figures are not yet available but they too will represent a further net down due to the establishment of protected areas.

Table 29. Percent change in net downs of AAC on Crown License 7 (Dick pers. comm., 2001).

| Year | Net downs of AAC | | | |
|---|---|---|---|---|
| | Softwood | | Hardwood | |
| | $m^3$ | % | $m^3$ | % |
| 1982 | 406 000 | na | na | na |
| 1987 | 439 000 | 8.1 | 301 980 | na |
| 1992 | 285 000 | -35.1 | 116 000 | -61.6 |
| 1997 | 339 500 | 19.1 | 167 300 | 44.2 |

Product Flow and End Uses

In 1998a, MacFarlane *et al*. summarized wood flow patterns in the FMF. Their work presents total product flow for end uses by ownership and represents an average wood flow for the period covering 1992 to 1996. It is readily available and the findings serve as benchmark data. Since there are no comparisons to be made until the next five-year update and in effort to avoid duplication it is suggested that the reader refer back to the section of this report that deals with indicator 1.4a (*i.e.*, actual production/use of products by owner). Information regarding product flow and end uses are presented in Appendix 9, Table II-H.

Product Sorts

Percent change in product sorts on Crown land is not readily available (Murphy, pers. comm., 2001). For private lands, however, Mr. Murphy stated that on Crown lands, 100% utilization of harvested trees is expected. This is encouraged through proper bucking and slashing techniques. The trend is toward tree-length harvest of trees that are a minimum of 8 cm in diameter for both softwood and hardwood species. Typically, penalties are assessed when waste volumes exceed 3.0 $m^3$ or 3%, whichever is lower, of the harvested volume. Utilization standards have virtually remained unchanged since 1982 with the exception of hardwoods. Standards for hardwood utilization have become stricter in the past three years (Murphy, pers. comm, 2001). For instance, almost all of the hardwood AAC is know realized. There is of course some waste due to defects such as butt rot. The province does not measure this, however, since it constitutes only a small amount. Actual specifications of product utilization standards may be obtained from the Forest Management Branch of NBDNRE.

## Functionality and Application

Originally, this indicator was to track the recovery rate of timber; namely, the percent of gross merchantable volume recovered in logging. This indicator included two aspects. The first is the percent of gross merchantable volume of marketable species recovered, and the second is the percent of gross merchantable volume of all species recovered. In the latter case, the problem is one of marketing low quality species. In order to avoid sensitivity issues, however, the indicator has been modified to reflect the amount of timber utilized in logging. The notion is to reflect how timber production has been impacted by other uses. An added benefit of this modification is that the information will provide an indication of trends in value-added products.

The assigned monitoring priority is 1 or functional.

Going back prior to 1982 for data comparison is not recommended. Collection and/or reporting methods differ prior to 1982, which would necessitate a generous outlay of time for data compilation that would be costly. An estimate of cost cannot be given because the amount of person weeks required to complete such a task is uncertain.

Indicator 5.1.7

R&D, management Expenditures, area treated on land designated for timber production (e.g., silviculture, protection, and access)

## Justification for Selection

This information provides a measure of the effort directed at increasing productive capacity, population, and production. It might help to explain whether the output of a good or service is sustainable. Management expenditures and area treated should be readily available from the principal landowners. Information on R&D expenditures is likely to be more difficult to obtain.

## Data Sources

- NBDNRE Annual Report, Communications Branch, NBDNRE
- NRC
- Forest Protection Ltd.
- SNB

## Monitoring Protocol

Under the co-ordination of the FMF, the principal agencies are to be contacted so that the following information can be summarized: 1) expenditures on fire suppression; 2) pest control and monitoring budget; 3) spending for silviculture; and 4) expenditures made by FMF plus an estimate of leveraged

funding. Expenditure data should be categorized so that funding for timber production is separate either on a provincial or regional level. The required information is available on an annual basis, although, a five-year monitoring period would suffice.

## Baseline Results

The following information on area treated was obtained from NBDNRE (2000c) and it was possible to present most items on a FMF basis (*i.e.*, Crown License 7, Region 3). Expenditures, however, were taken from the NBDNRE Annual Report (2000b) and were available on a provincial level only. Each individual section within the Forest Management Branch reports on a provincial basis. It would be difficult to disaggregate the data so that only one Crown license was represented (McDormick, pers. comm., 2001).

In 1999, approximately 6 400 ha on Crown license 7 received silvicultural management and 391 ha were destroyed by wildfires in Region 3 (Appendix 9, Tables II-N and II-O). These figures represent roughly 12% and 32% of the provincial totals, respectively. Looking at a ten-year average, the wildfires that have occurred in Region 3 represents 11% of the provincial forest area that has burned since 1990 (Appendix 9, Table II-O). In total, the province spent in excess of $10 million on fire suppression to treat 1 213 ha in the 1999 season (Table 17).

The aerial spray program typically conducts pesticide treatments. Since 1995 (the last spruce budworm outbreak), however, there has been no major pest problem to justify this type of treatment. Subsequently, the 1999 expenditure of roughly $1 million does not include aerial spray operations but rather the day to day operations necessary for early pest detection and control (Table 17).
Timber utilization entails the monitoring of Crown land harvest schedules and the promotion of value-added manufacturing within the forest industry (NBDNRE, 2000c). Not including harvests under First Nations agreements, 516 160 m3 (or 11% of the provincial total) were harvested from Crown license 7 (Appendix 9, Table II-P). Almost 11% of the wood volume harvested in NB were derived from Crown License 7 (Appendix 9, Table II-P). The 1999 cost of these operations was $4.6 million (Table 29).

Silviculture on Crown lands includes seedling production, reforestation, and stand improvement and tending. Two types of planting are conducted on Crown land: full and fill planting (NBDNRE, 2000c). Full planting is done in areas that have been site prepared and target density is 2000 trees per hectare. Fill planting applies to unprepared areas to supplement natural regeneration. Altogether 9 846 ha were reforested in NB, which included 200 ha of roadside planting, 175 ha for DWA's, and 511 ha to correct understocked plantations (Table 29). Another 31 896 ha received stand improvement. Pre-commercial thinning was applied to 23 413 ha, 342 ha received semi-commercial thinning, and 8 141 ha qualified as plantation cleaning. Of this, 829 ha represented DWA's and 6 812 ha were remedial plantation cleaning. For stand tending, 12 824 ha were treated with herbicide. The rate per hectare for planting and pre-commercial thinning was $378 and $532, respectively. Altogether, NB spent over $33 million on silvicultural management.

Most seedlings planted on Crown land are genetically improved whose seeds are collected from managed seed orchards (NBDNRE, 2000c). Approximately 4 180 litres of seed cones were collected and 21 403 seedlings were shipped for planting on Crown land. The cost incurred to operate and manage the seed orchards was not available.

Good expenditure data is not available at the FMF level. Although, it reports on a national scale, Canada's State of the Forest report (NRC, 2000) at least provides a picture of what has been happening with forest

management expenditures. Consequently, highlights from that report are presented here to illustrate a general trend that can be applied to the FMF. Total expenditures on forest management in Canada in 1997 were $2.3 billion (Table 30). On a national basis, total forest management expenditures made by government dropped in 1997 as compared to previous years (NRC, 2000). Industry expenditures, however, remained stable. This change is largely due to the shift in responsibility from the public to the private sector over the last ten years. Between 1988 and 1997, expenditures made by industry nearly tripled while government expenditures dropped. With respect to the Federal Government, expenditures declined by two-thirds (NRC, 2000).

Table 30. 1999 Expenditures on Crown land designated for timber production in NB (NBDNRE, 2000b; NRC, 2000).

| Management Activity | R&D ($) | Expenditures ($) | Area Treated |
|---|---|---|---|
| Fire suppression | Na | 10 033 200 | 1 213 ha |
| Pest control and monitoring | Na | 1 001 200 | 0 |
| Silviculture<br>Reforestation<br>Thinning<br>Aerial herbicide | Na | 33 069 600 | <br>9 846 ha<br>31 896 ha<br>12 824 ha |
| Timber Utilization | Na | 4 644 800 | 5 259 375 $m^3$ |
| Federal Government | 0.1 billion | na | na |
| Provincial Governments | 0.9 billion | | |
| Industry | 2.3 billion | | |
| **Total** | 3.3 billion | 48 748 800 | na |

*na = not applicable.

## Functionality and Application

Monitoring priority for this indicator has been set to 1 or functional.

A cost of up to two person-weeks is associated with compiling the data required for this indicator.

## Indicator 5.2.1a/b/c/d

**Volume And Value Of Production/Use For Principal Products/Owner**

## Justification for Selection

This is simply a measure of whether output of goods and services is going up, down or remaining constant. This indicator reports on the value of goods and services produced. Emerging trends in value per unit are the most important because the economic activity generated cannot be solely attributed to the FMF defined forest area (*e.g.*, wood flow is not restricted to the FMF defined forest area).

## Data Sources

*Timber products (estimate of volume and value of roundwood, and secondary wood products produced within the defined forest area)*

- Timber Utilization Reports, Forest Management Branch, NBDNRE
- NRC (*e.g*., Employment and Income in Southeast New Brunswick by MacFarlane *et al*., 1998a)
- Private stumpage rates - SNB
- Crown royalties - Forest Management Branch, NBDNRE
- Census of Manufacturers – Statistics Canada
- Industry Canada web site (http://www.strategis.ic.gc.ca/SSG/io25009e.html)

*Marketed non-timber products*

- Christmas Tree Growers Co-op Ltd. (Belleisle Christmas Tree Growers and Petitcodiac Christmas Tree Growers)
- Council of New Brunswick Maple Syrup Producer Association (Southeastern Maple Sugar Producers)
- Energy Survey, Energy Secretariat, NBDNRE (Southern Region)
- Enterprise survey

*Wildlife (volume and value of harvest – fur, other)*

- Deer Hunter Survey (*i.e*., expenditure data) - Fish and Wildlife Branch, NBDNRE
- NB Big Game Harvest Report - Fish and Wildlife Branch, NBDNRE
- NB Furbearer Harvest Report - Fish and Wildlife Branch, NBDNRE
- Report on "The Importance of Nature to Canadians" - Federal-Provincial-Territorial Task Force
- National Angler Survey – DFO
- Revenues and expenditure data for game birds – CWS, DOE
- License revenue for game birds - Fish and Wildlife Branch, NBDNRE

*Recreation (participation levels and value)*

- FNP
- Poley Mountain Resort
- Business New Brunswick
- NB Federation of All Terrain Vehicles
- NB Federation of Snowmobiles
- Chignecto Ski Club
- SNB
- Enterprise survey

## Monitoring Protocol

*Timber products (estimate of volume and value of roundwood, and secondary wood products produced within the defined forest area)*

This indicator is to be monitored on an annual basis and the data required are: 1) sales volumes by product; 2) volume harvested and royalties; and 3) the value of processing (*i.e.*, employment and income).

Value estimates are to be based on average stumpage and end product prices, and calculated annually. Roundwood volume by product for each defined forest area is then aggregated. Next, multiply wood volume obtained from private land by the private stumpage rate and that obtained from Crown land by Crown royalties. Then subtract lumber prices, which will result in an average roundwood value. Employment and income estimates can be extracted from the Census of Manufactures. SIMFOR also contains employment and income data but it needs to be segregated. Data on secondary wood products is more difficult to obtain due to the diversity of products. The degree to which wood is delivered to secondary manufacturing operations (*i.e.*, beyond the sawmill and pulpmills) can only be determined by the Licensee and SNB. Information can be found on the Industry Canada web site but it is not readily available and would require one person-month to calculate.

*Marketed non-timber products*

Price figures are to be applied to the volume estimates that were obtained in the foregoing for indicator 5.1.4 (b) (*i.e.*, price × volume). To do this, the average price per: 1) Christmas tree; 2) wreath; 3) litre of maple syrup; and 4) cord or $m^3$ of firewood, has to be obtained. Prices for Christmas trees, wreaths, and maple syrup are to be obtained from the enterprise survey, which will be conducted every five years. Data from the Energy survey is conducted bi-annually and an annual average for the FMF should be recorded.

*Wildlife (volume and value of harvest – fur, other)*

The following data is to be monitored over a five year period: 1) revenue generated from hunting by species (*i.e.*, deer, moose, bear) for resident and non-resident participants; 2) revenue generated from pelt harvest by species for resident and non-resident participants; 3) revenue generated from angling by species for resident and non-resident participants; and 4) revenue generated from bird hunting by species and for resident and non-resident participants. Secondary impacts such as participant expenditures must also be summarized. Deer hunter expenditures are available every other year, bird hunter expenditures are available annually, and the angler data is available every five years. Multipliers are not available for deer hunter expenditures but should be applied to actual fish and bird harvests if they are available. Additionally, the report on the "Importance of Nature to Canadians" should be referenced.

Revenues generated from license sales and expenditures are to be compared to the number of animals/fish/birds harvested, which is presented in the foregoing under indicator 5.1.4 (b). Figures are to be presented for WMZ 22, 23, and 24, Region 3, and for the southern region of NB on a five year monitoring period.

*Recreation (participation levels and value)*

A comparison between participation rates with the cost of participation by activity is required. To do this, the following data needs to be collected: 1) the number of visitors by facility; 2) visitor expenditures by activity and category (*e.g.*, user fees, equipment, lodging); and 3) revenue generated by facility/activity. The foregoing indicator 5.1.4 is tracking the number of visitors by facility/activity.

## Baseline Results

*Timber products (estimate of volume and value of roundwood, and secondary wood products produced within the defined forest area)*

MacFarlane *et al*. (1998a) estimated the average wood flow in the FMF to be almost 1.3 million $m^3$. Based on Crown royalty rates and private stumpage rates, the estimated worth of the wood harvested was near $18 million (Appendix 10, Table III-A). Crown royalties listed (column 3) represent 76% of the fair market value (Bringloe, pers. comm, 2001). The private stumpage rates displayed in column 5 represent the current rates applied (SNB, pers. comm, 2001). Where no private stumpage rate was available, the fair market value was applied to wood obtained from private holdings (*i.e*., SNB, industrial freehold and other industrial freehold).

Although it is reasonable to calculate an average roundwood value based on average stumpage rates and end product prices, it was not feasible to do so. It was not possible to subtract lumber prices or end product prices from the overall wood estimate because it was not possible to determine the grade or quality of the products. It was also not possible to determine what proportion of each product was utilized to produce the different dimensions available. For example, roughly 305 000 $m^3$ of spruce-fir logs were harvested (Appendix 10, Table III-A); however, how much of this volume was utilized to produce 2x3, 2x4 or 2x8 lumber and how much was considered to be grade 1 or 2 (Appendix 10, Table III-B)? Likely, this type of data would need to come from a survey of enterprises in which the various firms would be contacted. It is possible to simply compare end product prices from year to year, which are documented monthly by the Wood Products Group (WPG). Appendix 10, Table III-B and C represent average softwood lumber prices per 1000 fbm for truckload orders delivered to the mill. It should be noted that Appendix 10, Table III-B denotes Canadian dollars and Appendix 10, Table III-C characterizes American dollars. Appendix 10, Table III-D represents average hardwood prices per 1000 fbm at northern region mills in US dollars for truckload orders delivered to the mill.

Value of Processing

The value of processing wood in the FMF was estimated by Fardy *et al*. in 1999 via a survey. In total, 26 industrial wood processing facilities and 12 portable sawmills participated in the survey. The volume of wood processed was 1 190 622 $m^3$ and 5 821.28 $m^3$, respectively. Based on their findings on the number of people employed in wood processing and applying the average annual income for the forest sector (MacFarlane *et al*., 1998b), the value of processing FMF wood was estimated to be approximately $9.5 million (Table 31).

Table 31. Estimated value of processing in the FMF.

| Wood Processed ($m^3$) | Workers Employed | Average Annual Income ($) | Estimated Worth of Processing ($) |
|---|---|---|---|
| 1 196 443.3 | 439.66 | 21 518 | 9 460 603.90 |

Marketed non-timber products

The overall worth of non-timber forest products was estimated to be just under $3.5 million (Table 32). Firewood made-up 57% of the total revenue earned from non-timber products in the FMF. Christmas wreaths and Christmas trees accounted for 32% followed by maple syrup with 11%.

Table 32. Value of non-timber production (Fardy *et al*., 1999).

| | Quantity | Average Price ($/unit) | Total ($) |
|---|---|---|---|
| Christmas Trees | 22 770 | 20.00 | 455 400.00 |
| Wreaths | 112 000 | 6.00 | 672 000.00 |
| Maple Syrup | 123 760 lbs. | 3.00 | 371 280.00 |
| Firewood | 20 688.19 cords | 95.00 | 1 991 445 |
| Total | na | na | 3 490 125 |

*Wildlife (volume and value of harvest – fur, other)*

Deer, Moose, Bear

An estimated 80 515 hunting licenses were sold in NB in 1998 generating revenue in excess of $2 148 640. Of these, 25.4% of deer hunting licenses were sold to FMF residents, 7.3% were sold to FMF moose hunters, and 13% represent varmint licenses for the FMF area (Appendix 10, Table III-E). Approximately $366 000.00 can be attributed to the FMF. This value represents an underestimate because the value of bear hunting is not included. On a provincial level, bear hunting accounts for roughly 7% of total revenue generated (deer=56%, moose=35% and varmint=1%).

Over half of NB hunters spent over $100.00 but less than $500.00. Another 16.7% of hunters spent up to $1 000.00 on their hunting experience. Based on the number of deer hunters and using the mid-point for each expenditure category in Table 33, total hunter expenditures, just for deer hunting was estimated to be $5 064 850.00. Based on the average NB expenditure, on hunting wildlife, of $415.00 annually per person (Leigh *et. al*., 2000), total expenditures made by moose and bear hunters in the FMF was estimated to be $6 041 155.00.

Table 33. Total hunter expenditure for the 1998 deer hunting season (%) (NBDNRE, 1999).

| $100 | $101 - $200 | $201 - $500 | $501 - $1000 | $1001 - $2000 | $2001+ | Total |
|---|---|---|---|---|---|---|
| 17.3 | 25.7 | 33.4 | 16.7 | 5.5 | 1.5 | 100 |

In 1994, a deer hunters survey was conducted, which targeted only those hunters that hunted in the FMF (MacGregor, 1998). The results of this survey provide an indication of how expenditures are distributed (Appendix 10, Table III-F). The average deer hunter, in the FMF, spent about $89.00 (25%) on transportation, $22.00 (6%) on accommodations or campsite fees, $103.00 (29%) on food and alcoholic beverages, $106.00 (30%) on equipment purchases and rentals, $21.00 on license fees, and around $9.00 (3%) on miscellaneous items such as books or guide fees.

NB license sales for the 1998-1999 trapping season declined from 1 300 in the previous season to 1 154. Fur exports from NB declined from 65 635 to 51 275 animals, which is primarily attributed to the lower number of muskrat harvested (Appendix 10, Table III-G). A significant change occurred in the revenue generated by trapping and snaring. Altogether, 51 275 pelts were collected in NB for a total value of $548 569 (Appendix 10, Table III-G). This value signifies a 40% reduction, or a loss of $358 857 in revenue from the previous year.

Game Birds

The revenue generated from license sales for hunting game birds in the FMF was a little over $438 000 (Appendix 10, Table III-H). Unfortunately, it is not possible to separate which licenses were bought specifically for hunting game birds since birds are hunted under the authority of deer and small game licenses.

Fishing

Participation rates in fishing have declined, yet expenditures have increased (DFO, 1997). Revenue earned in NB from recreational fishing was in excess of $44.1 million (Appendix 10, Table III-I). Seventy-six percent of resident expenditures were made for food and lodging, and transportation. Another $21.6 million was spent by NB resident alone, on big ticket items such as boating and camping equipment, and on land or real estate (Appendix 10, Table III-J).

Crown Region 3 data for fishing license sales provides an estimate of participation and worth. Next to Moncton, Hampton purchased the most licenses. The bulk of the licenses were sold to residents for angling non-salmon species (78%). Altogether, revenue generated from license sales for recreational fishing in Region 3 was $191 729.00 in 1999 (Pettigrew, pers. comm, 2000). Based on the proportion of license sales issued in Region 3 (*i.e.*, 23% of provincial total) and provincial revenue earned, the value of recreational fishing in the FMF was estimated at $10 148 851.00 (MacGregor and MacFarlane, 2000).

*Recreation (participation levels and value)*

There are a number of recreation activities in the FMF that generate income (Table III-K, Appendix 10). The FNP probably has the largest impact generating around $9.3 million in visitor expenditures (Kilpatrick and Runyon, 1994) and an operating budget of $4.3 million (MacGregor and MacFarlane, 2000). Poley Mountain Resort follows with an income of roughly $2.9 million. Another $124 000 in membership fees can be attributed to the snowmobile and cross-country ski clubs that operate in the FMF. Expenditure data was not available, although the Chignecto ski club considers expenditures to be low. The ATV clubs contributes an incredible $100 million annually (Graham, pers. comm., 2001) to the provincial economy.

In 1996, total expenditures made on viewing wildlife in NB amounted to $26.2 million in 1996 (Leigh *et al*., 2000). The 1996 census reported that the population of NB was 738 133 (Statistics Canada, 2001). The population of the FMF was 27 200 according to the SIMFOR database. Pro-rating the provincial expenditure figure by the proportion of the FMF population, (*i.e*., 3.7%), yields an expenditure of $969 400.00 for viewing wildlife in the FMF.

## Functionality and Application

Monitoring priority for this indicator is 1 or functional. One weak area for data collection and analysis that does exist is for secondary wood products. It would require one person-month to monitor this portion of the indicator correctly.

Some of the data needed for this indicator may be considered sensitive for JDI Therefore, private stumpage rates will be applied to JDI utilization data to serve as a proxy for value of production. It should

be noted that the figures presented represent an average and are not all-inclusive due to seasonal changes in stumpage rates and delivery costs.

NBDNRE has some idea about the value of secondary wood processing but overall, more data is needed for secondary wood products. Obtaining data on secondary wood products is difficult; it would require the co-operation of the mills/processors in question. Perhaps, applying an overall average value on a Provincial scale would suffice.

The enterprise survey should be developed in conjunction with survey data requirements for indicators 5.1.1, 5.1.4, 5.3.8, and 5.3.9.

An estimated 6 person-weeks every five years are required to monitor this indicator properly.

## Indicator 5.2.2a/b

## Volume And Value Of Trade In Principal Products

### Justification for Selection

This indicator simply accounts for the degree of export that is occurring, providing an indication of the economic well being of the area.

### Data Sources

*Percent of volume and value of roundwood processed outside FMF defined forest area, estimated volume and value of primary and secondary wood products from defined forest area exported outside Canada*

- Timber Utilization Reports - Forest Management Branch, NBDNRE
- SNB
- NRC (*i.e*., Wood Flow Patterns in the Fundy Model Forest by MacFarlane *et al*., 1998b)
- Export of secondary products - Statistics Canada

*Marketed non-timber products (Christmas trees, maple syrup), estimate of destination of production*

- Christmas Tree Growers Co-op Ltd. (Belleisle Christmas Tree Growers and Petitcodiac Christmas Tree Growers)
- Council of New Brunswick Maple Syrup Producer Association (Southeastern Maple Syrup Producers)

## Monitoring Protocol

*Percent of volume and value of roundwood processed outside FMF defined forest area, estimated volume and value of primary and secondary wood products from defined forest area exported outside Canada*

Monitoring of this portion of the indicator involves duplicating the NRC report entitled "Wood Flow Patterns in the Fundy Model Forest" (*i.e*., MacFarlane *et al*., 1998a) for NB. Using the Timber Utilization Reports, extract the volume of primary and secondary wood exported: 1) outside FMF defined forest area; and 2) outside Canada. Next, apply average values to these volumes using private stumpage estimates and delivered prices from SNB. The value of processing should also include average employment income.

*Marketed non-timber products (Christmas trees, maple syrup), estimate of destination of production*

The most important aspect here is to ascertain the "bottom line". To determine how much non-timber products contribute to the local economy, two items are needed: 1) the percentage of total production by destination; and 2) a comparison between local sales and exports. The result will illustrate where the largest revenue is coming from.

## Baseline Results

*Percent of volume and value of roundwood processed outside FMF defined forest area, estimated volume and value of primary and secondary wood products from defined forest area exported outside Canada*

This portion of the indicator was not monitored at this time because of the costs involved. Determining wood flow patterns outside the FMF defined forest area would require 16 person-weeks. If the data are to include wood flow outside of NB, more time will be required so that a comprehensive enterprise survey could be conducted.

*Marketed non-timber products (Christmas trees, maple syrup), estimate of destination of production*

Although Working Group 5 has omitted this portion of the indicator, baseline did exist and thus was included. Annually, about 75% of the provinces Christmas trees are exported to the Unites States (Hamilton, pers. comm., 1999). Of the remaining 25%, a small amount is shipped to Mexico and Puerto Rico. Canadian destinations include Ontario, Quebec, and Newfoundland and Labrador. The Christmas tree industry is highly competitive as a result of producers in other jurisdictions within Canada and the United States, and the availability of artificial trees. European trade barriers and the unavailability and high cost of farm labour are factors that threaten the long-term viability of the industry.

## Functionality and Application

The FMF represents an integrated market and wood flow is not confined to the FMF. As result, this indicator is not very meaningful; nor is it easily tracked or cost effective. Furthermore, collecting

information for secondary wood products may not be feasible due to the cost involved. Thus, it has been assigned a low priority. Part (a) has been assigned a monitoring priority of 2 or semi-functional and part (b) has been given a priority of 3 or non-functional at this time.

Duplicating the Wood Flow report (*i.e.*, part (a) of this indicator) would require a minimum cost of 16 person-weeks.

## Indicator 5.2.3

**Percent Production And Value Compared To Other Regions**

*Timber products as a percent of production and value compared to province as whole*

This indicator illustrates how much output of goods and services, produced in the FMF area, and the associated value, contributes to the economy at the provincial level. Again, this is not a meaningful indicator because of the integrated market and because all Crown licenses are considered to be equally important. Thus, Working Group 5 has decided to omit this indicator altogether.

## Indicator 5.2.4

**Recovery Rate Or Utilization Of Raw Material In Production**

*Volume ($m^3$) of roundwood/Mfbm in lumber, pulp, board products over time and compared with competitors*

This is a measure of how much of the actual volume harvested is utilized and/or contributing to the product mix. This indicator is also not relevant for the FMF; thus, Working Group 5 agreed to omit this indicator from the monitoring process.

Indicator 5.2.5

# Cost Of Wood Fibre Delivered As A Percent Of End Product Value And Relative To Competitors For Principal Secondary Wood Products

## Justification for Selection

What proportion of the final product value constitutes the delivered price and how much is due to value added in comparison to other producers or mills.

## Data Sources

- Lumber Price Tables – Wood Products Group
- Canadian Pulp and Paper Association
- Kraft pulp and newsprint prices - National Post

## Monitoring Protocol

The volume of delivery of end products is to be determined and stumpage rates are to be compared to delivered prices. Information on reported prices for wood processors and reported product prices need to be assessed. Also, a time series for end product prices is to be applied. Data on secondary wood products is difficult to obtain due to the diversity in products.

## Baseline Results

Part of this indicator was to determine how much is due to value added in comparison to other producers or mills. The information needed to estimate this, however, is considered a sensitive area for individual mills. Only, published prices and industry averages will be applied here.

The average published price for Kraft pulp is \$111.36/tonne or \$37.12/$m^3$ (Table 34). Average stumpage for 8-foot softwood pulp that is destined for Saint John is \$28.83/tonne (\$9.61/$m^3$) (SNB, 2001).

Table 34. Average published and delivered prices (Orser, pers. comm., 2001).

| | Average Price[a] | | Average Delivered Price |
|---|---|---|---|
| | (US$/tonne) | (C$/tonne)[b] | (C$/tonne) |
| Kraft pulp | 578 | 385 | 111.36 |
| Newsprint | 608 | 405 | na |

[a] The average price represents published monthly prices from January 2001 through September 2001.
[b] Canadian exchange rate = \$1.50.

Table 35 provides an indication of what percent the cost of fibre represents of the end product price. In other words, how much value-added exits. Stumpage represents approximately 26% of the delivered price, which in turn represents 29% of the Kraft pulp price. The Kraft pulp price represents 94% of the end product price (*i.e.*, newsprint). As would be expected, the value-added is highest at the point of processing the wood fibre into Kraft pulp; a price increase of \$191.11, which translates into a 232% jump.

Table 35. Value-added from stumpage to end product.

| | Average Price ($/tonne) | Difference ($/tonne) | % of Average Price |
|---|---|---|---|
| Stumpage | 28.83 | 0 | 25.9 |
| Average delivered | 111.36 | 82.53 | 28.9 |
| Kraft pulp | 385.00 | 273.64 | 95.1 |
| Newsprint | 405.00 | 20.00 | na |

## Functionality and Application

This indicator is functional has been assigned a monitoring priority of 1 or functional.

Participants may consider the kind of data collected here sensitive; thus, it is important not to differentiate between land tenures. Instead, one standard of measurement should be agreed upon and applied to an aggregate landbase.

An estimated two person-weeks are required to monitor this indicator.

Indicator 5.2.6

# Level Of Integration In Forest Products Processing - Number Of Independent Sawmills, Other Processing Plants

## Justification for Selection

Diversification is important to long-term sustainability. The level of integration provides an indication of how diversified the industry is (*i.e.*, how many mills are operating, are the mills producing the same or different products).

## Data Sources

- NRC report on wood flow patterns in the FMF (MacFarlane *et. al*., 1998a)
- Timber Utilization Survey - Forest Management Branch, NBDNRE
- SNB
- Census of Manufacturers – Statistics Canada

## Monitoring Protocol

In order to track this indicator the following needs to be assessed: 1) the number of mills and their level of integration; and 2) where production is going and how it is broken-up (*i.e*., product mix). The latter portion is directly extracted from the Timber Utilization Report. Statistics Canada tracks the former. This data is available and should be monitored over a five-year period for the SNB and Crown License 7 defined forest areas.

## Baseline Results

In 1998a, MacFarlane *et al*. integrated average wood flow information, for a period covering 1992 to 1996, for all landowners in the FMF. The following section will summarize the findings of that report since the data presented serves as baseline data, which can be updated when necessary. For the purpose of their report, and therefore, for the following section, the FMF was defined to encompass all of SNB and Crown License 7 boundaries.

There are 43 mills receiving and processing wood derived from the FMF area (Table III-L, Appendix 10). Twenty-three (23) are saw/planing mills, six (6) are pulp and paper mills and two (2) are plywood/veneer mills, two (2) are composite board mills, and the remaining 10 are specialty mills. Of these, only four (4) mills operate within the FMF defined forest area; three (3) of them are saw/planing mills and one (1) is a specialty mill (Table III-L, Appendix 10).

Table III-M in Appendix 10 illustrates where production is going (to what type of mill) and how it is broken-up by product. MacFarlane *et al*. (1998a) included all mills that utilized FMF wood, regardless of their location with respect to the FMF defined forest area. Over 75% of the total wood volume harvested in the FMF was spruce and fir pulpwood, studwood and sawlogs (Table III-M, Appendix 10). The majority of this volume (65%) went to JDI Pulp and Paper in Saint John or to the JDI Sawmill in Sussex.

The most prominent species used by saw/planing mills was spruce and fir in the form of studwood and sawlogs (46% and 31%, respectively). Nearly half of this volume was destined for JDI in Sussex. Comparing pulp and paper mills showed that JDI pulp and paper consumed nearly 95% of the spruce and fir pulpwood harvested in the FMF. The majority of the veneer products (92%) went to Nelson Forest Products. Hardwood full-tree chips were the most prominent (43%) product destined for the composite board mills. Specialty mills (column 6 - other) account for almost 6 000 $m^3$ of wood volume harvested from the FMF, which represents less than 0.5%.

## Functionality and Application

The information needed to monitor this indicator is readily available; so the monitoring priority is 1 or functional.

Compilation of the data would require one to two person-weeks and could be undertaken by FMF staff.

The next update should include export volumes; especially from SNB to Maine.

## Indicator 5.2.7

### Capital Expenditures

The notion behind capital investment is to compare trends with national industry investment to monitor potential future competitiveness of local forest companies.

Capital expenditures are a private matter and will not be readily shared by landowners and/or industry. That is why this indicator will be tracked on a provincial basis, as defined by Statistics Canada, which renders it somewhat meaningless. Therefore, Working Group 5 has decided to defer this indicator until some time in the future.

## Indicator 5.2.8

### R&D Expenditures

Research and development are crucial factors to successful management practices because they allow the organization to stay competitive. Expenditures on research and development provide an idea of how things are prioritized, of what is important. These expenditures also assign an implied economic value to whatever is being researched.

This type of information represents a sensitive area for landowners and is not readily available. Working Group 5 has decided not to monitor this indicator.

## Indicator 5.2.9

### Return On Investment (Feasible Only For Timber Management)

Return on investment serves as a tool for evaluating various management scenarios with respect to silvicultural treatments. Again, participants find this kind of data to be sensitive due to factors such as the level of subsidies that may be applied. Really, this type of data is only feasible for Crown lands, which makes this indicator meaningless. As a result, Working Group 5 has omitted this indicator. A sampling of standard silviculture treatments, however, could be assessed using net present value analysis. It would require 1 person-week to complete.

Indicator 5.3.1a/b/c/d

# Gross Value Of Production (Gross Provincial Product-GPP) For Principal Sectors

## Justification for Selection

GPP represents total annual production in the NB economy, including value-added, by sector. It is an important indicator because it illustrates what percentage of the GPP the FMF area contributes.

## Data Source

*Commercial primary and secondary forest products*

- Timber Utilization Survey - Forest Management Branch, NBDNRE
- Provincial GDP figures - Statistics Canada and/or the NB Statistics Agency

*Marketed non-timber products*

No known source available

*Wildlife/fish with market values*

- NB Big Game Harvest Report - Fish and Wildlife Branch, NBDNRE
- National Angler Survey – DFO
- Report on "The Importance of Nature to Canadians" – Federal Provincial Territorial Task Force
- Provincial GDP figures - Statistics Canada and/or the NB Statistics Agency

*Recreation activities*

- Provincial GDP figures - Statistics Canada and/or the NB Statistics Agency

## Monitoring Protocol

*Commercial primary and secondary forest products*

Extract roundwood production and allocation by destination using the Timber Utilization Report. Next pro-rate GDP for the defined forest area or record the data on a provincial level. SNB has estimated GDP contributions from the production of forest products from private woodlots and these should be included. This data can be compiled every five years under the co-ordination of FMF.

*Marketed non-timber products*

For FMF purposes, this indicator is to be monitored primarily to observe changes. Statistics Canada, however, does not track GDP figures for these industries. Evaluating price and volume trends will have to suffice (*e.g.*, see indicator 5.2.4).

*Wildlife/fish with market values*

SNB has estimated GDP contributions from deer hunting for its defined forest area. These calculations are based upon the: 1) number of animals harvested by species; 2) the number of fish caught by species; 3) hunter success; 4) angler success; and 5) expenditure data. The SNB data could be duplicated or, SNB figures could be used as a proxy for the FMF area with respect to deer hunting. SNB figures are based on WMZ's 22, 23, and 24. Alternately, GDP figures can be purchased from Statistics Canada and presented on a provincial basis or pro-rated to the FMF.

*Recreation activities*

Tourism statistics for GPD are available from Statistics Canada. Data on accommodations, the food industry and recreational facilities needs to compiled and summarized for the FMF defined forest area.

## Baseline Results

*Commercial primary and secondary forest products*

The 1999, GDP for NB was $265.0 million for the wood industries, $348.3 million for Paper and Allied firms, $323.9 million for Pulp and Paper, $144.6 million for the Logging industry and $72.5 million for Forestry Services industries for a combined GDP of $1 154.3 million (Appendix 11, Table IV-A). In relation the average GDP for the period covering 1990 to 1999, all industries show an increase with the exception of the Logging industry, which shows a decline of 47% since 1990. The largest growth in GDP has occurred in the Forestry Services industry, which has jumped an impressive 202% since 1990.

In an effort to evaluate GDP on a smaller scale, SNB has estimated its 1996 GDP contribution from the production of forest products. Based on the total volume of roundwood harvested in NB of 9 923 696 $m^3$, of which SNB provided 385 745 $m^3$, wood produced in the SNB defined forest area accounts for 3.9% of the overall volume. The provincial 1996 GDP from logging, forestry services, wood industries and paper and allied products industries was $708 757 000.00. Using this information an estimate can be made at to SNB's contribution to the provincial GDP, which equates to $27 641 523.00 or $71.66/$m^3$.

*Marketed non-timber products*

Statistics Canada does not track GDP for these industries. GDP for this sector likely contributes a small percentage to the total provincial GDP. Subsequently, this portion of the indicator can either be dropped or can be evaluated based on the information given in the foregoing indicator 2.4.

*Wildlife/fish with market values*

Fishing and trapping industries contributed $81.3 million to the provincial GDP in 1999 (Table IV-B, Appendix 11). Since 1990, the GDP exhibits a general decline until 1999, at which time, there was a dramatic increase. Overall, GDP for the fishing and trapping industries has declined by 38%.

For 1996, 3 358 deer were harvested in WMZ 22, 23, and 24. The estimated number of active hunters in these zones was 20 551 who exhibited a provincial hunter success rate of 16.34%. Using this data coupled with deer hunter expenditures, SNB estimated the mean GDP contribution from deer hunting to be $7 782 381.00.

It is also interesting to note that in their report, which assesses the importance of nature to Canadians, Leigh *et al*. (2000) stated that nature-related expenditures in NB contributed $193 million to the provincial GDP.

*Recreation activities*

The recreation sector has been defined here in terms of the Accommodation Services and Food and Beverage industries. The 1999 GDP for these industries was $390.2 million (Appendix 11, Table IV-C). Of this, Food and Beverage industries accounted for $285.6 million and the remaining is attributed to the accommodation industry at $104.6 million. Between 1991 and 1992 the GDP for the recreation sector appears to have dropped somewhat. Otherwise, the general trend is upward with an eight percent (8%) change in the Accommodation industries and a 35.5% increase in the Food and Beverage industries.

## Functionality and Application

Monitoring priority for parts (a) and (d) of this indicator are functional or 1 because it can be monitored using published information. Parts (b) and (c) are considered to be semi-functional or 2 because there is some uncertainty as to what exactly might be available.

Summarizing the data needed for this indicator will require two person weeks under the co-ordination of the FMF.

Indicator 5.3.2

# Income (Salaries And Wages) Paid In Commercial Forest Products Industries By Principal Industry Group

## Justification for Selection

Income or revenue earned in an industry indicates its importance in the economy (*i.e*., which sector generates the highest revenue). Income levels provide an indication of community health because it affects people's spending and decisions regarding whether to stay in the community or leave for better opportunities.

## Data Sources

- Statistics Canada (*e.g*., census data and forest sector multipliers)
- Income data – NRC

## Monitoring Protocol

Using census data provided by Statistics Canada, community level income data is to be recorded. The NRC report entitled Employment and Income Impacts in South East New Brunswick" (MacFarlane *et al*., 1998a) serves an example of the data that might be collected. Information for this indicator can be summarized for the census sub-divisions as defined by Statistics Canada.

## Baseline Results

In a 1998 study, MacFarlane *et al*. presented baseline information to monitor trends in employment and income in the FMF pertaining to the forestry sector. Their findings refer to southeastern NB, which was defined to encompass the counties of Saint John, Sunbury, Queens, Albert, Kings, and Westmorland. Income data were based on data from the 1991 Statistics Canada census and are summarized here (Table 36, columns 2 and 3). Additionally, average employment income for NB based on the 1996 census data is presented (Table 36, column 4). It is possible to acquire income data for the five counties that make up the FMF and this information should be included with the next update.

In 1991, the average employment income for the FMF was $21 140 (Table 36). Within the forest sector, Paper and Allied workers received the highest pay with an average annual income of $29 520.00. Workers employed in Logging were paid an average annual income of $22 099.00 followed by those working in Wood industries ($17 854.00) and Forestry Services ($16 598.00). At the provincial level, the 1996 figures show that Paper and Allied workers are still the highest paid with an average annual income of $54 101.00 despite the fact that this industry has experienced the lowest rate of change (53%) in the forestry sector. The sharpest rise in income is seen in the Forestry Services industry, which shows an increase of 179% from $14 380.00 to $40 113.00. In terms of the Logging and Wood industries the average annual income rose by 86% and 57%, respectively (Table 36).

Table 36. Average annual employment income for forestry sector in the FMF and NB.

| | Average Employment Income ($) | | | |
|---|---|---|---|---|
| | FMF | NB - 1991 | NB - 1996 | % Change |
| Total - All Industries | 21 140 | 19 906 | 32 865 | 65.1 |
| Logging | 22 099 | 18 215 | 33 899 | 86.1 |
| Forestry Services | 16 598 | 14 380 | 40 113 | 178.9 |
| Wood Industries | 17 854 | 19 487 | 30 561 | 56.8 |
| Paper & Allied Industries* | 29 520 | 35 318 | 54 101 | 53.2 |
| Total - Forest Related | 21 518 | 21 974 | 39 668 | 80.5 |

*Paper and allied products = pulp and paper; asphalt roofing industries; paper bag and box industries; and other conventional paper products industries.

NB workers employed in the forestry sector earn about $1 500 less as compared to the national average (Table IV-D, Appendix 11). Evaluating average weekly earnings from 1997 to the present, however, shows that employment income in NB has increased at a higher rate than that of the Canada; 10% as compared to the national average of 4%.

## Functionality and Application

A monitoring priority of 1 or functional has been assigned to this indicator.

It is possible to acquire income data for the five counties that make up the FMF (*i.e*., Queens, Kings, Saint John, Westmorland and Albert counties) and this information should be included with the next update. The cost involved in obtaining income and wage data from Statistics Canada was estimated to be around $1000.00 and thus, were not included at this time. It would be prudent to combine this data request with those needed for other indicators (*i.e*., 5.3.8).

Data for secondary wood products is lacking.

## Indicator 5.3.3

### Income To Landowners And Service Providers In Commercial Wildlife, Fishing, And Trapping Activities

Income or revenue earned in an industry indicates its importance in the economy. Income levels provide an indication of community health because it affects people's spending and decisions regarding whether to stay in the community or leave for better opportunities.

Due to the difficulty in obtaining income data, Working Group 5 has deemed that income is not a priority in terms of what the FMF needs. As a result, this indicator has been dropped.

## Indicator 5.3.4

### Income To Landowners And Labour In Recreation – Based Businesses

Income or revenue earned in an industry indicates its importance in the economy. Income levels provide an indication of community health because it affects people's spending and decisions regarding whether to stay in the community or leave for better opportunities.

Due to the difficulty in obtaining income data, Working Group 5 has deemed that income is not a priority in terms of what the FMF needs. As a result, this indicator has been dropped.

Indicator 5.3.5

Comparison Of These Values With Those At The Provincial Level

This is an important indicator because it compares local income figures with those at the provincial level, which illustrates the importance of FMF activities in relation to those for NB and also provides a picture for how incomes are distributed.

It was decided, however, by the Working Group that comparing incomes reported in 5.3.2, 5.3.3 and 5.3.4 would be more useful. Since it is not feasible to obtain information for indicator 3.3 and 3.4, however, this comparison is not possible. Thus, indicator 5.3.5 has also been omitted. It can, however, be reported in the foregoing indicator 5.3.2 as a comparative measure by requesting the data from Statistics Canada.

Indicator 5.3.6

Average Salaries And Wages Paid By Principal Sector

This indicator is very similar to indicators 5.3.2, 5.3.3, and 5.3.4. As such, Working Group 5 has decided to combine this indicator with 5.3.2 (*i.e.*, income (salaries and wages) paid in commercial forest products industries by principal industry group) and report it therein.

Indicator 5.3.7

Land rent and stumpage prices for species/product groups

## Justification for Selection

Land rent represents the potential worth of land to produce or yield timber. Stumpage is the value of uncut timber. It is important to be able to distinguish between changes in stumpage rate and changes in harvest volumes. Providing both per cubic metre rates and the total payments will enable this to be assessed.

Calculations involved in determining land rents are too involved and, therefore, too expensive. Working Group 5 has decided to modify this indicator to reflect stumpage prices only and omit land rent.

## Data Sources

- Crown land royalties - Forest Management Branch, NBDNRE
- Stumpage rates – SNB
- Foregoing indicator 2.1

## Monitoring Protocol

Crown royalties are to be compared on an annual basis with NBDNRE sponsored private stumpage surveys for the province. Stumpage rate per $m^3$ and the total amount paid is to be reported by species and product.
The comparison should be traced back to 1995.

## Baseline Results

Average stumpage rates for private holdings have not changed since 1995 (Corbin, pers. comm, 2001). SNB does not really track annual revenue from stumpage because not all of the harvested wood volume is reported.

With respect to Crown land, poplar and cedar have seen the greatest price increase over the past five (5) years (Table IV-E, Appendix 11). Royalty rates for cedar fencing and tree length have risen by 101.2% and 76.1% from \$4/$m^3$ in 1995 to \$8.1/$m^3$ and \$7.1/$m^3$, respectively, in 2001. Hardwood fuelwood exhibits the next highest rate increase (73.6%) from \$3.8/$m^3$ to \$6.6/$m^3$, followed by poplar veneer, logs, studwood and lathwood. Royalty rates for poplar veneer show an increase of 68.8% from \$6.8/$m^3$ to \$11.4/$m^3$ and poplar logs, studwood and lathwood have increased by 65.5% from \$5.6/$m^3$ to \$9.2/$m^3$. Rates for other hardwood and poplar in tree length form have changed from \$4.6/$m^3$ to \$7.4/$m^3$ and from \$4.5/$m^3$ to \$7.1/$m^3$, which represents an increase of 61.8% and 58.6%, respectively. Lastly, cedar logs and studwood royalties show a change of 52.8% from \$5.3/$m^3$ to \$8.1/$m^3$ and cedar posts and rails, as well as, cedar shinglewood royalty rates have risen by 51.1% from \$4.0/$m^3$ to \$6.1/$m^3$.

Other species harvested for pulpwood, veneer and logs show a more modest rate increase (Table IV-E, Appendix 11). Spruce, fir and jack pine pulp, as well as, poplar pulp royalties have risen by 47.9% and 47.1%, respectively, from \$6.4/$m^3$ to \$9.5/$m^3$ and \$3.3/$m^3$ to \$4.9/$m^3$. Prices for sugar maple and yellow birch veneer and logs show an increase of 36.1% and 28.7%, respectively. Veneer rates have changed from \$16.7/$m^3$ to \$22.7/$m^3$ and those for logs show an increase of 28.7% from \$12.1/$m^3$ to \$15.5/$m^3$. Similarly, royalty rates for hemlock and tamarack logs have declined by 24.9% from \$5.8/$m^3$ to \$7.3/$m^3$.

Since 1995, some of the royalty rates have also decreased (Table IV-E, Appendix 11). Prices for other hardwood and poplar, used for oriented strandboard, have dropped from \$4.5/$m^3$ to \$3.0/$m^3$ and from \$3.9/$m^3$ to \$3.0/$m^3$, which represent a change of 31.6% and 22.5%, respectively. Jack pine, red pine and cedar poles have decreased by 10.7% from \$25.3/$m^3$ to \$22.6/$m^3$ and white pine, tamarack and other softwood pulp prices have declined by 6.1% from \$6.4/$m^3$ to \$6.0/$m^3$.

Total revenue collected from royalties on Crown License 7 in 2001 was slightly over $6 million for 518 703 $m^3$ of wood harvested (Table IV-F, Appendix 11). Spruce, fir and jack pine represent the bulk of the revenue collected ($4.5 million) followed by other hardwood ($1.2 million), white pine ($231 849), poplar ($111 654), red pine ($14 405), cedar ($4 031), tamarack ($805), and hemlock ($347). The amount harvested for each species follows the same order with the exception of white pine and poplar. More poplar was harvested (23 203 $m^3$) than white pine (15 225 $m^3$), which indicates that white pine has a higher value associated with it.

## Functionality and Application

Monitoring priority has been set to 1 or functional.

Stumpage rates vary seasonally so it is recommended that an annual average be used.

Indicator 5.3.8a/b/c/d

Direct And Indirect Employment By Principal Sector

## Justification for Selection

Employment figures illustrate the dependence of the local community on forest based industry.

## Data Sources

*Commercial primary and secondary forest products – employment per unit of output*

- Statistics Canada (*e.g.*, input/output models)
- NRC (*e.g.*, Employment and Income in Southeast New Brunswick by MacFarlane *et al.*, 1998a)

*Marketed non-timber products*

- Enterprise survey of producers

*Wildlife, fish, birds, trapping activities*

- Statistics Canada census
- Enterprise survey

*Recreation businesses*

- FNP
- Poley Mountain Resort
- Business New Brunswick
- Outfitters
- Time series for employment - Statistics Canada
- Enterprise survey

## Monitoring Protocol

*Commercial primary and secondary forest products – employment per unit of output*

The data to be compiled are: 1) employment per $m^3$ of wood produced and/or utilized in logging and processing (*e.g.*, census data); 2) forest product service employment (*e.g.*, time series); and 3) indirect employment multipliers. The indicator will utilize two person-days to monitor every five years under the co-ordination of FMF.

*Marketed non-timber products*

Need to conduct a periodic survey of producers every five years followed by a summary of the findings.

*Wildlife, fish, birds, trapping, bird activities*

Need to conduct a periodic survey of outfitters every five years. The data gathered must then be compiled into a useable form.

*Recreation businesses*

Need to conduct a periodic survey of businesses operating in the FMF every five years, followed by a summary of the data collected.

## Baseline Results

*Commercial primary and secondary forest products – employment per unit of output*

Based on 1991 census data, the experienced labour force (age 15 and older) in the FMF area consisted of 159 730 workers or 46% of the total provincial work force (Table IV-G, Appendix 11). The forest sector directly employed 4 615 people. Indirect employment was estimated to be 2 308 people using a multiplier of 1.50. This multiplier represents an average for all industries in the forest sector.

On a provincial level, employment across the forest sector has typically increased since the 1991 census, with the greatest jump having occurred in the wood industries (34%) (Table IV-G, Appendix 11). One exception exists in the Paper and Allied industries where the labour force employed has declined by three percent (3%). The 1996 employment multiplier is not yet available (Statistics Canada, 2001). Evaluating the proportion of the provincial labour force that was employed in the forestry sector during the 1991 and 1996 census shows that there has been no change in the dependence on forestry for employment. Six percent (6%) of the total labour force is employed by the forestry sector (Table IV-G, Appendix 11).

Looking at the employment time series for the forestry sector beginning in 1990, it is clear that the labour force in NB has increased significantly (30%) when compared to the national level of 8% (Appendix 11, Table IV-H).
Fardy *et al*. (1999) compiled a comprehensive list of all the wood processing facilities that utilized wood fibre obtained from the FMF and contacted them to request information. A total of 26 mills participated in their study. Based on data for Crown License 7, SNB, and JDI freehold, these mills are credited with 427 person-years employment for 1 190 622 $m^3$ of wood consumed. This translates into 0.002 person-years/$m^3$ of employment.

*Marketed non-timber products*

Working Group 5 had agreed to omit this portion of the indicator the time being due to the difficulty in obtaining data. Baseline data did exist, however, and were included.

Total annual employment created from Christmas trees production in 1997 was 12.91 person-years (Fardy *et al*., 1999). This translates into an employment per hectare of 0.0672 person years.

The production of Christmas wreath creates a total of 4 150 full-time seasonal positions in NB annually for a duration of 6 weeks, which represents 479 person-years (Hamilton, pers. comm., 1999). This figure represents only direct employment and does not account for spin-offs. Employment generated from tipping on Crown Region 3 was 13.46 or 0.384 person years per permit (Fardy *et al.*, 1999).

The demand for firewood in the FMF in 1997 resulted in 69.62 person-years of employment or 0.0009 person years/$m^3$ of wood.

*Wildlife, fish, trapping, bird activities*

From the 1996 census, the experienced labour force (age 15 and older) in NB consisted of 388 280 workers (Table IV-G, Appendix 11). Of this, the wildlife sector directly employed 4 465 people who worked an average of 22 weeks (Table 37). This translates into roughly 2% of the total labour force in NB.

Table 37. Total labour force activity (15 years and older) for the fishing and trapping industries in NB (Statistics Canada, 2001).

| Experienced Labour Force Age 15 Years and Over | Total Labour Force Employed | Average Weeks Worked |
|---|---|---|
| 6 785 | 4 465 | 22 |

*Recreation businesses*

Of the total experienced labour force (age 15 and older) in NB (Table IV-G, Appendix 11), the accommodations and food and beverage sectors directly employed 27 040 people (Table 38) or nearly 7%.

Table 38. Total labour force activity (15 years and older) for the accommodation service and food and beverage industries in NB (Statistics Canada, 2001).

| Experienced Labour Force Age 15 Years and Over | | Average Weeks Worked | |
|---|---|---|---|
| Accommodation | Food & Beverage | Accommodation | Food & Beverage |
| 6 485 | 20 555 | 32 | 34 |

The provincial time series for employment in the recreation/tourism sector illustrates that employment has grown at a rate below the national rate. In NB, the employment in this sector has risen by 17% since 1990 as compared to 22% in Canada (Table IV-I, Appendix 11).

## Functionality and Application

Part (a) of this indicator (*i.e.*, commercial primary and secondary forest products employment) has been assigned a monitoring priority of 1 or functional. Parts (b) and (c) (*i.e.*, marketed non-timber products and wildlife, fish, birds, trapping activity) were assigned a priority of 3 or non-functional because the information needs to be gathered through the use of a survey. Part (d) or recreation business has a priority of 2 or semi-functional.

It would be convenient to use the subdivisions defined by Statistics Canada. Again, to minimize cost, employment data from Statistics Canada should be requested at the same time as the data request for indicator 3.2.

SNB has estimated the direct and indirect employment generated by forest product production for its defined forest area. Based on Statistics Canada figures and AAC, an estimate could be made for the FMF. Or, the NRC report entitled "Employment and Income Impacts in South East New Brunswick" (MacFarlane *et al*., 1998a) can be duplicated every five years.

It would be convenient to use the subdivisions defined by Statistics Canada. Gathering employment data for the wildlife-based sector is best accomplished through a survey. The information to be determined is average employment by business type (*e.g.*, outfitters, enforcement).

Data gaps exist in the non-timber sector, which can be resolved through an enterprise survey to be conducted every five years. The survey question(s) needed for this indicator should be part of the same survey needed to fill data requirement for other indicators (*i.e.*, indicators 5.1.1 and 5.4.1).

The enterprise survey should be developed in conjunction with survey data requirements for indicators 5.1.1, 5.1.4, 5.2.1, and 5.3.9.

Time series needed to ascertain sustainability. It is important to be able to report on all sectors (*e.g.*, non-timber, wildlife-based).

Indicator 5.3.9a/b/c/d

Quality Of Employment For Principal Sectors As Measured By (Average Duration, Safety – Workmen's Compensation Rates, Level Of Training)

## Justification for Selection

This indicator is important because it provides a measure of how fulfilling the employment is, which in turn will help improve the understanding of whether attracting and retaining employees in the future will be more difficult. As well, it is a key determinant of social cohesion in the rural communities, which comprise the FMF. The proxy's for quality will be safety, training and duration. It is important to determine whether the professions are improving to facilitate recruitment.

## Data Sources

*Commercial primary and secondary forest products*

- Time loss due to injury and compensation rates - Workplace Health and Safety Commission
- Degree of employee/contractor training or education - Enterprise survey
- Percentage of employees/contractors who complete training programs - Enterprise survey

*Marketed non-timber products*
*Wildlife, fishing, trapping activities*
*Recreation businesses*

- Enterprise survey

## Monitoring Protocol

*Commercial primary and secondary forest products*

Summarize safety levels in relation to compensation rates, education or level of training, and the duration of employment. Compensation rates are to differentiate between forestry and non-forestry sectors (*e.g.*, logging, sawmills, and pulpmills). Also, an invitation for submission is to be sent to JDI and to SNB to publish something (*e.g.*, IQ 200 program). This portion of the indicator will require one person-week to complete.

*Marketed non-timber products*
*Wildlife, fishing, trapping activities*
*Recreation businesses*

In order to compile data for parts b, c, and d of this indictor a periodic survey of FMF businesses will need to be conducted and the results summarized. The survey can be administered electronically by FMF staff.

## Baseline Results

*Commercial primary and secondary forest products*

The Workplace Health and Safety Commission (WHSCC) does not base compensation rates on the level of training or education of the worker. Rather compensation rates are based on the employees' annual earnings. An injured worker in entitled to 85% of his or her yearly net earnings up to a maximum of a pre-determined amount (Morin, pers. comm., August 2001). This pre-determined amount is based on the risk factor of the sector and job position in question. For example, workers in the forest sector may have a higher risk toward injury than those working in the recreation sector. Similarly, a person working in the woods is exposed to higher risk than one who works in an office.

Two of the indicators that the WHSCC tracks are lost-time claims and payrolls by industry. Payroll is the indicator that has been used since 1919 to serve as a proxy of labour activity. That is, how many people are working and what is the degree of exposure to risk.

Since 1995, the number of lost-time claims has steadily declined in the logging industry, yet; those in the forestry services industry rose abruptly until 1999 at which time the number began to drop (Table IV-J, Appendix 11). The overall change in the total number of lost-time claims since 1995 is 23.4%. Looking at the number of lost-time claims per $1 million of payroll, no trend is evident. In fact, there does not appear to be a connection between salary or wages and the number of days lost as a result of injury (Morin, pers. comm., 2001). Dividing the total number of lost-time claims by the total number of workers, multiplied by 100 (for simplicity), however, suggests that lost-time claims per employee has in fact declined since 1995 (Table 39).

Table 39. Total number of lost-time claims and employment for the forestry sector.

| Year | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|
| Lost-time Claims | 265 | 280 | 270 | 263 | 231 | 203 |
| Employment | 15 000 | 14 800 | 16 000 | 15 600 | 17 000 | 18 200 |
| Claims/employee | 1.8 | 1.9 | 1.7 | 1.7 | 1.4 | 1.1 |

As might be expected, the saw and planing mill products industry has the highest number of lost-time claims in the forestry sector (WHSCC, 2001). The total number of claims has increased annually from 241 in 1995 to 375 in 1999. In 2000, the number of claims dropped to 338 for the first time in five (5) years. The next highest number of claims occurs in the pulpmill industry. The trend here is a fluctuating one with the number of claims totaling 72 in 2000; down from 115 in 1995.

JDI and to SNB were invited to submit a statement regarding special programs that their organizations may have in place that address quality of employment. Unfortunately, SNB was not able to participate. From personal communication with Joe Gushue (2001), of JDI Woodlands in Sussex, the following account is presented.

JDI has utilized the 14001 standards as a starting point to develop a program for its employees (including contractors). International Standards Organization (ISO) 14001 is simply an environmental process and/or a tool used for achieving consistent results. They also comply with the Sustainable Forestry Initiative (SFI) that sets the baseline for operations similar to that of the CSA or FSC standards. Combining the ISO process with the SFI produces a third entity - an environmental management system (EMS). The basis for the EMS is continuous improvement and it is a system that is easily followed by company employees. Basically, the company applies these systems and/or standards to all its employees from senior management to contractors.

Employee satisfaction is evaluated yearly through the use of a survey (that is administered to all employees - management included) that is conducted by a third party. The survey results are pooled over the years to produce a trend that can then be assessed to see if changes are required to ensure employee satisfaction.

Safety has been more strongly addressed over the past three years. JDI now invites a safety audit that is also conducted by a third party and adheres to the standards set out by Occupational Health and Safety. This audit has created increased awareness and processes to motivate employees to maximize safety.

To motivate employees in all aspects of the company and to provide incentives, JDI has set-up the IQ 200 program that is based on bonus points and financial rewards. The higher the bonus points the higher the reward. Categories that are included on the IQ200 score card are: 1) financial (*e.g.*, delivered wood costs), 2) customer (*e.g.*, recovery of value, % products on specification), 3) operational (*e.g.*, inventory levels), 4) efficiency (*e.g.*, administrative, productivity) and 5) people (*e.g.*, accident prevention, machine fire prevention). The goal is to continually improve on the previous year's results. Additionally, the program is always evolving based on employee feedback. The key appears to be good communication between all levels within the company.

*Marketed non-timber products*

Working Group 5 has omitted this portion of the indicator for the time being due to the difficulty in obtaining data.

*Wildlife, fishing, trapping activities*

Within the wildlife-based industry, services incidental to fishing exhibit the highest number of time-lost claims (Table 40). The total number of claims culminated in 1997 and has since fluctuated to 35 in 2000.

Table 40. Workplace Health and Safety Commission statistics for the wildlife sector (Morin pers. comm, Aug. 2001).

| Number of Lost-time Claims By Industry Type | | | | | | |
|---|---|---|---|---|---|---|
| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
| Inland Fishing Industry | 0 | 1 | 0 | 0 | 0 | 3 |
| Services Incidental to Fishing | 30 | 39 | 47 | 30 | 38 | 35 |
| Furs and Skins, Wild | 0 | 0 | 0 | 0 | 0 | 0 |
| Other Trapping | 0 | 0 | 0 | 0 | 0 | 0 |
| Outfitters (Hunting and Fishing Camps) | 1 | 0 | 2 | 1 | 1 | 0 |

*Recreation businesses*

Time lost working in recreation-based business has been typically low over the past five (5) years, which is not surprising (Table 41).

Table 41. Workplace Health and Safety Commission statistics for the recreation sector (Morin pers. comm, 2001).

| Number of Lost-time Claims By Industry Type | | | | | | |
|---|---|---|---|---|---|---|
| | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
| Camping Grounds and Travel Trailer Parks | 1 | 2 | 6 | 0 | 1 | 1 |
| Other Recreation and Vacation Camps | 0 | 0 | 1 | 0 | 1 | 0 |

## Functionality and Application

Monitoring priority has been set at 1 or functional for part (a) and at 2 or semi-functional for the remainder.

The enterprise survey should be developed in conjunction with survey data requirements for indicators 5.1.1, 5.1.4, 5.2.1, and 5.3.8.

Indicator 5.3.10

Number Of Forest Dependent Communities

## Justification for Selection

The number of forest dependent communities is an important indicator since the forest industry employs a large proportion of the labour force. Additionally, this indicator provides an idea of how integrated the local market is.

### Data Sources

- Statistics Canada census

## Monitoring Protocol

Extract desired information from Statistics Canada reports by census sub-divisions; namely: 1) identify forest dependent communities, 2) provide a diversity index of these communities, and 3) show the level of diversity within the community.

## Baseline Results

The following data was provided by the SNB and is based on the 1991 census. SNB has been defined here as the Queens, Kings, Albert, Saint John and Westmorland counties and therefore the data serves to represent the FMF. Statistics Canada defines communities that have a forest economic base as those which export forest sector products. Forest sector categories include logging, forest services, wood industries and paper and allied products. A significant forestry economic base may be defined as being moderate (10 to 50% dependent) or heavy (50% or higher dependent) based on the total employment by all forest sector categories.

Altogether, there are 59 community sub-divisions (CSD's) in the FMF. Of these, two (2) communities are heavily dependent on the forestry sector and 23 are moderately dependent (Table IV-K, Appendix 11). From the 1991 and subsequent Statistics Canada Census, "Experienced Labour Force" data for 58 out of the 59 CSD's in the FMF area is available. This data describes the number of people employed in each CSD by industry division. There are 25 communities where forest sector employment exceeded 10% of the total employment. Based on the proportion of employment in the forest sector as compared to all other sectors, the diversity of the local industrial base can be determined. Three classes are commonly used to describe indices of diversity levels:

*Forest Dependent*: a forest dependent community in which only the forest sectors employ more than 10% of the total employed.

*Dual Sector*: a forest dependent community in which the forest sectors and one other sector, each employ 10% or more of the total employed.

*Diversified*: a forest dependent community in which three or more sectors (one being forestry) each employ 10% or more of the total employment.

Of the 25 CSD's in the FMF area, 21 or 84% are classified as being diversified and four (4) or 16% are considered to be dual sector.
Looking at the diversity of forest use within each community, five (5) or 20% support only of the four industries that make up the forest sector. Seven (7) or 28% depend on two (2) industries, nine (9) or 36% utilize three (3) and four (4) or 16% depend on the entire forest sector (Table IV-L, Appendix 11). Taking the weighted average of the diversity of forest use yields 2.5, which may be used to represent the FMF area.

Evaluating the average contribution to diversity by industry, logging and wood industries have the highest impact at 29% (Table IV-L, Appendix 11). Paper and Allied products contribute 23% to community diversity followed by Forestry Services at 19%.

Summarizing the work done by MacFarlane *et al*. (1998b), the most prominent forest industry in Queens County is the wood industry, followed by Logging in Westmorland County and Paper and Allied in Kings and Saint John Counties (Table IV-M, Appendix 11). The predominant type of forestry worker in the FMF was the forestry labourer, except in Saint John. In Saint John, clerical staff and trades, transport, and equipment operations compromised most of the forestry workforce.

## Functionality and Application

Monitoring priority for this indicator is 1 or functional since all data comes from published sources. The cost of retrieving the data is undetermined and the time that is required for this analysis is one person-week.

This indicator was modified to include indicator 5.3.13 as requested by Working Group 5.

Indicator 5.3.11

Value Added Per $M^3$ Of Wood Harvested

## Justification for Selection

Value added may be defined as the difference between the market price of a product and the cost of all purchased inputs needed to produce that product. Or, as the value of the finished product divided by the number of $m^3$ of timber required in manufacturing an equivalent unit of product.

Working group 5 has defined value-added to include processing required to transform standing timber into a product that is delivered to the mill.

## Data Sources

- Statistics Canada
- SNB
- NRC (*e.g.*, Value-Added Indicators for the Fundy Model Forest by Fardy *et al*., 1999)

## Monitoring Protocol

An estimate of the $m^3$ of value added can be determined by comparing: 1) production costs with selling prices; and 2) end product prices by product (*i.e*., product mix and price). Comparing production costs to selling prices is accomplished by evaluating stumpage rates and delivered product prices. SNB has some estimates for its defined forest area that are available and may serve as proxy for the FMF area.

## Baseline Results

There have been no significant changes in the average stumpage rates and delivered prices for wood obtained from private holdings. Subsequently, SNB applies the 1999 figures that are outlined in Table IV-N, Appendix 11 (SNB, 2001).

End product prices for softwood and hardwood products are listed in Tables III-B, C, and D (Appendix 10) under indicator 5.2.1 of this report. To avoid duplication, the reader is asked to refer to that section. There will be no summary or comparison available until the next update, at which time the tables can be compared to see what changes have taken place.

Fardy *et al*. (1999) estimated the employment generated per cubic metre of FMF wood harvested. The authors compiled a comprehensive list of all the wood processing facilities that utilized wood fibre obtained from the FMF and contacted them to request information. A total of 26 mills participated in their study. Based on data for Crown License 7, SNB, and JDI freehold, these mills are credited with 427 person-years employment for 1 190 622 $m^3$ of FMF wood processed. This translates into 0.002 person-years/$m^3$ (Table 42). Based on the average forest sector wage of $21 518 (MacFarlane *et al*., 1998b), the value of employment for industrial wood processing using FMF wood was estimated to be around $9.2 million or $43/$m^3$. It should be noted that this estimate represents mill activity only; logging is not included.

Table 42. Value-added indicators for industrial wood processing using FMF wood (Fardy *et al*., 1999).

| FMF Wood Processed ($m^3$) | Employment (Person-years) | Employment (Person-years/$m^3$) | Estimated Worth | |
|---|---|---|---|---|
| | | | ($) | ($/$m^3$) |
| 1 190 622 | 427 | 0.002 | 9 188 186.00 | 43.04 |

Additionally, an estimated five percent (5%) of wood harvested within the SNB defined forest area has not been accounted for because some private woodlot owners sell their wood independently. SNB has, however, developed a system to track wood supplied to mills in NB, as well as, the amount of wood fibre exported (Belyea, pers. comm., 2000). Export of wood fibre is monitored through the cooperation of the mills who receive wood and who report the amount of wood fibre processed and who supplied it. This information should be available for the next update.

There are also 12 portable sawmills in the FMF that provide barn boards, cedar and spruce/pine/fir dimension lumber as well as custom cuts. These sawmills produced a total wood volume of about 5 821 $m^3$ creating 12.66 person years of employment. This may be translated into 0.0022 person years/$m^3$ (Table 43). The value of employment was estimated to be $272 418 or $47/$m^3$ based on the average forest sector wage of $21 518.00.

Table 43. Value added indicators for portable sawmills in the FMF (Fardy *et al*., 1999).

| Volume Produced ($m^3$) | Employment (Person-years) | Employment (Person-years/$m^3$) | Estimated Worth | |
|---|---|---|---|---|
| | | | ($) | ($/ $m^3$) |
| 5821.28 | 12.66 | 0.0022 | 272 417.88 | 47.34 |

SNB also has some estimates for value-added per $m^3$ of wood harvested for its defined forest area. This information, however, was not available at the time of this report due to administrative changes at the SNB. Nonetheless, this data would serve as a proxy for the FMF area if it were available for the next update.

## Functionality and Application

The assigned monitoring priority for this indicator is 1 or functional.

Data collection for this indicator will require about one person-week.

Indicator 5.3.12

Estimate Of % Of Employment And Income Generated From Timber Production And Other Goods In The Model Forest Area, Which Remains In The Area As Compared To, That Which Is "Leaked"

Comparing economic indicators within the community to those outside or in surrounding areas provides an idea of how self-sufficient a community is (*i.e.*, does the FMF economy rely more heavily on the local market or on outside markets?).

Working Group 5 agreed that this is not a meaningful indicator given that the FMF economy represents an integrated market. Furthermore, it was decided that the GPP data collected for indicator 5.3.1 was sufficient. Thus, this indicator has been dropped.

Indicator 5.3.13

Diversity Of Manufacturing Facilities And Businesses Providing Services (The Number Of Different Operations)

This indicator measures the degree of long-term economic success or economic sustainability, which impact on the well being of the community.

Due to similarity, this indicator was combined with indicator 3.10 as requested by Working Group 5.

Indicator 5.4.1

Value Of Goods Consumed For Domestic Use

## Justification for Selection

This indicator measures the benefits that people derive from the forest that are not typically accounted for. The notion here is to capture subsistence and enjoyment.

## Data Sources

- Fuelwood permits (Crown License 7) – Forest Management Branch, NBDNRE
- Firewood consumption - Energy survey, Energy Secretariat, NBDNRE
- Willingness to pay for angling - National Angling Survey, DFO
- Expenditures for angling - National Angling Survey, DFO
- Willingness to pay for hunting – Report on "The Importance of Nature to Canadians", Federal-Provincial-Territorial Task Force
- Expenditures for hunting - The Importance of Nature to Canadians, Federal-Provincial-Territorial Task Force
- Expenditures for game bird hunting - CWS, DOE
- Average expenditures for bird-watching - Statistics Canada
- Household survey

## Monitoring Protocol

FMF is to co-ordinate the collection and summary of: 1) estimated firewood sales; 2) willingness to pay estimates and expenditures by activity; and 3) birdwatcher's expenditure data. For the most part, data simply needs to be extracted from the published sources and is to be compiled every five years.

## Baseline Results

Firewood permits sold and revenue generated

The following firewood data was presented by Fardy *et al*. (1999) and represents the southeastern part of the province. Approximately 39% of households in the FMF use wood as a heat source. Fardy *et al*. (1999) assumed that all firewood consumed was supplied by FMF sources. Using an average cost of $105.00 per cord for cut, split and delivered wood, and $59.00 per cord in eight foot length, the total value of firewood was estimated to be $1 991 445.49 in 1997 dollars (Table 44).

Table 44. Indicators for firewood production (Fardy *et al.*, 1999).

| Dwellings Using Firewood | Total Cords Consumed | Total Value ($/m$^3$) | Employment (Person-years) |
|---|---|---|---|
| 5 444 | 20 688.19 | 26.50 | 69.62 |

The Crown also provides the opportunity to harvest wood for the purpose of firewood. There are four kinds of permits that may be purchased: 1) roadside clean up; 2) fuelwood clean up; 3) fuelwood contractors; and 4) fuelwood stands. The fuelwood contractor permit is normally not issued. The roadside and fuelwood clean-up permits cost $20.00 each. The fuelwood stands permit is issued at a cost of $8.62/m$^3$.

NBDNRE issued 818 firewood permits in 1999 (Table V-A, Appendix 12) for the FMF area. In total, 287 clean-up permits were issued yielding a revenue of $5 740.00. Additionally, 3 556 m$^3$ (Table V-A, Appendix 12) of wood were harvested from fuelwood stands yielding a revenue of $30 652.72.

Hunting and angling expenditures

Table 45 summarizes total hunter expenditures for the 1998 deer hunting season. Over half of NB hunters spent over $100 but less than $500. Another 16.7% of hunters spent up to $1 000 on their hunting experience. Based on the number of deer hunters that hunted in the FMF (Appendix 9, Table II-I) and using the mid-point for each expenditure category in Table 32, total hunter expenditures, just for deer hunting in the FMF was estimated to be $1 061 150.

Table 45. Total hunter expenditure for the 1998 deer hunting season (%) (NBDNRE, 1999).

| $100 | $101 - $200 | $201 - $500 | $501 - $1000 | $1001 - $2000 | $2001+ | Total |
|---|---|---|---|---|---|---|
| 17.3 | 25.7 | 33.4 | 16.7 | 5.5 | 1.5 | 100 |

Moose and bear hunting expenditures in the FMF were also estimated using the average NB expenditure for hunting wildlife of $415 per person (Leigh *et. al*., 2000). Total expenditures made by moose and bear hunters in the FMF was estimated to be $60 175 and $66 815, respectively.

In their report, the importance of nature to Canadians, Leigh *et al*. (2000) stated that while outdoor activities in natural areas provided the largest share of the total value, on a per capita basis, NB hunters attached values that were larger than for other participants, at a yearly value of $139 (Table V-B, Appendix 12). Outdoor activities in natural areas came second with $110 yearly average per participant. Recreational fishing and wildlife viewing came third and fourth respectively with yearly averages per participant of $88 and $56. With respect to daily averages, those who hunted waterfowl and large mammals derived more direct benefits than participants in any other nature-related activity with $14.3 and $12.4 per day respectively. For recreational fishing, the average daily value per participant was $8.8. Daily averages for hunting other birds and outdoor activities in natural areas were close with $8.0 and $7.4 respectively (Table V-B, Appendix 12).

The DFO summarized direct expenditures for recreational fishing (Table V-C, Appendix 12). Revenue earned in NB from recreational fishing was in excess of $44.1 million in 1995. What is interesting, is that despite a reduction in the participation rate, expenditures have increased. Seventy-six percent (76%) of resident expenditures were made for food and lodging, and transportation. Fishing services and supplies accounted for 17.7% and other expenditures accounted for 1.7% of all expenditures made for recreational fishing (Table V-C, Appendix 12).

Another $21.6 million was spent by NB resident alone, on big ticket items such as boating and camping equipment, and on land or real estate (Table V-D, Appendix 12). Non-resident expenditures accounted for $2.2 million for a total of $23.8 million spent on major purchases in NB.

Consumer surplus

Hunters' net willingness to pay (over and above any expenditure incurred) was found to be in excess of $1.4 million in 1994 (Table V-E, Appendix 12). This translates into an average value of $63.00 per hunting trip, over and above expenditures. Additionally, non-FMF residents were willing to pay as much as $75.00 per trip, as compared to residents who were willing to pay an extra $30.00 per trip.

In 1995 National Angler Survey (DFO, 1997) suggests that willingness to pay for the average angler had decreased (Table V-F, Appendix 12). This finding, however, is not unreasonable because anglers spent more money on recreational fishing as compared to the 1990 survey.

Although, the DFO (1997) survey only provided information on a provincial basis, the number of angling licenses sold and revenue generated are tracked by the NBDNRE. Looking at the Region 3 figures, shows that 20 098 angling licenses were sold in 1999, which represents 23% of the provincial total (Appendix 9, Table II-L). Of this, two percent (2%) signify non-resident anglers.

## Functionality and Application

Monitoring priority has been set to 1 or functional since much of the required data comes from published sources.

In order to monitor this indicator, some baseline data must be obtained through a survey and by analyzing existing information from broader surveys.

Much information on non-timber goods is lacking (*e.g.*, berries and mushroom picking). With regard to recreation, the values associated with non-consumptive recreation are potentially significant. No valuation of these kinds on recreational amenities has been conducted for the FMF with the exception of deer hunting. Also, NBDNRE has little information (*i.e.*, other than the number of permits/leases issued) on the degree of use on Crown lands other than parks. This type of data would be useful for land use and recreational planning, as well as potentially increasing revenues.

## Indicator 5.4.2

## Availability And Use Of Recreational, Cultural, And Heritage Opportunities (Interpretive Centers, Scenic Vistas, Cultural And Heritage Sites)

These sites posses implicit values that can be quite significant. As such, this indicator is an important one, although, estimating a value for these type of sites can be costly.

The data collected for this indicator is very similar to that obtained for indicators 5.1.4 and 5. 2.1. Therefore, Working Group 5 has decided to omit this indicator.

Indicator 5.4.3

| Number Of Participants Associated With These Facilities Or Services (Number Of Participants, Length Of Stay) |
|---|

This indicator has been dropped because it accounts for factors that are already monitored for indicator 5.2.1.

Indicator 5.4.4

| Memberships And Expenditures In Clubs And Special Interest Groups (*e.g.*, Snowmobile, Hikers, And Birdwatchers) |
|---|

This indicator has been dropped because it accounts for factors that are already monitored for indicator 5.2.1.

Indicator 5.5.1

| Protected Areas - Number, Size, And Total Area Protected By Degree Or Type Of Protection: A) Bone Fide Protected Areas; B) Greenbelts; C) DWA; D) Older Softwood Forest Habitat; E) Parks; F) Ecological Reserves; And G) Spiritual Areas |
|---|

## Justification for Selection

These types of areas have been advocated and deemed important by society and, thus, it is an important indicator. This indicator simply accounts for all protected sites and will allow trends to emerge with which to gauge whether this type of land use is increasing, decreasing, or remaining constant.

## Data Sources

- FMF (*e.g.*, indicator 1.1c – area, percent and representation of forest community and age class in protected areas)
- Land Classification Inventory - Forest Management Branch, NBDNRE
- FNP
- JDI Woodlands (Sussex district)
- SNB

## Monitoring Protocol

The information that needs to be tracked includes: 1) the area or site description (*e.g.*, location, size, importance); and 2) the degree of protection using IUCN classification. Working Group 1 is monitoring much of the needed information. Therefore, they should be contacted before any other data retrieval begins. As well, if the importance of these values to residents within and outside the FMF is to be assessed, then a survey must be developed and undertaken (*i.e.*, contingent valuation survey).

## Baseline Results

Protected areas are defined according to the degree of protection that they require. The statuses of protection used are those reflected by the International Union for the Conservation of Nature (IUCN). The IUCN represents an internationally based, non-governmental organization that pursues scientifically sound research and management of protected areas. In 1994, the various classifications were standardized so that they could be applied around the globe (Pugh, pers. comm., 2000). The IUCN classifications and their definitions are:

I. *Strict Nature Reserve/Wilderness Area*: protected area managed mainly for science or wilderness protection.

Ia. *Strict Nature Reserve*: protected area managed mainly for science.
Ib. *Wilderness Area*: protected area managed mainly for wilderness protection.

*National Park*: protected area managed mainly for ecosystem protection and recreation.

*Natural Monument*: protected area managed mainly for conservation of specific natural features.

*Habitat/Species Management Area*: protected area managed mainly for conservation through management intervention.

*Protected Landscape Seascape*: protected area managed mainly for landscape/seascape conservation and recreation.

*Managed Resource Protected Area*: protected area managed mainly for the sustainable use of natural ecosystems.

More detailed or specific definitions may be found in the IUCN guidelines for protected area management categories (IUCN, 1994).

Using FMF criteria, special management sites found in the FMF were categorized and then assigned IUCN titles where applicable (*i.e.*, not all of the special management sites in the FMF are protected). Actual areas that have been designated as protected or unique are presented by Working Group 1 under indicator 1.1c - Area, Percentage, And Representativeness Of Forest Community And Age Class In Protected Areas.

## Functionality and Application

Monitoring priority for this indicator is 1 or functional since much of the data is available.

There may be some sites that are being protected from being publicly accessible. That is, The locations of these sites are not to be revealed.

It would be useful to conduct a household survey of FMF residents every five years to determine which values are important and also to prioritize them.

Should there be another indicator for ecosystem function to monitor sustainability of the public good?

Indicator 5.5.2

Wildlife (this includes wildlife species (both plant and animals) not previously accounted for such as endangered species of plants and animals)

## Justification for Selection

This indicator allows for awareness of all the species that may be affected by management actions and/or changes taking place on the landbase overall.

## Data Sources

- FMF (*e.g.*, indicator 1.2)
- NB Conservation Council
- NB Committee on Endangered Species
- Committee on the Status of Endangered Wildlife in Canada
- List of species at risk - Fish and Wildlife Branch, NBDNRE
- Greater Fundy Ecosystem Research Group, UNB
- Naturalist clubs
- NB Museum
- Population changes - Conservation Data Centre (Sackville, NB)

## Monitoring Protocol

Compile and list: 1) extinct and endangered species, and 2) population changes, and 3) steps to take to prevent any further losses.

## Baseline Results

The information required to monitor this indicator is presented by Working Group1 under and thus will not be duplicated here. For instance, indicator 1.2a – number of known forest dependent species classified as extinct to vulnerable on local and national lists. For a list of extinct, extirpated endangered species, and also for a listing of those species that are of special concern, the reader may refer to the appendices for Working Group 1. Working Group 1 also presents changes in population and habitat levels of selected species and species guilds under indicator 1.2b.

## Functionality and Application

All the data requirements are easily met for this indicator so it has been assigned a monitoring priority of 1 or functional.

To monitor this indicator will require a cost outlay of roughly 4 person-weeks to complete.

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