



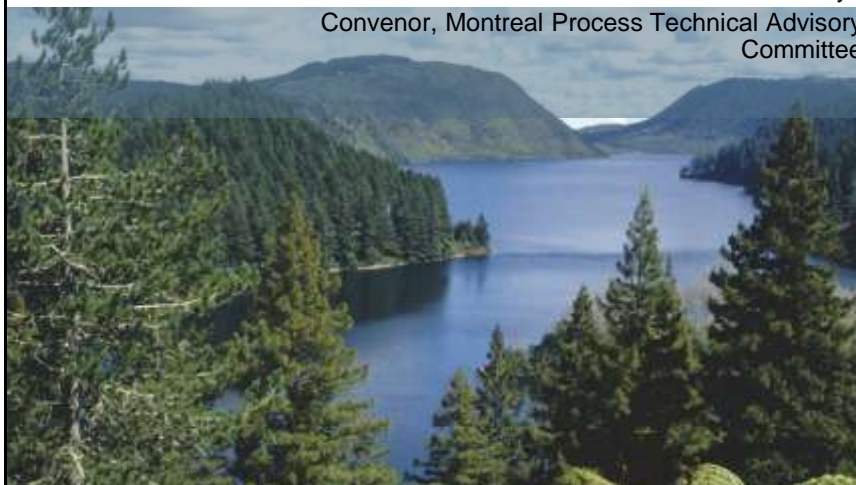
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## Montreal Process Developments, Achievements, and Future Directions

Dr Tim Payn

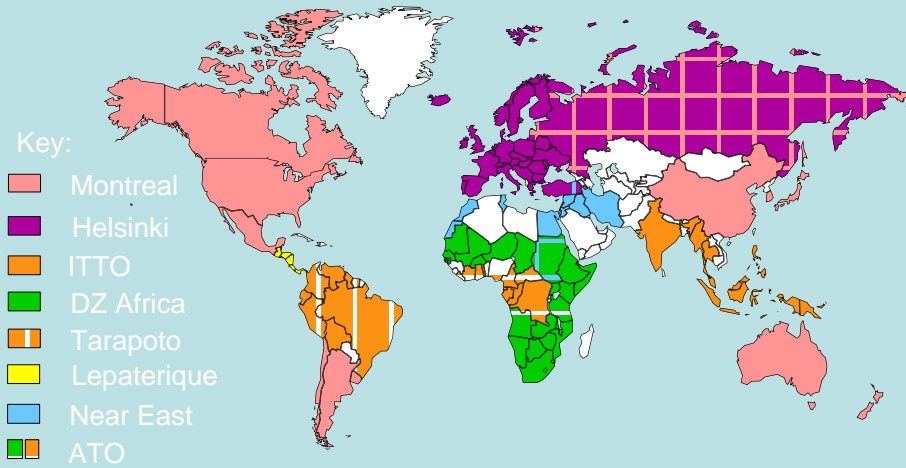
Convenor, Montreal Process Technical Advisory Committee



### Recent Activities

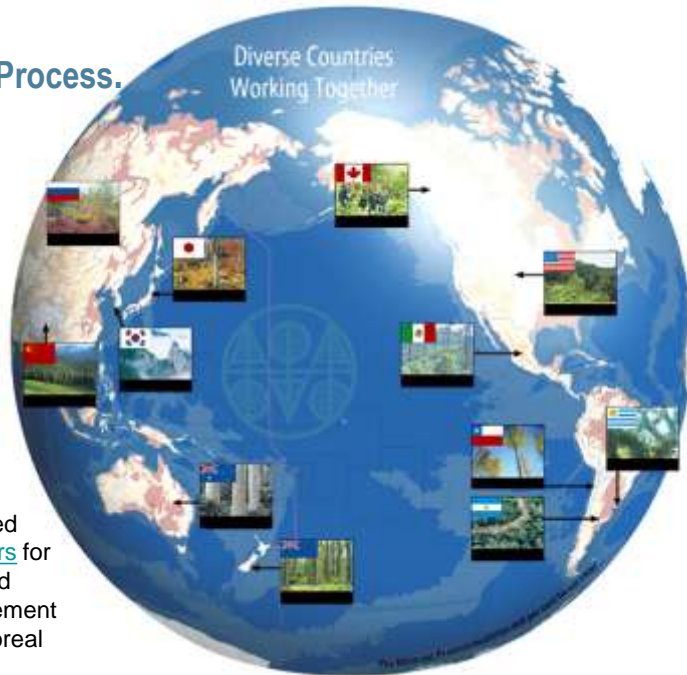
- ***Evolution of the Indicator set***
- Reporting activities
- Network of knowledge (Peter Gaulke)
- ***Joint initiatives – streamlining***
- ***Use of Indicators for thematic analysis***
  - ***Forest Degradation***
  - Water
  - Soil
- Future watch – use of C&I for planning (Tim Barnard)

## Nations involved in intergovernmental C&I processes



## The Montréal Process.

Developing and implementing internationally agreed [criteria and indicators](#) for the conservation and sustainable management of temperate and boreal forests.

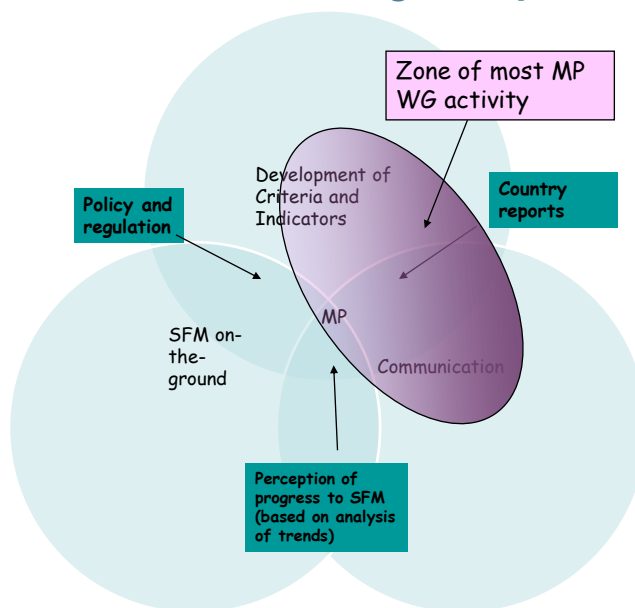




## Criteria & Indicators for Sustainable Forest Management

- **Criterion** = Category of conditions by which to assess SFM
  - Maintenance of productive capacity of forest ecosystems
- **Indicator** = Measure of an aspect of the criterion
  - Area of forest land and net area of forest land available for timber production
  - Area and growing stock of plantations of native and exotic species
- C&I are value neutral

## Montreal Process Working Group Activities



# Evolution of the Indicator Set

## Montreal Process Criteria and Indicators (first edition - 1995)

### Criterion 1: Conservation of biological diversity

- 1.1. Ecosystem Diversity**
- 1.1.a. Extent of areas by forest type relative to total forest area
- 1.1.b. Extent of area by forest type and by age class or successional stage
- 1.1.c. Extent of area by forest type in protected areas categories as defined by IUCN (also known as the World Conservation Union) or other classification systems
- 1.1.d. Extent of areas by forest type in protected areas defined by age class or successional stage
- 1.1.e. Fragmentation of forest type
- 1.2. Species Diversity**
- 1.2.a. The number of forest dependent species
- 1.2.b. The status (threatened, rare, vulnerable, endangered, or extinct) of forest dependent species at risk of not maintaining viable breeding populations, as determined by legislation or scientific assessment
- 1.3. Genetic Diversity**
- 1.3.a. Number of forest dependent species that occupy a small portion of their former range
- 1.3.b. Proportion of forest dependent species

### Criterion 2: Maintenance of productive capacity of forest ecosystems

- 2.a. Area of forest land and net area of forest land available for timber production
- 2.b. Total growing stock of both merchantable and non-merchantable tree species on forest land available for timber production
- 2c. The area and growing stock of plantations of native and exotic species
- 2.d. Annual removal of wood products compared to the volume determined to be sustainable
- 2e. Annual removal of non-timber forest products (e.g. leaf beavers, berries, mushrooms, game), compared to the level

### Criterion 3: Maintenance of forest ecosystem health and vitality

- 3.a. Area and percent of forest affected by processes or agents beyond the range of historic variation, (e.g. by insects, disease, competition from exotic species, fire, storm, land clearance, permanent flooding, salinization, and domestic animals)
- 3.b. Area and percent of forest land subjected to levels of specific air pollutants (e.g. sulfates, nitrate, ozone) or ultraviolet B that may cause negative impacts on the forest ecosystem
- 3.c. Area and percent of forest land with diminished biological components indicative of changes in fundamental ecological processes (e.g. soil, nutrient cycling, seed dispersal, pollination) and/or ecological continuity (monitoring of functionally important species such as fungi, arboreal epiphytes, nematodes, beetles, wasps, etc.)
- Criterion 4: Conservation and maintenance of soil and water resources**
- 4.a. Area and percent of forest land with significant soil erosion
- 4.b. Area and percent of forest land managed primarily for protective functions (e.g. watersheds, flood protection, avalanche protection, riparian zones)
- 4.c. Percent of stream kilometers in forested catchments in which stream flow and timing has significantly deviated from the historic range of variation
- 4.d. Area and percent of forest land with significantly diminished soil organic matter and/or changes in other soil chemical properties
- 4.e. Area and percent of forest land with significant compaction or change in soil physical properties resulting from human activities
- 4.f. Percent of water bodies in forest areas (e.g. stream kilometers, lake hectares) with significant variation from the historic range of variability in pH, dissolved oxygen, levels of chemicals (electrical conductivity), sedimentation or temperature change
- 4.g. Area and percent of forest land experiencing an accumulation of persistent toxic substances

### Criterion 5: Maintenance of forest contribution to global carbon cycles

- 5.a. Total forest ecosystem biomass and carbon pool (and if appropriate, by forest type, age class, and successional stages)
- 5.b. Contribution of forest ecosystems to be the total carbon budget, including absorption and release of carbon (standing biomass,

### Criterion 6: Maintenance and enhancement of long-term multiple socio-economic benefits

- 6.1. Production and Consumption**
- 6.1.a. Value and volume of wood and wood products production, including value added through downstream processing
- 6.1.b. Value and quantities of production of non-wood forest product
- 6.1.c. Supply and consumption of wood and wood products, including consumption per capita
- 6.1.d. Value of wood and non-wood products production as percentage of GDP
- 6.1.e. Degree of recycling of forest products
- 6.1.f. Supply and consumption/use of non-wood products
- 6.2. Recreation and Tourism**
- 6.2.a. Area and percent of forest land managed for general recreation and tourism, in relation to the total area of forest land
- 6.2.b. Number and type of facilities available for general recreation and tourism, in relation to population and forest area
- 6.2.c. Number of visitor days attributed to recreation and tourism, in relation to population and forest area
- 6.3. Investment in the Forest Sector**
- 6.3.a. Value of investment, including investment in forest growing, forest health and management, planted forests, wood processing, recreation and tourism
- 6.3.b. Level of expenditure on research and development, and education
- 6.3.c. Extension and use of new and improved technologies
- 6.3.d. Rates of return on investment
- 6.4. Cultural, Social and Spiritual Needs and Values**
- 6.4.a. Area and percent of forest land managed in relation to the total area of forest land to protect the range of cultural, social and spiritual needs and values
- 6.4.b. Non-consumptive-use forest values
- 6.5. Employment and Community Needs**
- 6.5.a. Direct and indirect employment in the forest sector and the forest sector employment as a proportion of total employment
- 6.5.b. Average wage rates and injury rates in major employment categories within the forest sector
- 6.5.c. Viability and adaptability to changing economic conditions, of forest dependent communities, including indigenous

### Criterion 7: Legal, institutional and economic framework for forest conservation and sustainable management

- 7.1. Extent to which the legal framework (laws, regulations, guidelines) supports the conservation and sustainable management of forests, including the extent to which it:**
- 7.1.a. Clarifies property rights, provides for appropriate land tenure arrangements, recognizes customary and traditional rights of indigenous people, and provides means of resolving property disputes by due process
- 7.1.b. Provides for periodic forest-related planning, assessment, and policy review that recognizes the range of forest values, including coordination with relevant sectors
- 7.1.c. Provides opportunities for public participation in public policy and decision making related to forests and public access to information
- 7.1.d. Encourages best practice codes for forest management
- 7.1.e. Provides for the management of forests to conserve special environmental, cultural, social and/or scientific values
- 7.2. Extent to which the institutional framework supports the conservation and sustainable management of forests, including the capacity to:**
- 7.2.a. Provide for public involvement activities and public education, awareness and extension programs, and make available forest related information
- 7.2.b. Undertake and implement periodic forest-related planning, assessment, and policy review including cross-sectoral planning and coordination
- 7.2.c. Develop and maintain human resources skills across relevant disciplines
- 7.2.d. Develop and maintain efficient physical infrastructure to facilitate the supply of forest products and services and support forest management
- 7.2.e. Enforce laws, regulations and guidelines

### 7.3. Extent to which the economic framework (economic policies and measures) supports the conservation and sustainable management of forests through:

- 7.3.a. Investment and taxation policies and a regulatory environment which recognizes the long-term nature of investments and permit the flow of capital in and out of the forest sector in response to market signals, non-market economic valuations, and public policy decisions in order to meet long-term demands for forest products and services
- 7.3.b. Non-discriminatory trade policies for forest products
- 7.4. Capacity to measure and monitor changes in the conservation and sustainable management of forests, including:**
- 7.4.a. Availability and extent of up-to-date data, statistics and other information important to measuring or describing indicators associated with criteria 1-7
- 7.4.b. Scope, frequency and statistical reliability of forest inventories, assessments, monitoring and other relevant information
- 7.4.c. Compatibility with other countries in measuring, monitoring and reporting on indicators
- 7.5. Capacity to conduct and apply research and development aimed at improving forest management and delivery of forest goods and services, including:**
- 7.5.a. Development of scientific understanding of forest ecosystem characteristics and functions
- 7.5.b. Development of methodologies to measure and integrate environmental and social costs and benefits into markets and public policies, and to reflect forest related resource depletion or replenishment in national accounting systems
- 7.5.c. New technologies and the capacity to assess the socioeconomic consequences associated with the introduction of new technologies
- 7.5.d. Enhancement of ability to predict impacts of human intervention on forests
- 7.5.e. Ability to predict impacts on forests of possible climate change

**Why? Changing Environment**

**How? TAC led, participatory**

**Indicator numbers reduced from 67 to 54**

**New Concepts**

- Forest based services (6.1.c)
- Social equity and distribution of benefits (6.6.a)
- Regulatory compliance of technical data (4.2.a, 4.3.a)
- GHG emissions and avoided emissions (5.c)

**Will be used in reporting from 2009 onwards**

**Overall conclusions**

- Robust
- Simplified
- Well aligned
- Easier to report on
- Continuity

**Criterion 7 – legal and institutional frameworks a big challenge**

**Montreal Process Indicator Review**

## Montreal Process Criteria and Indicators (third edition - 2009)

<p><b>Criterion 1: Conservation of biological diversity</b></p> <p><b>1.1. Ecosystem Diversity</b></p> <p>1.1.a Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure</p> <p>1.1.b Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage</p> <p>1.1.c Fragmentation of forests</p> <p><b>1.2. Species Diversity</b></p> <p>1.2.a Number of native forest-associated species</p> <p>1.2.b Number and status of native forest-associated species at risk, as determined by legislation or scientific assessment</p> <p>1.2.c Status of on site and off site efforts focused on conservation of species diversity</p> <p><b>1.3. Genetic Diversity</b></p> <p>1.3.a Number and geographic distribution of forest-associated species at risk of losing genetic variation and locally adapted genotypes</p> <p>1.3.b Population levels of selected representative forest-associated species to describe genetic diversity</p> <p>1.3.c Status of on site and off site efforts focused on conservation of genetic diversity</p> <p><b>Criterion 2: Maintenance of productive capacity of forest ecosystems</b></p> <p>2.a Area and percent of forest land and net area of forest land available for wood production</p> <p>2.b Total growing stock and annual increment of both merchantable and non-merchantable tree species in forests available for wood production</p> <p>2.c Area, percent, and growing stock of plantations of native and exotic species</p>	<p>2.d Annual harvest of wood products by volume and as a percentage of net growth or sustained yield</p> <p>2.e Annual harvest of non-wood forest products</p> <p><b>Criterion 3: Maintenance of forest ecosystem health and vitality</b></p> <p>3.a Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive alien species) beyond reference conditions</p> <p>3.b Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions</p> <p><b>Criterion 4: Conservation and maintenance of soil and water resources</b></p> <p><b>4.1 Protective Function</b></p> <p>4.1.a Area and percent of forest whose designation or land management focus is the protection of soil or water resources</p> <p><b>4.2 Soil</b></p> <p>4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources</p> <p>4.2.b Area and percent of forest land with significant soil degradation</p> <p><b>4.3 Water</b></p> <p>4.3.a Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources</p> <p>4.3.b Area and percent of water bodies, or stream length, in forest areas with significant change in physical, chemical or biological properties from reference conditions</p>	<p><b>Criterion 5: Maintenance of forest contribution to global carbon cycles</b></p> <p>5.a Total forest ecosystem carbon pools and fluxes</p> <p>5.b Total forest product carbon pools and fluxes</p> <p>5.c Avoided fossil fuel carbon emissions by using forest biomass for energy</p> <p><b>Criterion 6: Maintenance and enhancement of long-term multiple socio-economic benefits</b></p> <p><b>6.1 Production and Consumption</b></p> <p>6.1.a Value and volume of wood and wood products production, including primary and secondary processing</p> <p>6.1.b Value of non-wood forest products produced or collected</p> <p>6.1.c Revenue from forest based environmental services</p> <p>6.1.d Total and <i>per capita</i> consumption of wood and wood products in round wood equivalents</p> <p>6.1.e Total and <i>per capita</i> consumption of non-wood forest products</p> <p>6.1.f Value and volume in round wood equivalents of exports and imports of wood products</p> <p>6.1.g Value of exports and imports of non-wood forest products</p> <p>6.1.h Exports as a share of wood and wood products production, and imports as a share of wood and wood products consumption</p> <p>6.1.i Recovery or recycling of forest products consumption</p>	<p><b>6.2 Investment in the Forest Sector</b></p> <p>6.2.a Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest-based environmental services, recreation and tourism</p> <p>6.2.b Annual investment and expenditure in forest-related research, extension and development, and education</p> <p><b>6.3 Employment and Community needs</b></p> <p>6.3.a Employment in the forest sector</p> <p>6.3.b Average wage rates, annual average income and annual injury rates in major forest employment categories</p> <p>6.3.c Resilience of forest-dependent communities</p> <p>6.3.d Area and percent of forests used for subsistence purposes</p> <p>6.3.e Distribution of revenues derived from forest management</p> <p><b>6.4 Recreation and Tourism</b></p> <p>6.4.a Area and percent of forests available and/or managed for public recreation and tourism</p> <p>6.4.b Number, type, and geographic distribution of visits attributed to recreation and tourism and related to facilities available</p> <p><b>6.5 Cultural, Social and Spiritual needs and Values</b></p> <p>6.5.a Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values</p> <p>6.5.b The importance of forests to people</p>	<p><b>Criterion 7: Legal, institutional and economic framework for forest conservation and sustainable management</b></p> <p>7.1.a Legislation and policies supporting the sustainable management of forests</p> <p>7.1.b Cross sectoral policy and programme coordination</p> <p>7.2.a Taxation and other economic strategies that affect sustainable management of forests</p> <p>7.3.a Clarity and security of land and resource tenure and property rights</p> <p>7.3.b Enforcement of laws related to forests</p> <p>7.4.a Programmes, services and other resources supporting the sustainable management of forests</p> <p>7.4.b Development and application of research and technologies for the sustainable management of forests</p> <p>7.5.a Partnerships to promote the sustainable management of forests</p> <p>7.5.b Public participation and conflict resolution in forest-related decision making</p> <p>7.5.c Monitoring, assessment and reporting on progress towards sustainable management of forests</p>
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# Thematic Analysis

## forest degradation

*'The reduction of the capacity of a forest to provide goods and services'*  
(FAO 2<sup>nd</sup> expert meeting)

### Key Question

- Can the MP C&I be used to address global (thematic) issues such as Climate Change response, Forest Degradation, Water Supply, Biodiversity?
  - The C&I must be relevant for global issues
- Approach:
  - Identify core descriptors of forest degradation (UN FAO etc) and test against MP C&I set
  - New Zealand Case Study



## Cross reference of 2009 Montreal Process indicators with FAO Forest Degradation indicators

### Criterion 1: Conservation of biological diversity

#### 1.1. Ecosystem Diversity

1.1.a Area and percent of forest by forest ecosystem type, successional stage, age class, and forest ownership or tenure

1.1.b Area and percent of forest in protected areas by forest ecosystem type, and by age class or successional stage

1.1.c Fragmentation of forests

#### 1.2. Species Diversity

1.2.a Number of native forest-associated species

1.2.b Number and status of native forest-associated species at risk, as determined by legislation or scientific assessment

1.2.c Status of on site and off site efforts focussed on conservation of species diversity

#### 1.3. Genetic Diversity

1.3.a Number and geographic distribution of forest-associated species at risk of losing genetic variation and locally adapted genotypes

1.3.b Population levels of selected representative forest-associated species to describe genetic diversity

1.3.c Status of on site and off site efforts focussed on conservation of genetic diversity

### Criterion 2: Maintenance of productive capacity of forest ecosystems

2.a Area and percent of forest land and net area of forest land available for wood production

2.b Total growing stock and annual increment of both merchantable and non-merchantable tree species in forests available for wood production

2.c Area, percent, and growing stock of plantations of native and exotic species

2.d Annual harvest of wood products by volume and as a percentage of net growth or sustained yield

2.e Annual harvest of non-wood forest products

### Criterion 3: Maintenance of forest ecosystem health and vitality

3.a Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive alien species) beyond reference conditions

3.b Area and percent of forest affected by abiotic agents (e.g. fire, storm, land clearance) beyond reference conditions

### Criterion 4: Conservation and maintenance of soil and water resources

#### 4.1. Protective function

4.1.a Area and percent of forest whose designation or land management focus is the protection of soil or water resources

#### 4.2. Soil

4.2.a Proportion of forest management activities that meet best management practices or other relevant legislation to protect soil resources

4.2.b Area and percent of forest land with significant soil degradation

#### 4.3. Water

4.3.a Proportion of forest management activities that meet best management practices, or other relevant legislation, to protect water related resources

4.3.b Area and percent of water bodies, or stream length, in forest areas with significant change in physical, chemical or biological properties from reference conditions

### Criterion 5: Maintenance of forest contribution to global carbon cycles

5.a Total forest ecosystem carbon pools and fluxes

5.b Total forest product carbon pools and fluxes

5.c Avoided fossil fuel carbon emissions by using forest biomass for energy

### Criterion 6: Maintenance and enhancement of long-term multiple socio-economic benefits

#### 6.1. Production and consumption

6.1.a Value and volume of wood and wood products production, including primary and secondary processing

6.1.b Value of non-wood forest products produced or collected

6.1.c Revenue from forest based environmental services

6.1.d Total and per capita consumption of wood and wood products in round wood equivalents

6.1.e Total and per capita consumption of non-wood forest products

6.1.f Value and volume in round wood equivalents of exports and imports of wood products

6.1.g Value of exports and imports of non-wood forest products

6.1.h Exports as a share of wood and wood products production, and imports as a share of wood and wood products consumption

6.1.i Recovery or recycling of forest products as a percent of total forest products consumption

6.1.j The importance of forests to people

6.2 Investment in the forest sector

6.2.a Value of capital investment and annual expenditure in forest management, wood and non-wood forest product industries, forest-based environmental services, recreation and tourism

6.2.b Annual investment and expenditure in forest-related research, extension and development, and education

6.3 Employment and community needs

6.3.a Employment in the forest sector

6.3.b Average wage rates, annual average income and annual injury rates in major forest employment categories

6.3.c Resilience of forest-dependent communities

6.3.d Area and percent of forests used for subsistence purposes

6.3.e Distribution of revenues derived from forest management

6.4 Recreation and tourism

6.4.a Area and percent of forests available and/or managed for public recreation and tourism

6.4.b Number, type, and geographic distribution of visits attributed to recreation and tourism and related facilities available

6.5 Cultural, social and spiritual needs and values

6.5.a Area and percent of forests managed primarily to protect the range of cultural, social and spiritual needs and values

6.5.b The importance of forests to people

### Criterion 7: Legal, institutional and economic frameworks for forest conservation and sustainable management

7.1.a Legislation and policies supporting the sustainable management of forests

7.1.b Cross sectoral policy and programme coordination

7.2.a Taxation and other economic strategies that affect sustainable management of forests

7.3.a Clarity and security of land and resource tenure and property rights

7.3.b Enforcement of laws related to forests

7.4.a Programmes, services and other resources supporting the sustainable management of forests

7.4.b Development and application of research and technologies for the sustainable management of forests

7.5.a Partnerships to promote the sustainable management of forests

7.5.b Public participation and conflict resolution in forest-related decision making

7.5.c Monitoring, assessment and reporting on progress towards sustainable management of forests



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## New Zealand case study




Natural forests

## Planted Production forests



- Indicator set is appropriate
- Application may differ across forest types
- Challenge! – baseline definition
  - Data availability

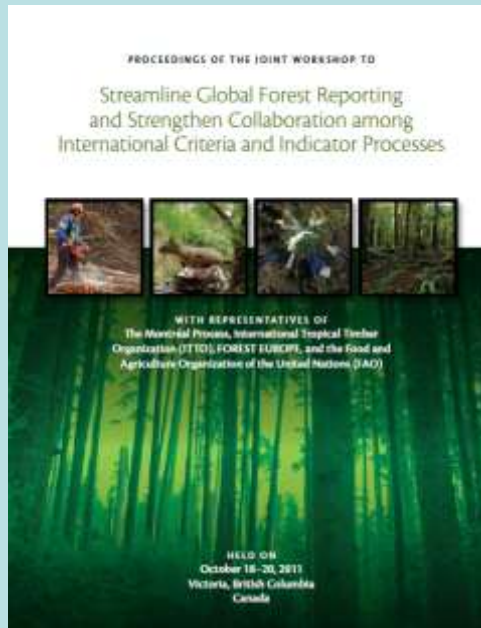
## Joint Activities

 MINISTERIAL CONFERENCE ON THE PROTECTION OF FORESTS IN EUROPE LIAISON UNIT WARSAW		C&I processes co-operation
UNFF	MCPFE Criteria	Montreal Process
1. Extent of forest resources.	1. Maintenance & appropriate enhancement of forest resources and their contribution to global carbon cycles	2. Maintenance of Productive Capacity of Forest Ecosystems 5. Maintenance of Forest Contribution to Global Carbon Cycles
2. Biological diversity	4. Maintenance, conservation & appropriate enhancement of biological diversity in forest ecosystems	1. Conservation of Biological Diversity
3. Forest health and productivity	2. Maintenance of forest ecosystem health and vitality	3. Maintenance of Forest Ecosystem Health and Vitality
4. Productive functions of forest resources.	3. Maintenance and encouragement of productive functions of forests (wood and non-wood)	6. Maintenance and Enhancement of Long Term Multiple Socio-Economic Benefits to Meet the Needs of Societies
5. Protective functions of forest resources.	5. Maintenance and appropriate enhancement of protective functions in forest management	4. Conservation and Maintenance of Soil and Water Resources
6. Socio-economic functions.	6. Maintenance of other socio-economic functions and conditions	6. Maintenance and Enhancement of Long Term Multiple Socio-Economic Benefits to Meet the Needs of Societies
7. Legal, policy and institutional framework.	[MCPFE qualitative indicators could be interpreted as the 7 <sup>th</sup> criterion]	7. Legal, Institutional and Economic Framework for Forest Conservation and Sustainable Management



## Joint activities

- Increasing interactions with other C&I Processes and UN FAO
- Streamlining and aligning – GFRA 2015
- Communication of Sustainable Forest Management



## Future Directions Some New Zealand Thoughts

## What's next?

- Country Issues
  - Social License to Operate
  - Climate Change Response
  - Water
- Responses
  - Thematic reporting
    - Planted Forests
      - Expansion of indicators
    - Natural Forests
      - Biodiversity responses
      - Degradation
    - Climate Change Responses
  - Integrated monitoring frameworks (all lands)
  - Future Watching

Company	Year		
<b>Basic information</b>			
Forest Area	ha		
Total area harvested	ha		
Number of coupes	Average coupe size	17.4	
Area established	ha		
Number of Resource Consents held	ha		
<b>Forest Operations Indicators</b>			
<b>Basic impacts</b>			
Area damaged by wind	ha	% of forest area	
Area damaged by fire	230	2.8%	
Area of erosion damage (total)	130	1.5%	
Area affected by storm damage (total)	31	0.4%	
Area affected by storm damage (total)	12		
<b>Chemical Use</b>			
<b>Herbicide (kg active)</b>			
Area of pasture (& other past animal control)	ha		
<b>Pesticide (kg active)</b>			
<b>Fertiliser (tonnes nitrogen)</b>			
n	p	k	
20	5	0	
<b>Regulatory compliance</b>			
n	ha	% of forest area	% of harvested area
2	20	0.0%	0.0%
<b>Forest Benefits</b>			
n	ha	% of forest area	
1	1	0.0%	

## Conclusions

- Communication
- Localisation!
- Capitalising on trend data – 'Future Focus'
- Thematic Focus

