



Forest disturbance data needs of the Montréal Process

Tim Payn, Principal Scientist at Scion and Montréal Process Technical Advisory Committee Convenor

Presentation to the Scientific -Technical Symposium "Assessing Forest Damage and Disturbance", Vienna, Austria
29th – 30th September 2022



Outline

- The Montréal Process
- The Criteria & Indicators framework
- Disturbance indicators
- Indicator principles and data considerations
- Gaps in indicator coverage
- Way forward





The Montréal Process: *Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests*

- 12 Countries
- Voluntary Intergovernmental Process
- One of 11 C&I processes established globally
- 95% of the world's temperate and boreal forests
- Well tested C&I framework
- Regular country reports
- Indicator data from 1995 onwards

RUSSIAN FEDERATION

CANADA

CHINA

REPUBLIC OF KOREA

JAPAN

UNITED STATES
OF AMERICA

MEXICO

AUSTRALIA

NEW ZEALAND

CHILE

URUGUAY

ARGENTINA

Montreal Process Criteria and 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 focused 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 focused 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

6.2 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 to 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

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

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

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



Montréal
Process



The Montréal Process: *Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests*


 RUSSIAN FEDERATION

 CANADA

 CHINA

 REPUBLIC OF KOREA

 JAPAN

 UNITED STATES
OF AMERICA

 MEXICO

Montreal Process Indicator Principles

- Non prescriptive on methods
- Collect once use many times
- Country audience
- Changes 'beyond reference conditions'
- Network of knowledge
- Cross Process collaboration/harmonisation

 AUSTRALIA

 NEW ZEALAND

 CHILE

 URUGUAY

 ARGENTINA

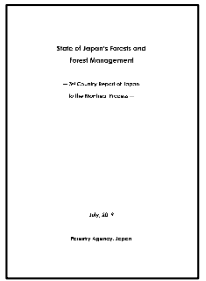
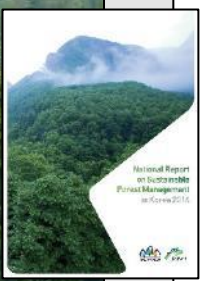
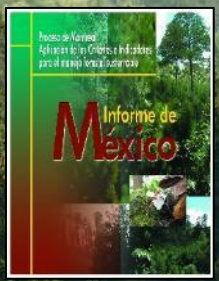
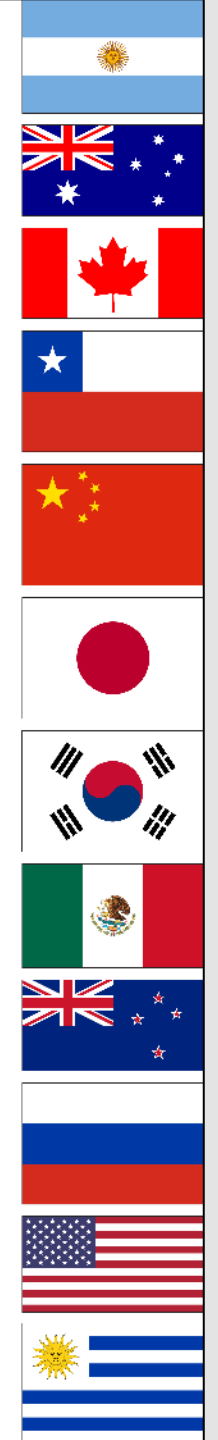
Montréal Process Working Group
Synthesis Report



Progress towards the conservation and sustainable management of temperate and boreal forests:

Overview and country highlights from the Montréal Process

November 2019



No single damage or disturbance indicator



Criterion 3 – Maintenance for forest ecosystem health and vitality

3.b Forest area affected by fire (abiotic disturbances) Lead author: Guy Robertson

Area of forest disturbed by fire, 2000 - 2017 (thousand hectares)

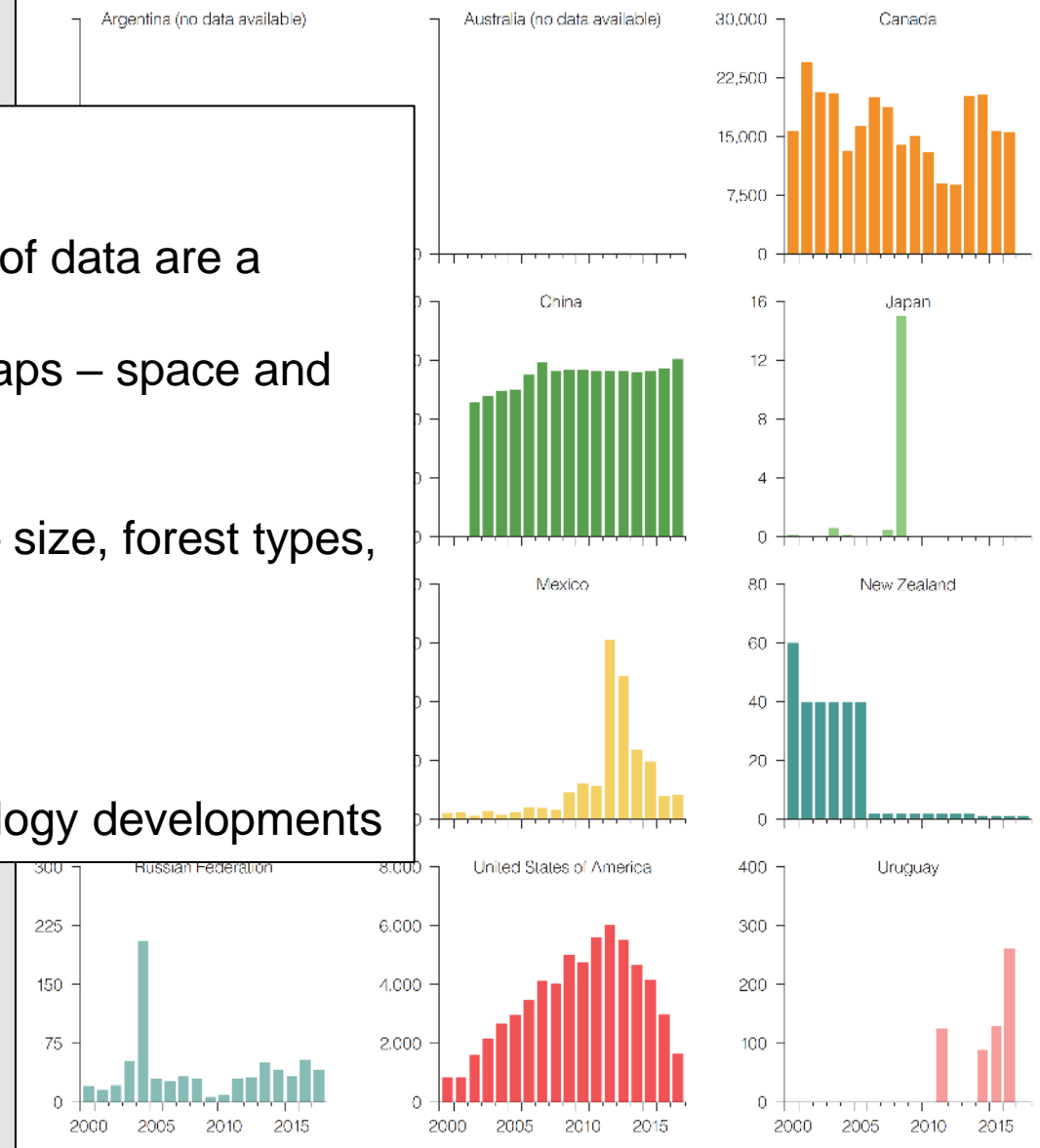


Note: Colors indicate different area scales (left-hand axis).

Criterion 3 – Maintenance for forest ecosystem health and vitality

3.a Disturbance by insects (biotic disturbances) Lead author: Guy Robertson

Area of forest disturbed by insects, 2000 - 2017 (thousand hectares)



Note: 1. Colours indicate different area scales (left-hand axis), 2. Japan has insect-damaged forests of pine and oak with recorded as the timber volume of damaged trees, but the area is unknown and not included in this graph.

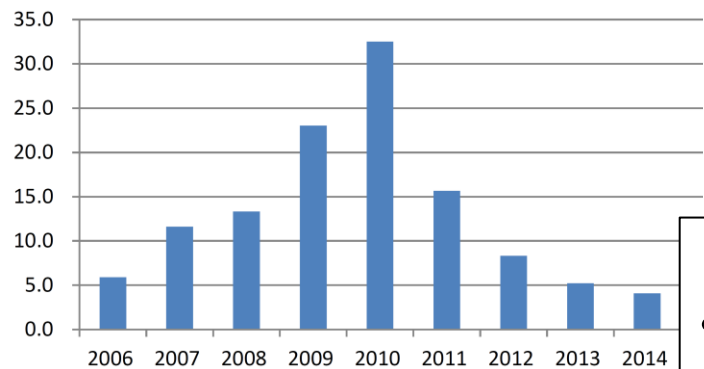
Data Challenges

- Accuracy and consistency of data are a perennial problem
- Inconsistencies and data gaps – space and time
- Variable methodologies
- Diversity of MP countries – size, forest types, reporting conventions

Data Opportunities

- Making the most of technology developments

Figure 32: Change in volume of trees damaged by Japanese oak wilt (10 thousand m³)



Source: Forestry Agency

How have disturbances shaped Canada's forests?

Type of disturbance	Area (ha)	Percentage of forest area (%)
Area affected by insects (2019)	14,473,760	4.00
Area harvested (2019)	756,875	0.21
Area burned (2020)	227,477	0.06
Area deforested (2019)	49,046	0.01

Table 3.1: Indicators for Criterion 3 – quality of information and trends

Indicator	Quality of information	Trend
3.a. Area and percent of forest affected by biotic processes and agents (e.g. disease, insects, invasive species) beyond reference conditions	M/H	▲
3.b. Area and percent of forest affected by abiotic agents (e.g. fire, storm, ice) beyond reference conditions	M	▶

KEY

- L – low
- M – medium
- H – high
- ▲ – positive
- ▶ – positive
- ▼ – negative
- ◀ – negative

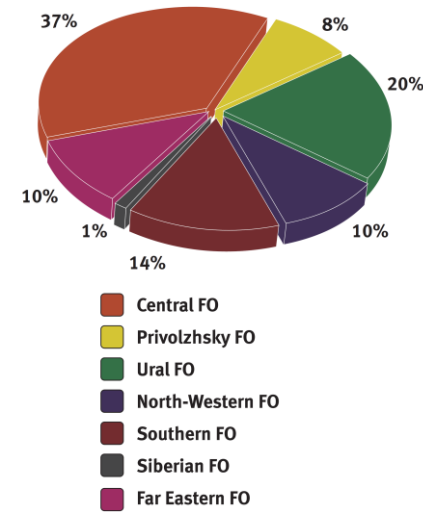
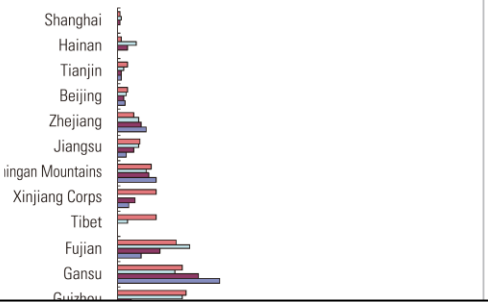


Figure 26. Illegally cut timber in different Federal Okrugs RF

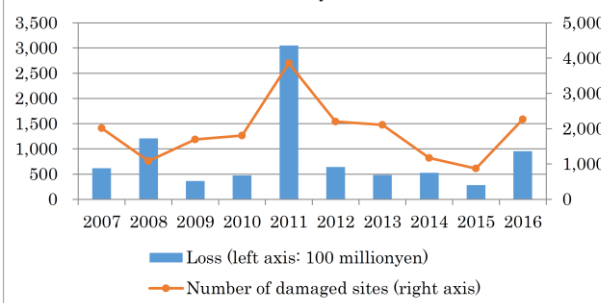
Country Reports

- Many disturbance types reported – fire, insects, pathogens, rodents, deer, landslides, erosion, tsunamis, ice storms, harvesting, illegal activities, radiation impacts
- Country focussed narratives
- Rare to detail methods/data types used
- Majority of narratives are on individual disturbance types
- Few on overall/general disturbance

Figure 4-4. Average forestry pests occurrence area by every 5 years (10,000 ha)

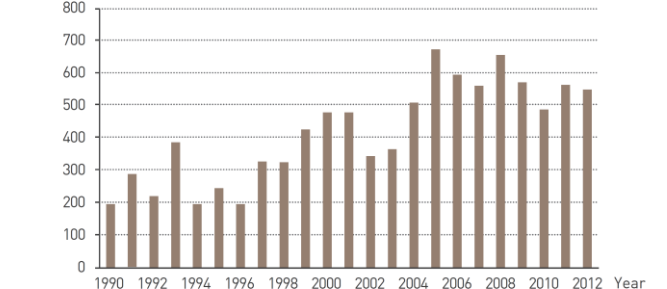
Year	1970-1974	1975-1979	1980-1984	1985-1989	1990-1994	1995-1999	2000-2004	2005-2009	2010-2014
Loss (left axis: 100 millionyen)	~100	~150	~200	~250	~300	~350	~400	~450	~500
Number of damaged sites (right axis)	~50	~100	~150	~200	~250	~300	~350	~400	~450

Figure 37: State of occurrence of forest disasters in recent years



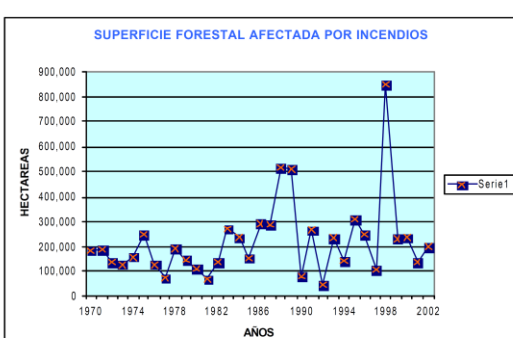
Source: Forestry Agency

Figure 4-4. Damaged area from illegal forest activities (ha)

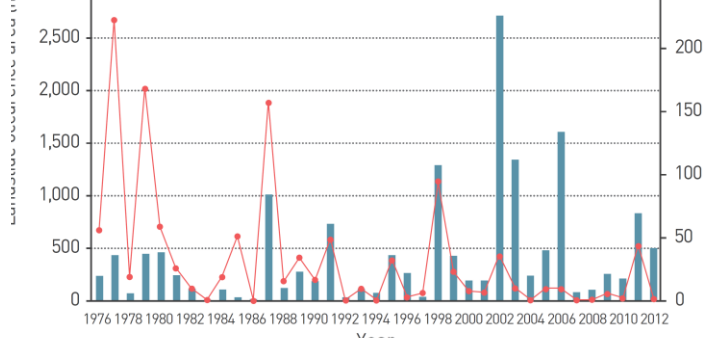


Source: Forestry Agency

Gráfica No. 1 Registro histórico de incendios forestales (1970-2002)



Gráfica No. 2 Registro histórico de deslizamientos y víctimas (1976-2012)



Source: Forestry Agency

Key points

- No single damage or disturbance indicator
- Currently rely on story telling from multiple indicators, direct and indirect for overall picture – country specific
- Value in exploring development of single ‘umbrella’ indicator
- Make the most of new technologies
- Use the Montréal Process network of knowledge to co-develop and adopt
- Align with other Processes – continue to work towards global consistency



Montréal
Process

Acknowledgements

- Members of the Montréal Process Technical Advisory Committee, especially the Synthesis Report Development Team
- Dale Corbett and Greg Scott of Scion for graphics production
- The Montréal Process Working Group members



Montréal
Process

References



Montréal
Process

- Montréal Process website
www.montreal-process.org
- Montréal Process Fact Sheet
<https://www.montreal-process.org/documents/publications/factsheets/MontrealProcess-WFC2015-FactSheet.pdf>
- Overview and Country Highlights from the Montréal Process (2019)
<https://www.montreal-process.org/documents/publications/techreports/Montr%C3%A9alProcessOverviewandCountryHighlightsReportNovember2019FINAL.pdf>
- The Montréal Process, Criteria and Indicators for the Conservation and Sustainable Management of Temperate and Boreal Forests, Fifth Edition (2015)
<https://www.montreal-process.org/documents/publications/techreports/MontrealProcessSeptember2015.pdf>
- Montréal Process Synthesis Report (2022)
available on website in late 2022
- Linser, S.; Wolfslehner, B.; Bridge, S.R.J.; Gritten, D.; Johnson, S.; Payn, T.; Prins, K.; Raši, R.; Robertson, G. 25 Years of Criteria and Indicators for Sustainable Forest Management: How Intergovernmental C&I Processes Have Made a Difference. *Forests* (2018) 9, 578.
<https://doi.org/10.3390/f9090578>
- Linser, S.; Wolfslehner, B.; Asmar, F.; Bridge, S.R.J.; Gritten, D.; Guadalupe, V.; Jafari, M.; Johnson, S.; Laclau, P.; Robertson, G. 25 Years of Criteria and Indicators for Sustainable Forest Management: Why Some Intergovernmental C&I Processes Flourished While Others Faded. *Forests* (2018) 9, 515.
<https://doi.org/10.3390/f9090515>

tim.payn@scionresearch.com
www.scionresearch.com



Prosperity from trees *Mai i te ngahere oranga*