



The **Teal-Jones Group**

Fraser Public Advisory Group
(Fraser PAG)

Role in Global Ecological Cycles

Forest License A19201 & Timber
License T0822

Sustainable Forest Management



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Introduction

This document has been created to give members of the Fraser Public Advisory Group (Fraser PAG) relevant background information to participate in identifying and selecting local Values, Objectives, Targets and Indicators for contributions to global ecological cycles.

The goal of this meeting is to identify values, objectives, indicators and targets for Contributions to Global Ecological Cycles, considering:

- Carbon uptake and Storage
- Forest Land Conversion

In order to aid members and their respective groups, the following information is provided in this document.

- Overview of Ecological Cycles
- Forest License A19201 & Timber License T0822 (the **Defined Forest Area** or **DFA**) and contributions to Global Ecological Cycles (including a brief description of mandatory indicators that Teal must measure for other commitments or processes e.g., legislative requirements, government policy, etc.)
- Reference set of indicators from the Canadian Council of Forest Minister
- Examples of indicators used by forest companies on Vancouver Island and for the Lillooet SFMP in their Sustainable Forest Management Plans
- Draft indicators and targets for consideration by the Fraser PAG as a basis for discussion and building the sustainable forest management plan

Ideally members will review this package prior to the meeting. This will enable members to:

- Educate themselves (and their group where applicable) on global ecological cycles
- Bring forth informed ideas and opinions to the meeting
- Participate effectively and efficiently to maximize valuable discussion time at meetings

Please feel free to contact us if you have any questions on this material, or bring your questions to the meeting!



Overview of Ecological Cycles

Global ecological cycles are a complex of self-regulating processes responsible for recycling the earth's limited supply of water, carbon, nitrogen and other life-sustaining elements. The world's forests are critically dependent upon, and make substantial contributions to, these global processes. Global ecological cycles are negatively impacted by fossil fuel combustion and associated toxic emissions. Forests make a major positive contribution to global cycles through the uptake and storage of carbon.

The Carbon Cycle

The movement of carbon, in its many forms, between the biosphere, atmosphere, oceans, and geosphere is described by the carbon cycle, illustrated in diagram below. The cycle has various sinks, or stores, of carbon and processes by which the various sinks exchange carbon (the arrows).

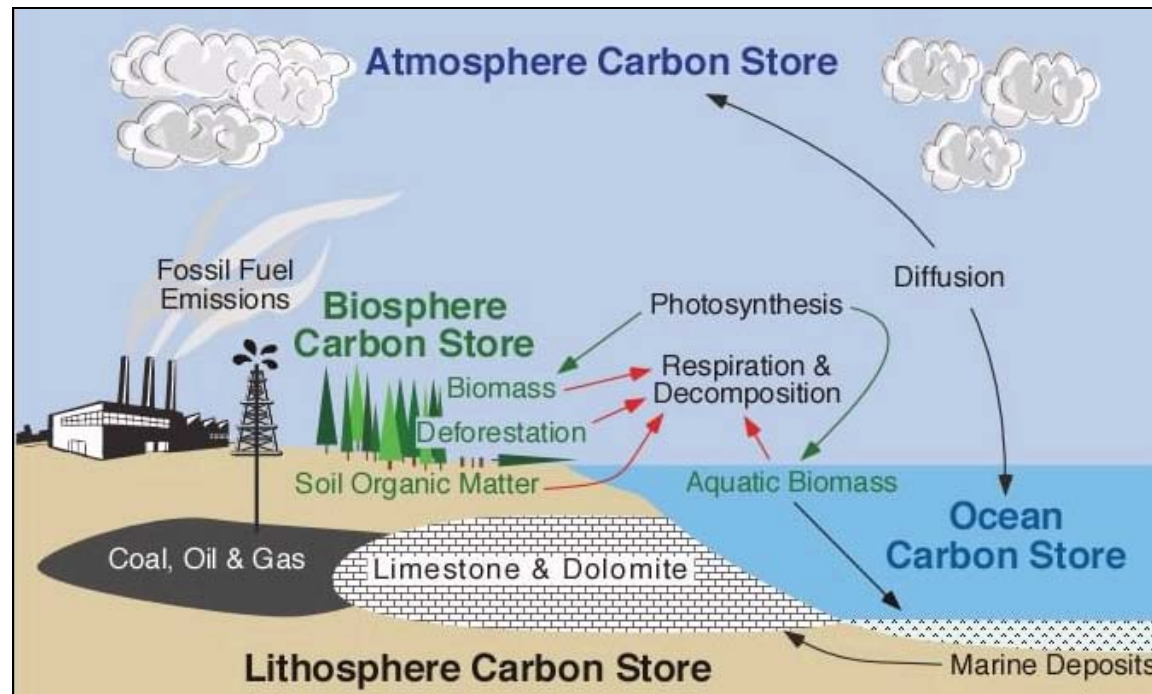


Figure 1: the Carbon Cycle¹

With respect to forest management we are primarily concerned with the interactions of the biosphere, specifically the forest's role in the carbon cycle.

Plants absorb carbon dioxide (CO₂) from the atmosphere during photosynthesis, and release CO₂ back in to the atmosphere during respiration or decomposition.² All forests collect CO₂ and store

¹ PhysicalGeography.net

² <http://www.cotf.edu/ete/main.html>



the carbon in the form of wood. Unless unusual circumstances occur the wood is eventually broken down releasing the carbon as CO₂ and water back to the atmosphere.

Forests are significant reservoirs or "sinks" of carbon. Carbon is stored in forests (in living biomass, dead biomass or soils) or in forest products. Increasing the amount of carbon stored in forests (i.e., creating carbon sinks) has been identified as a potential short-term measure to mitigate climate change.³ Through their destruction, forests can be serious sources of greenhouse gases but through their sustainable management they can be important sinks of the same gases. Managing the existing forest resource for carbon sequestration and storage involves minimizing the loss of forest area to deforestation, maintaining or improving tree growth, minimizing soil disturbance and residual stand damage during timber harvesting, adopting socially acceptable programs of forest protection or community-based management; improving the management of parks and protected areas; ensuring satisfactory natural regeneration of harvested forests and forests damaged by fire, insects, and disease; improving forest fire suppression and management capabilities; adopting reduced-impact logging practices; and minimizing the negative environmental impact of road construction and maintenance. In short, it means practicing sustainable forest management.⁴

The amount of carbon retained per hectare per year depends on the vigor of the trees, the quality of the site, and the amount of disturbance or mortality each year. Stopping CO₂ circulation depends on keeping the wood from decomposing.⁵

The rate of carbon sequestration depends on the growth characteristics of the species, the conditions for growth where the tree is planted, and the density of the tree's wood. The rate of carbon sequestration is greatest in the younger stages of tree growth, between 20 to 50 years.⁶

3 <http://www.climatechangesolutions.com/index.asp>

4 CIDA Forestry Advisors Network <http://www.rcfa-cfan.org/english/info.tree.html>

5 <http://pages.prodigy.net/afmo/co2disc.htm>

6 CIDA Forestry Advisors Network <http://www.rcfa-cfan.org/english/info.tree.html>



Forest License A19201 & Timber License T0822: Role in Global Ecological Cycles

Carbon sequestering and storage are not values which are actively or directly managed within the DFA. The following information therefore focuses on management activities that have influence over or impact on the carbon cycle. Many of these subjects have been discussed through previous meeting topics; refer to take home packages (Biodiversity, Ecosystem Condition & Productivity and Soil & Water) for more detailed information.

Forest Reserves

Adjacent to the DFA are several large protected areas including: Garibaldi, Golden Ears, Pinecone Burke, and Manning Provincial Parks.

Other forms of forest reserves include landscape level retention initiatives such as Old Growth Management Areas, Ungulate Winter Range, Wildlife Habitat Areas, inoperable areas within the DFA; and stand level retention initiatives such as representative reserves for each cutblock (Wildlife Tree Patches), Riparian Reserves, etc.

Maintaining or Improving Tree Growth

Combinations of activities are implemented in order to establish and maintain a new forest following harvesting and/ or other disturbances. These activities are referred to as Basic silviculture, and may include planting, brushing or site preparation. Basic silviculture is focused on insuring that all harvested areas are regenerated and reach a "free-growing"⁷ state, it is a legal obligation and is undertaken at Teal's expense.

Incremental silviculture activities are applied to free growing stands to increase the yields of merchantable volume and/ or wood quality, to reduce the time to future harvest, to increase wildlife capability or in some cases to increase employment in high unemployment areas. On crown lands, incremental silviculture are not a legislated requirement, however, funding may be available. A number of incremental silviculture activities, including juvenile spacing, fertilization, tree improvement, and pruning can be considered within the DFA.

Deforestation

A limited amount of forest is removed from the DFA landbase in order to facilitate forest management activities. These include building of facilities such as roads and landings. Minimizing the amount of productive forest land occupied by these structures is an important objective of forest management.⁸

⁷ Free Growing is defined as a stand of healthy trees of a commercially valuable species, the growth of which is not impeded by competition from plants, shrubs or other trees

⁸ Forest Practice Code Soil Conservation Guidebook May 2001



Harvesting Methods

During the design of cutblocks several measures are taken to protect residual stands and soil.

- Road locations and building techniques are carefully scrutinized in order to minimize the amount of productive area occupied and the impact on surrounding resources
- Before ground based harvesting methods are prescribed, soil qualities are assessed and sensitive areas are avoided or where they are unavoidable, measures are taken to reduce impact
- Prior to prescribing cable based harvesting methods, deflection lines (i.e. a survey of the profile of the slope) are measured to ensure yarding will provide adequate lift to avoid damage to soil and residual stands adjacent to the harvest area

Protection of Forests

Fire

There are many management activities that prepare for or prevent unplanned wildfires. Teal maintains a 'Wildfire Emergency Preparedness and Response Plan' which specifies appropriate measures such as: equipment to be kept on active sites or central caches; operational weather condition limitations or special actions to be taken in hot weather (e.g., fire spotters or early shifts); personnel with experience who will take responsibilities for first response procedures.

Insects & Disease

Although there are no significant risks to the health of forest resources currently active in the DFA area, there are factors, which may affect forest health and must be recognized and managed. Commonly the management objective for these forest health factors is to conduct site specific assessments and prescribe activities to mitigate their impact and control their proliferation at the stand level. Common diseases within the DFA are: root diseases, and hemlock dwarf mistletoe.

Windthrow

Windthrow is a naturally occurring process throughout the DFA. Measures to reduce the impact of windthrow are prescribed where windthrow risk is judged to be 'high' or 'very high' and has the potential to impact important resource features. Measures may include altering cutblock design, adding buffers or treatments to timber edges (e.g., topping and pruning).

Where economically feasible, areas of windthrow are salvaged for timber. All salvaged areas are regenerated.



General Guidelines for Choosing Local Values, Objectives, Indicators and Targets

The following is a summary of the CCFM Criteria and CSA Elements, which will serve as a starting point for organizing DFA values and objectives. Where local level values and objectives do not fit into CSA Elements, new elements may be developed.

CCFM SFM Criteria 4: Forest Ecosystem Contributions to Global Ecological Cycles

Maintain forest conditions and management activities that contribute to the health of global ecological cycles.

CSA SFM Element 4.1 Carbon Uptake and Storage

Maintain the processes that take carbon from the atmosphere and store it in forest ecosystems.

CSA SFM Element 4.2 Forest Land Conversion

Protect forestlands from deforestation or conversion to non-forests.



Canadian Council of Forest Ministers

Indicators

Forest Ecosystem Contributions to Global Ecological Cycles

Global ecological cycles are a complex of self-regulating processes responsible for recycling the earth's limited supply of water, carbon, nitrogen and other life-sustaining elements. The world's forests are critically dependent upon, and make substantial contributions to, these global processes.

Global ecological cycles are negatively impacted by fossil fuel combustion and associated toxic emissions. Forests make a major positive contribution to global cycles through the uptake and storage of carbon. The longevity of forest trees, the large area of standing trees and the relatively slow rate of decomposition characteristic of forest ecosystems make them particularly well adapted to long-term positive carbon balance. Conversely, conversion of forest lands to low biomass, short-lived standing crops with rapid turnover rates, or the permanent removal of forest cover degrade the land's capacity to absorb and store carbon. For these reasons forest management should promote sustained utilization and rejuvenation of forest ecosystems and protect them from widespread destruction by fire, pests and conversion to alternate land uses. Further, forest management should promote the manufacture of products that can act as long-term carbon pools and that have a low fossil fuel demand in their production.

4.1 Contributions to global carbon budget

Global ecological cycles are negatively affected by the accelerated release of CO₂ into the atmosphere. Carbon budgets that estimate the balance between carbon fixation and carbon release from natural forests and forest products provide a sensitive indicator of the nation's contribution to atmospheric carbon enrichment.

- 4.1.1 Tree biomass volumes
- 4.1.2 Vegetation (non-tree) biomass estimates
- 4.1.3 Percentage of canopy cover
- 4.1.4 Percentage of biomass volume by general forest type
- 4.1.5 Soil carbon pools
- 4.1.6 Soil carbon pool decay rates
- 4.1.7 Area of forest depletion
- 4.1.8 Forest wood product life cycles
- 4.1.9 Forest sector CO₂ emissions



4.2 Forest land conversion

Carbon budgets are sensitive to forest land conversions because replacement ecosystems usually have higher carbon turnover rates and lower storage capacity than forested lands. Irreversible forest removals have particularly negative and long-term impact on carbon budgets.⁹

4.2.1 Area of forest permanently converted to non-forest land use (for example, urbanization) (ref. 3.1.2)

4.2.2 Semi-permanent or temporary loss or gain of forest ecosystems (for example, grasslands, agriculture)

⁹ Canadian Council of Forest Ministers Criteria & Indicators (2003) www.ccfm.org



Example Indicators - Other Forest Companies

CCFM Criterion 4 – Forest Ecosystem Contributions to Global Ecological Cycles

CSA SFM Element 4.1 Carbon Uptake and Storage					
Company	Operation	Value	Objective	Indicator	Target
Teal Cedar Products Ltd. (Teal Jones Group)	Southwest Island Timberlands	Natural ecological cycles	Accelerate forest growth to maximize carbon absorption	Successful regeneration (average time required to reforest a cutblock)	Full compliance with regeneration delay requirements in approved stocking standards
	(TFL 46, TL T0910 and FL A52027)		Minimize negative impacts of harvesting on natural global ecological cycles	Percent of volume harvested converted to long term products (e.g., solid wood) versus short term products (e.g., pulp)	80% per year
Lillooet Timber Supply Area SFMP Proponents: 1) Ainsworth Engineered Canada L.P. 2) BC Timber Sales 3) Lytton Lumber Ltd. 4) The Teal-Jones Group	1) Lillooet Operation 2) Kamloops Business Area 3) Lytton Lumber Ltd. 4) Lillooet Logging Division	Storage of carbon in forest Ecosystems and forest products	The processes that remove and store carbon from the atmosphere are maintained	Percentage of Blocks where Free Growing Requirements are met / not met within the Legal Timeframes by Plan Proponent	100% to meet target – 0% not met.



CSA SFM Element 4.1 Carbon Uptake and Storage					
Company	Operation	Value	Objective	Indicator	Target
Weyerhaeuser	West Island Timberlands	Ecological cycles	Forest management activities are conducted in ways that maintain ecological cycles	Change in area of water bodies	Maintain current area of water bodies
				Number of units (as defined below) where inadequate old growth (as defined below) exists: A unit is: Variant within a landscape unit within the DFA that is greater than 250 hectares Inadequate is defined as: the provincial guidelines	Do no increase the number of units where inadequate old growth exists
		Carbon budget	Enhance the long term uptake & storage of carbon	Indicator to be determined based on Advisory education/information gathering	Increase the Advisory understanding of carbon budget factors
Western Forest Products Inc.	North Vancouver Island Region	Natural ecological cycles	Accelerate forest growth to maximize carbon absorption	Average time to reforestation	Average time to reforestation
Western Forest Products Inc.	North Vancouver Island Region	Natural ecological cycles	Accelerate forest growth to maximize carbon absorption	Percent of seed orchard seedlings planted	Percent of seed orchard seedlings planted
				Number of ha's broadcast fertilized	500 hectares (5 year avg.)



CSA SFM Element 4.1 Carbon Uptake and Storage					
Company	Operation	Value	Objective	Indicator	Target
Canadian Forest Products Ltd.	Englewood Division	Natural ecological cycles	Minimize negative impacts on natural global ecological cycles	Seral stage representation by LU and BEC variant	Achieve seral stage representation objectives ($\pm 10\%$) by LU and BEC variant as detailed in the SFM plan, within three rotations, with focus on old seral until January 2004. Review every 5 years
				Percent of area reforested	100% cutblocks are reforested and are regenerated with preferred and acceptable species as specified within SP's
				Percent cover old growth by Landscape Unit (LU) and Biogeoclimatic Ecosystem Classification (BEC) variant	Submit for government review, old growth management areas (OGMA's) ($\pm 10\%$ of targets outlined in Table 5) by LU and BEC variant by March 31, 2003



CCFM Criterion 4 - Forest Ecosystem Contributions to Global Ecological Cycles

CSA SFM Element 4.2 Forest Land Conversion					
Company	Operation	Value	Objective	Indicator	Target
Teal Cedar Products Ltd. (Teal Jones Group)	Southwest Island Timberlands	Forest Land	Minimize conversion of forests to other uses	Review and respond to proposals for conversion of forested lands to non-forest uses	Evaluate and respond to 100% of all formal proposals
	(TFL 46, TL T0910 and FL A52027)		Access structures are built and maintained for long term uses to support forest maintenance/ silviculture, fire protection, recreation while also protecting the soil resource	Compliance with soil conservation limitations (permanent access structures and soil disturbance)	Full compliance with permanent access and site disturbance limitations as specified within operational plans (or within legislation where not specified within the operational plan)
Lillooet Timber Supply Area SFMP Proponents: 1) Ainsworth Engineered Canada L.P. 2) BC Timber Sales 3) Lytton Lumber Ltd. 4) The Teal-Jones Group	1) Lillooet Operation 2) Kamloops Business Area 3) Lytton Lumber Ltd. 4) Lillooet Logging Division	Productive Forest Land	Minimal loss of productive forest land on the DFA	Percent of harvested area converted to permanent access by Plan Proponent	



CSA SFM Element 4.2 Forest Land Conversion					
Company	Operation	Value	Objective	Indicator	Target
Weyerhaeuser	West Island Timberlands	Forested land	There is no significant conversion of forested land to other uses without due public process	% productive forest area in the DFA converted to non-forest use	Limit conversion to non-forest use to <.001% per year
		Permanent access structures	Access structures are built and maintained for long term uses to support forest maintenance/silviculture, fire protection, recreation while also protecting the soil resource	Annual percent of opening areas in access structures	≤ 7% opening areas in access structures
		Rare, endangered or under represented features	Rare, endangered or otherwise significant features are identified and their important qualities are protected	The number of rare endangered or otherwise significant features destroyed by harvest activity	Zero rare endangered or otherwise significant features destroyed by harvest activity
Western Forest Products Inc.	North Vancouver Island Region	Sustainable forest on a dedicated forest land base	Minimize conversion of forests to other uses	ha of land base withdrawn from forestry uses (utilized for external industrial use)	Evaluate and respond to 100% of all formal requests
Western Forest Products Inc.	North Vancouver Island Region	Sustainable forest on a dedicated forest land base	Ensure forests are promptly regenerated on harvested and disturbed sites	Average time to reforestation	Average time to reforestation



CSA SFM Element 4.2 Forest Land Conversion					
Company	Operation	Value	Objective	Indicator	Target
Canadian Forest Products Ltd.	Englewood Division	Protection of the forest land base	Maintain the forest land base	Percent of cutblocks at or below site degradation specifications identified in SP's	100% ($\pm 1\%$) of cutblocks in compliance with site degradation objectives specified in SP's
			Minimize impacts of other forest developments where possible	Documented communications with non-forest developers on the DFA	In all referrals that have potential to remove significant land from the DFA, stress the minimization of losses to the forest land base
			Ensure that forests are regenerated on harvested and disturbed sites	Percent of area reforested	100% cutblocks are reforested and are regenerated with preferred and acceptable species as specified within SP's



Draft Target and Indicators for the DFA (for Fraser PAG consideration):

CCFM Criterion 4 – Forest Ecosystem Contributions to Global Ecological Cycles

CSA SFM Element 4.1 Carbon Uptake and Storage				
Value	Objective	Indicator	Target	Variance
Natural ecological cycles	Accelerate forest growth to maximize carbon absorption	Average time to reforestation	Average time to reforestation is less than 2 years from completion of harvesting activities	1 year
	Minimize negative impacts of harvesting on natural global ecological cycles	Percent of area reforested	100% cutblocks are reforested	Zero



CSA SFM Element 4.2 Forest Land Conversion				
Value	Objective	Indicator	Target	Variance
Forest Land	There is no significant conversion of forested land to other uses without due public process	Productive forest area in the DFA converted to non-forest use	Evaluate and respond to 100% of all formal requests	Zero
	Access structures are built and maintained for long term uses to support forest maintenance/silviculture, fire protection, recreation while also protecting the soil resource	Annual percent of opening areas in access structures	≤ 7 % opening areas in access structures	+/- 0.5%