POLLUTION PROBE

CLEAN AIR. CLEAN WATER.

FOREST CARBON MANAGEMENT (FCM) PILOTS SERIES

FCM PROTOCOL TEMPLATE

and

GUIDANCE FOR PROJECT DEVELOPMENT

July 14, 2004

Pollution Probe Forest Carbon Management (FCM) Pilots Series

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Preface

Canada's preliminary estimate of the contribution that Forest Carbon Management (FCM) will make to its Kyoto Protocol commitments is that forests will sequester 20 Mt CO_2 equivalent per year from 2008-2012. This is determined by projecting the net impacts of all "business as usual" forest-based activities eligible under the Kyoto Protocol on lands likely to be selected by Canada for national reporting. Under the rules of the Kyoto Protocol, Canada is allowed to claim a maximum of 44 Mt CO_2e/yr from forest-related activities during 2008-2012. The difference between the estimate and this cap, or 24 Mt CO_2e/yr, is the potential for FCM projects in Canada that go beyond "business as usual" and it is only these incremental or "additional" activities that can generate forest-based carbon credits which may be traded in the proposed Offset Trading System. Currently, the federal government estimates that FCM projects can generate more than 4 Mt CO_2e/yr by 2010. At $15/tonne, the carbon credits created by these projects would be worth over $60 million. The opportunity for FCM projects in Canada is thus significant.

To raise awareness and understanding of this opportunity and stimulate action, Pollution Probe convened a national series of five progressive workshops on Forest Carbon Management (FCM) over the period November 2001 to March 2002. These workshops were intended to improve understanding of FCM within Canada and to identify associated opportunities and the policies and infrastructure necessary to capitalize on them effectively. Over 200 individuals representing federal, provincial and municipal governments, the forest products industry, other "large final emitters", ENGOs, academia, brokers, traders and consultants participated in the series. The final report of the workshop series is available at www.pollutionprobe.org/whatwedo/Kyoto.htm.

One recommendation arising from the FCM Workshop series was that Canada should obtain more experience and learning in implementing FCM on the ground. With that in mind, the FCM Pilots series was conceived to bring together practitioners who were conducting activities eligible under the Kyoto Protocol with those involved in developing the rules for offset trading to develop a standard protocol for measurement and monitoring of carbon and contribute to increased certainty in the creation of carbon credits through FCM activities. The *FCM Protocol Template and Guidance for Project Development* contributes to both of these objectives and has been developed through direct interaction among participants in the FCM Pilots series, largely through four workshops held between January 2003 and March 2004. It provides FCM proponents with sufficient generic information and guidance to enable them to identify, design, develop and implement projects that are compatible with the rules for offset trading currently in development.

While those participants in this project who are undertaking FCM work are referred to as "FCM Pilots", the work of piloting the FCM Protocol Template is yet to be done. The intent of the project was to first engage practitioners In the development of a protocol that reflected project-level realities and to then engage those practitioners in the implementation of the protocol to further refine its requirements. This is thus a living document that can be enhanced over time to reflect the progress in developing Canada's Offset Trading System and the learnings gained through applying the protocol in practice.

The Forest Carbon Management Protocol Template

Articles 3.3 and 3.4 of the Kyoto Protocol enable a wide range of Forest Carbon Management (FCM) projects, including afforestation / reforestation (AR), avoided deforestation (D), and forest management (FM) activities that either enhance carbon sequestration or reduce / avoid greenhouse gas emissions. Figure 1 provides more detailed examples of eligible FCM activities. This protocol template can be adapted to all forms of FCM. It assumes that proponents will be initiating projects intended to create carbon offset credits during the first commitment period of the Kyoto Protocol (2008-2012) and beyond either for application toward any emission reductions target assigned to the proponent or to be entered into the national Offset Trading System. It draws from existing literature in Canada and internationally to ensure that the FCM Protocol Template is consistent with emerging international requirements in this area. In particular, this document complements the *Good Practice Guidance for Land Use, Land Use Change and Forestry* of the Intergovernmental Panel on Climate Change.

Figure 1: Eligible FCM Activities

Forest Management (FM) projects either increase carbon storage or reduce carbon emissions from a site in the managed forest. Eligible activities may include:

- adjustment of harvesting frequency and/or rotation length;
- enhanced or increased intensity of fire/disease/pest protection;
- implementation of density management and commercial thinning regimes;
- reclamation of degraded areas;
- increased use of genetically improved stock;
- selecting species that are disease-resistant, contain more carbon, or are capable of producing greater quantities of biomass;
- enrichment planting to improve stocking of existing stands; and
- maximizing productivity of the stand by more carefully matching appropriate species to site and micro-site and/or planting frost-resistant species.

Deforestation (D) projects reduce or prevent the permanent removal of land from forest cover. Activities may include:

- purchasing/leasing land threatened with deforestation;
- reducing the size or impact of corridors (e.g., by narrowing seismic lines or reducing road construction); and
- establishing protected areas.

Afforestation / Reforestation (AR) projects return land to forest cover that was not forested on December 31, 1989. Eligible activities include:

- planting trees on land that has not sufficiently regenerated;
- planting trees on land that has been converted to non-forest use (e.g., abandoned roads and rights-of-way); and
- establishing plantations on agricultural land or other lands not part of the forest estate.

The protocol is also informed by current federal government efforts to formulate rules governing the design of its proposed Offset Trading System. One of the purposes of the FCM Pilots series is to influence the ongoing federal process and consultations on the design of the offset system are still underway. Reference is made throughout to the federal government's *Offset System Discussion Paper* (www.climatechange.gc.ca/english/publications/offsets/pdf/consultationsE.pdf) when that document provides guidance or suggests options for certain aspects of FCM project development, and also to a presentation made to the National Forests Sinks Committee by the federal Offsets Working Group (www.climatechange.gc.ca/english/offsets/) which reflects the most recent thinking on the design of the OTS. Figure 2 shows minimum eligibility requirements for an FCM project, based on current thinking regarding the design of the offset system, which are elaborated in subsequent sections.

Figure 2: Basic Eligibility Requirements for FCM Projects

- According to the Kyoto Protocol, eligible ARD activities must have started on or after 1 January, 1990 and FM activities must have taken place since 1 January, 1990, with a credible start date defined. The federal government is currently proposing a start date for all offset initiatives of no earlier than January 1, 2002;
- project proponents must be able to account for the five main forest carbon pools
    - aboveground biomass
    - belowground biomass
    - litter
    - dead wood, and
    - soil organic carbon

    or ensure that carbon pools that are not accounted for are not net sources of GHG emissions;
- only carbon that is incremental to a business as usual scenario (i.e. what would have happened in the absence of the project) can be claimed for credit; and
- the proponent of the FCM project should be able to clearly demonstrate the ownership of any carbon credits produced through project activities.

In general, the objective of an FCM project is to reduce net emissions of carbon to the atmosphere from the project site (by, for example, reducing deforestation) or to increase carbon removals from the atmosphere on the project site (for example, by establishing fast-growing plantations) compared to what would have happened in the absence of the project. The result of these activities is a carbon credit, or offset, which may be retained by the project proponent or traded in the Offset Trading System. To avoid confusion with the wide range of terminology in use, this report will refer to greenhouse gas (GHG) *emissions* and *removals* resulting in *carbon credits* or *offsets* throughout.

The federal government proposes to issue two types of credits in the Offset Trading System: temporary and permanent credits. In the case of temporary credits, the federal government proposes that these would represent the storage of 1 tonne of CO_2e for one year. At the end of the year, the buyer would be required to replace the temporary credit. In contrast, a permanent credit represents the permanent storage of 1 tonne of CO_2e. If the sink becomes reversed once the credit is issued, it is proposed that the liability be shared by the project proponent and the government.

The body of this document describes the steps that an FCM proponent needs to undertake in developing a project with interpretation of the key issues that must be addressed at each stage. Where appropriate, specific supplementary guidance is provided for AR, D and FM projects. As this document is intended to be a contribution to the development of methodologies and rules governing FCM projects, none of the methodologies described herein should be considered final and project proponents are free to propose their own project-specific methodologies and approaches as long as they are compatible with the general requirements of the FCM Protocol Template. Appendix I sets out the FCM Protocol Template itself, which indicates the format in which a project submission should be made. The sections in the main text correspond to section headings in Appendix I.

Section A — Proponent Identification

The proponent of an FCM project can be a single entity (eg., a forest company) or a group of entities who come together for the purposes of the project (eg., a cooperative of private woodlot owners). A primary contact for the project should be identified. It is also important to ensure that the consent of all of those parties necessary to enable a project to proceed has been obtained and their cooperation secured where necessary. This is of particular importance in situations in which the ownership of resulting carbon credits may need to be negotiated among parties (e.g., in a situation where investors fund a project manager to undertake activities on land leased from a third party).

FCM proponents will first need to generate a project idea (PI), which is a general characterization of activities and locations that constitute a viable FCM project. For example, PI can be formulated as: “afforestation of unused agricultural land near settlement A with fast growing species B”; or “prevention of logging of a forest tract C owned by a company D”. In order to allow for greater flexibility in designing an effective FCM project it may be advantageous to consider several alternative locations for the same project activity.

Section B — General Project Description

B.1 Project Title

For ease of reference, the title should incorporate the name of the proponent, the activity to be undertaken, and the geographical area in which it takes place (e.g., Company X’s afforestation project in northeastern Saskatchewan).

B.2 Project Description

Proponents should provide a summary of what they propose to do, the elements of which will be expanded upon in later sections. This should include a description of the activities to be undertaken, the location(s) in which they will take place, when the project will start or started, and its projected impact on GHG emissions or removals.

B.3 Extent of the Project

This is a summary of the geographic and temporal extent of an FCM project and its impact on greenhouse gas emissions.

B.3.1 Project Border

A geographic/physical border of the project must be established. The delineation of the project border limits the area that will be subjected to project activities.

FM	As FM activities may be subject to direct internal leakage (see Section E.1), it is recommended that FM projects be undertaken at the estate level (e.g., include all lands managed by a project proponent) unless there is ample evidence that additional carbon storage at the project site is not accompanied by increased emissions at other sites controlled by the same entity.

ARD	It is highly unlikely that individual landowners will be undertaking ARD projects of sufficient size to enable them to participate directly in the Offset Trading System. Small projects will also face barriers in addressing the transaction costs (administration, monitoring, verification, etc.) of generating carbon credits and in dealing with issues such as leakage. For those reasons, one recommended approach is for small projects to aggregate into pools within a region providing economies of scale in allocating transaction costs and assisting individual participants to better address the requirements of the FCM Protocol Template.

B.3.2 Site Description

Proponents should develop a complete description of the characteristics of the site(s) on which the proposed activities will be undertaken. This will be of particular importance when the activity involves a change of land use (e.g., afforestation of marginal agricultural lands).

B.3.3 Project Lifetime

The project lifetime needs to be considered from two perspectives. One factor in its determination is the period of time during which the FCM proponent is willing and/or has the capability to control and support proposed project activities and can thus accept responsibility for the project. The other is the period of time during which project activities can predictably affect carbon fluxes within the project boundary. These are also factors in the determination of whether the project will generate permanent or temporary credits. According to current federal government thinking, no FCM project can be initiated before January 1, 2002.

B.3.4 Project Boundary

Unlike the project border, this refers to the domain or sphere of influence of the project rather than its geographical extent. It includes all GHG fluxes directly controlled by the project activities; for example, the UNFCCC COP7 decision states that the project boundary “shall encompass all anthropogenic emissions by sources of greenhouse gases under the control of the project participants that are significant and reasonably attributable to the (CDM or JI) project activity”(UNFCCC, 2002).

The boundary of a specific FCM project is dictated by proposed project activities. This boundary accounts for all GHG fluxes (emissions or removals) affected by these activities and which are under the control of the project proponent. For example, an afforestation project boundary might include GHG emissions from project site preparation and tree planting as well as carbon removals by growing trees. Only those GHG fluxes that (1) directly result from project activities and (2) can be predictably controlled by changing the extent or level of these activities fall within the project boundary. GHG fluxes that are indirect effects of project activities (e.g., market effects of changes in timber supply) are not included within the project boundary as they constitute leakage (see Section E.1).

B.3.5 Eligibility for Offset Trading System (OTS)

In addition to the requirements of the Kyoto Protocol, FCM projects must also meet the eligibility requirements for the Offset Trading System if the carbon they generate is to be traded. While those eligibility requirements are still being developed, it is likely that FCM projects will need to satisfy the following criteria drawn from the requirements of the Pilot Emissions Reduction, Removals and Learnings (PERRL) program of Environment Canada. Emission removals must be:

- **real** and result in an increase in carbon on site due to a specific, identifiable action or undertaking;
- **measurable** by quantifying the actual carbon storage on the site in contrast with the baseline scenario;
- **verifiable** through an accurate, transparent and replicable methodology for calculating carbon with raw data being available;
- **surplus** in that the activity is not required through, for example, legal or regulatory requirements and there will therefore be no “double counting”; and
- **incremental**, in that the activity must have an acceptable defined start date on which it departed from business as usual.

Further, current federal government thinking suggests that emission removals must also be **unique** in that they can only be credited once under the OTS. Although the Offset Trading System is still in development, Figure 3 summarizes the process that FCM projects will likely need to go through in order to be eligible to participate.

Figure 3: Description of Likely Offset Trading System Cycle

1. Project Development - by project proponent
2. Project Documentation and Review
    - project protocol submitted for ex-ante validation
    - review of project (Review Team)
    - approval by OTS Program Authority
    - registration of project protocol (as early as 2005/6)
    - re-registration on January 1, 2013 and every five years thereafter
3. Emission Reduction / Sequestration
    - ex-post measurement and monitoring by proponent
    - verification report (by an independent third-party)
    - review and certification by OTS
    - issuance of credits by OTS Program Authority
4. Trading - by market participants

Section C — Determination of Baseline GHG Emissions / Removals

Once the boundary of a proposed FCM project is described, proponents need to develop a baseline scenario using one of the suggested baseline methods and GHG estimation approaches outlined in this section or an equivalent. Current thinking in the development of Canada's Offset Trading System states that the baseline is a scenario that reasonably represents the anthropogenic GHG emissions by sources and removals by sinks that would occur in 2008-2012 in the absence of the project activity. For FCM projects, this will be assessed on a project-by-project basis. "Business as usual" is suggested to be the activities, emissions or removals that would occur in the absence of the proposed offset project. It follows that the baseline for an FCM project and business as usual are closely related.

Canada's preliminary national baseline scenario estimates that forests will sequester 20 Mt CO_2e/year from 2008-2012, which will be used by Canada to meet its Kyoto commitments. The national baseline scenario is estimated by projecting the net impacts of all "business as usual" forest-based activities eligible under the Kyoto Protocol on lands likely to be selected by Canada for national reporting (ARD must be reported while the area of FM activities to be used in the calculations, if any, is up to the reporting country). Canada is allowed to claim a maximum of 44 Mt CO_2e/yr from forest-related activities during 2008-2012. The difference between the baseline and this cap, or 24 Mt CO_2e/yr, is the estimated potential for FCM projects in Canada that go beyond "business as usual" and it is only these incremental or "additional" activities that can generate forest-based carbon credits which may be traded. The ability to establish a credible baseline is thus critical to the legitimacy of FCM projects.

It is recommended that the development of a baseline scenario and estimation of GHG fluxes for this scenario be accomplished without direct reference to the proposed project activities and project-related GHG benefits (e.g., the volume of tradable offsets that can be generated). Such a decoupling of baseline and project scenarios will lead to a more realistic baseline and, hence, to a more convincing FCM project. For example, a proposed project may consist of measures to avoid deforestation of a specific tract of forested land (this may include long-term leasing of land; fencing; etc.). In this case, the simultaneous development of baseline and project scenarios by the same group of experts may result in a baseline that automatically assumes complete deforestation and disregards all contradicting evidence. On the other hand, an independent baseline study might conclude (using all available data and evidence) that partial or no deforestation is the most likely future for the selected project site and there is thus less potential to create credits through the proposed activity. In the latter case, project developers may then choose a different project site where the threat of deforestation is more imminent or may make a more realistic estimate of the amount of emissions that can be reduced on the original site.

C.1 Description of the Baseline Scenario

A credible baseline scenario for FCM projects is required for quantifying GHG emissions reductions and/or increases in removals that result from additional activities in order to generate credits that can be traded within the Offset Trading System. FCM proponents need to provide a detailed description of the activities that would most likely be carried out on the site under a business as usual scenario and calculate the impacts of these activities on carbon stock changes on the site (see Section C.3). Further, the federal government has also indicated that activities that are undertaken to comply with other mechanisms for addressing climate change will be ineligible for credit and must be included in the baseline scenario. Section C.2 describes several different methods of establishing a baseline. No matter which one is chosen, the baseline scenario must thus include emissions reductions or removals required by site-specific regulation/operating certificates or those resulting directly from government-sponsored climate change mitigation measures and policies.

FM In developing the baseline scenario, proponents of FM projects need to consider:

- federal and provincial regulatory requirements and their local interpretation;
- common practices among industry or landowners in the region where the project is located;
- requirements of other government-sponsored climate change mitigation measures and policies;
- a credible methodology for estimating the average effects of fire, insects and other disturbances; and
- credible estimates of future human-induced disturbances (e.g., harvesting, road construction).

ARD Project baselines need to estimate all carbon pools including above- and below-ground woody and non-woody vegetation and soil that would occur on the site if the land conversion actually happened (D) or did not happen (AR) (eg. the average carbon storage in agricultural crops and soil when forests are likely to be converted to or from agricultural land). For pool estimation, there are two caveats - the pool must actually exist and the quantity of carbon in the pool must be significant (see Figure 4). In the case of D, there should also be a realistic estimate of when the deforestation would actually have occurred (e.g., total deforestation can not be assumed in Year One where progressive deforestation over five years better reflects expected land use conversion).

The baseline scenario also needs to reflect:

- federal and provincial regulatory requirements and their local interpretation;
- common practices among industry or landowners in the region where the project is located; and
- requirements of other government-sponsored climate change mitigation measures and policies.

C.2 Selection of Methodology for Calculating the Baseline Scenario

As stated, an objective and comprehensive baseline study is the most important element in designing an FCM project as it sets the stage for an unbiased evaluation of the project's effectiveness and can lead to substantial changes in the initial project design. These may include additional project activities, changes in the project location, and adjustments to the project lifetime.

Baselines for FCM projects should include all GHG emissions and carbon pools that can potentially be affected by project activities (see Figure 4). Any carbon pools that are not included in accounting must be shown to not be net sources of GHG emissions. Methods of quantifying GHG emissions in the baseline scenario are discussed in Section C.3.

Prior to quantifying baseline GHG emissions or reductions, FCM proponents must determine the approach to identifying a baseline scenario that is most appropriate to the proposed FCM project. The federal government's *Offset System Discussion Paper* suggests several ways of establishing the baseline for an FCM project, including:

1. *Control Group:* designation of a control site next to the project site, which will be subject to business as usual activities. The control sites have to be similar to the project sites in terms of the major human activities, biophysical features and expected impacts on carbon stocks and GHG emissions.

2. *Site-Specific Forward-Looking Scenarios:* project-specific projections of the most likely future development based on current technological, economic, and environmental factors and existing management plans.

3. *Region-Specific Forward-Looking Scenarios:* region-specific projections of the most likely future development based on general technological, economic, and environmental factors.

Figure 4: Estimation of Carbon Pools

FCM proponents must account for carbon in all forest pools (or ensure that those carbon pools that are not accounted for are not net sources of GHG emissions), including:

- aboveground biomass;
- belowground biomass;
- litter;
- dead wood; and
- soil organic carbon.

In practice, measurement of some carbon pools on the site may be difficult or costly. The IPCC *Good Practice Guidance for Land Use, Land Use Change and Forestry* suggest that any pool that is expected to contribute more than 5% of the total CO_2e emissions from the site must be measured. Where there are defensible grounds to believe that a pool is smaller than this (i.e. through research conducted on similar sites) the pool may be estimated or ignored.

Pools that are expected to increase as a result of FCM project activities do not need to be included in calculations provided that the proponent does not wish to claim credit for those increases. In this case, for example, credits may be issued for 90% of the actual increase in carbon stock change on the site as the cost of measuring and verifying the additional 10% may be prohibitive.

The Control Group method (1) is an example of a *dynamic* baseline as the baseline can be changed after the project start date as new data becomes available. In this case, GHG emissions resulting from the FCM project are compared against the actual performance of a comparable site subject to business as usual activities. The Control Group method can only be used after the actual project is initiated and the control site is established. As most FCM proponents will want to estimate project effects before actually initiating the project, they will have to utilize either baseline methods 2 or 3 in their planning. In most cases, the Control Group method will provide a more accurate and realistic estimate of the additional carbon sequestered as a result of the project than one based on modeling. On the other hand, the lands set aside for the Control Group could otherwise be incorporated into the FCM project reducing the total amount of carbon offsets.

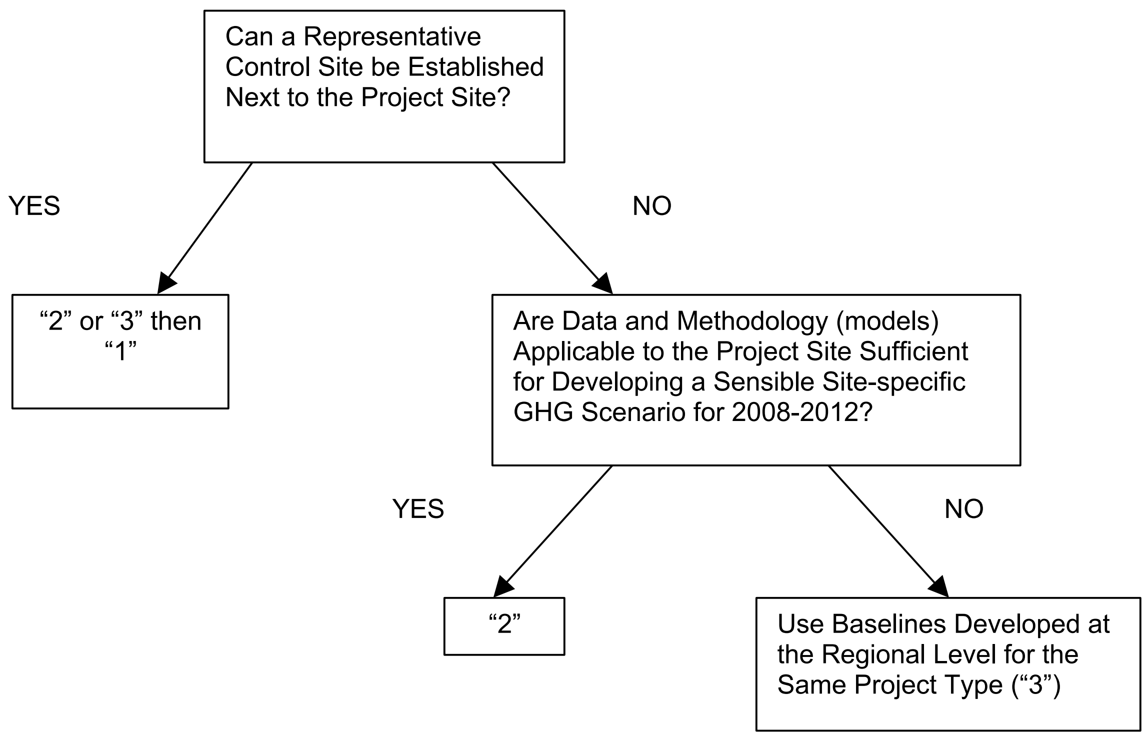
The forward-looking scenarios (2 and 3) are examples of *static* baselines in that they are fixed from the project start to the end of its lifetime based on assumptions about the extent and impacts of future business as usual activities on the site. These baselines can be employed in situations where the establishment of a Control Group is not feasible. If an FCM proponent opts for site- (2) or region-specific (3) forward-looking scenarios, the Control

Group method (1) may also be employed once the project is approved and project activities begin. This allows the assumptions built in to the estimates to be tested against on-the-ground performance and adjustments made accordingly. If the Control Group method cannot be employed (no control site is available), the static baselines estimated using forward-looking methods remain after the project initiation. A decision tree that can be used as guidance for selecting a baseline method for various project types and data is presented in Figure 5.

FM	Baselines for FM projects can be either dynamic or static. A dynamic baseline should be supported by a Control Group baseline method, which uses a control site next to the project site to substantiate offsets generated by the project. The control site should be similar in every respect to the project site, but unlike the project site should not be subject to the proposed FM activities. Where establishment of a control site is not possible, the FM project can rely on baseline methods involving Site-Specific or Region-Specific Forward-Looking Scenarios. Site-Specific scenarios are more applicable when a project site is very different from the surrounding territory. Region-Specific Forward-Looking scenarios can be used for fairly uniform regions where common assumptions can be made about forest growth and harvesting profiles.

ARD	Baselines for ARD projects can be either dynamic or static. A dynamic baseline should be supported by a Control Group baseline method, which uses a control site next to the project site to substantiate offsets generated by the project. The control site should be similar in every respect to the project site, but unlike the project site should not be subject to ARD activities. For example, if a tract of forest is slated to be deforested for certain development goals, one part of this tract can become a D project (by implementing measures to prevent deforestation, such as reducing a corridor width compared to customary practices) with the area that is actually subject to deforestation used as a control site for baseline substantiation. Where establishment of a control site is not possible, ARD projects can rely on baseline methods involving Site-Specific or Region-Specific Forward-Looking Scenarios. Site-Specific scenarios are more applicable when deforestation is likely to happen due to local interventions, not associated with a broader regional pattern (e.g., road construction). On the other hand, if such pattern exists (e.g., massive land clearing for agricultural or housing purposes) Region-Specific Forward Looking scenarios can be applied.

Figure 5: Decision Tree for Selecting a Baseline Method



C.3 Estimation of GHG Emissions / Removals in the Baseline Scenario (must include 2008-2012 period)

All GHG emissions and removals within the project boundary must be quantified and reflected in both the baseline and project scenarios (See Section D). The processes leading to these emissions and removals include, but are not limited to:

- carbon removals (sequestration) resulting from forest growth;
- carbon emissions resulting from forest harvest and natural disturbance (with all harvested biomass counted as an emission); and
- GHG emissions during forest planting, maintenance and harvesting operations (from fossil fuel use, soil preparation, fertilizer application, etc.).

> (**Note**: Although carbon storage in durable wood products will not be credited under the first Kyoto Protocol compliance period, it is recommended to keep track of project-related carbon storage in harvested products, which might be credited under the second and consecutive compliance periods.)

Specific methods for estimating emissions and removals from forest growth, harvest and disturbance are outlined below. Baseline and project scenarios for a given FCM project should be quantified using a method that is best suited to the specific project circumstances, given data and resource limitations. GHG emissions from forest operations within the project boundary should be estimated using the default IPCC methodology (IPCC, 1996 and 2000) and incorporated in the baseline and project scenarios.

The following approaches can be used to estimate carbon sequestration in baseline and project scenarios:

- Extrapolation of Historic Records
- Growth and Yield Models (GYMs)
- Carbon Accounting Models (CAMs)

This estimation is different from the direct measurement of carbon sequestration on sample plots, which can be part of monitoring project results and/or generating a dynamic baseline using the Control Groups approach. In general, any of the three carbon estimation approaches can be used in combination with both forward-looking baseline methods ("2" and "3") outlined in Section C.2

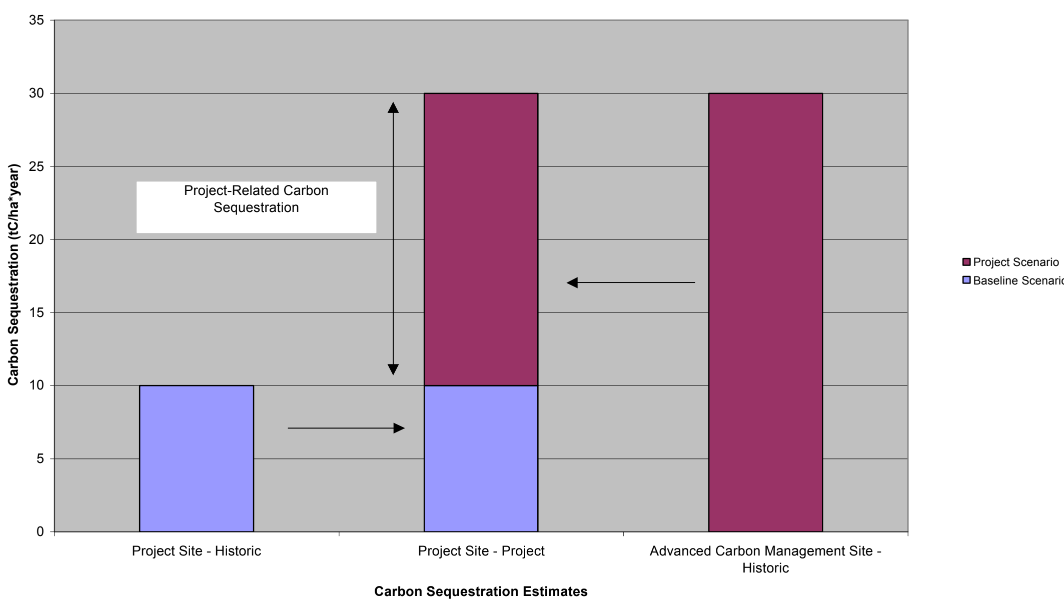
Extrapolation of Historic Records

This approach is based on previous forest inventories conducted at the proposed project site and/or sites with similar environmental conditions and forest composition. Results of these inventories can be used to estimate total forest carbon stock based on site- and age-specific expansion and conversion factors and ratios. The difference between carbon stocks measured in different years can be used to estimate historic annual carbon emissions or removals within the proposed project boundary. This value can be used as a proxy for future carbon emissions or removals in the baseline or project scenarios.

If the historic records were taken at the proposed project site, carbon emissions / removals estimated from these records may become baseline emission / removals. In this case, the FCM project should include activities or practices that would reduce carbon emissions or enhance carbon removals with respect to the situation before the project.

Carbon emissions and removals in the project scenario can also be estimated based on historic records, but these records should be obtained from another site with similar environmental conditions and forest composition but more advanced carbon management practices - the same practices that are proposed as part of the project scenario (Figure 6).

Figure 6: Examples of Using Historic Data for Baseline and Project Scenarios.



The advantages of the extrapolation approach include its relative simplicity (if previous inventory records are available) and clarity to outside evaluators and verifiers. Its disadvantages are associated with a questionable premise that future emissions / removals will be the same as those in the past. If this approach is selected, the project proponent should provide ample evidence that given all the environmental and management variability future emissions / removals can be reasonably well extrapolated from the past records, without major adjustments or the use of various modeling approaches.

Growth and Yield Models (GYM)

Growth and yield models are widely used for developing merchantable timber projections and can be adapted to projecting carbon fluxes by using appropriate coefficients and ratios. GYMs are frequently based on and/or validated using results of past forest inventories. The difference between using GYMs and direct extrapolation of historic records is the ability of the former to account for current age-species structure of the project site and to include changes in the management regime. For example, if a forest company introduced a new genetic variation of seedlings two years ago, this change could be captured by a site-specific GYM (after incorporation of new growth parameters), but not by historic inventories conducted before the seedlings were planted.

It is a common practice to have GYMs parameterized and calibrated based on field data from a specific forest region. Consequently, a region-specific GYM can be used to generate not only site-specific baseline scenarios (baseline method “2”), but also scenarios for an entire region (baseline method “3”).

Carbon Accounting Models (CAMs)

Carbon accounting models are specifically built to simulate primary and secondary forest carbon fluxes at a stand or landscape level. CAMs can directly track major forest carbon pools (e.g., aboveground, below ground, soil) and reflect changes in management and disturbance regimes. One example of CAMs is the Carbon Budget Model of the Canadian Forest Sector (CBM-CFS2), which has been specifically developed by the Canadian Forest Service to monitor past forest carbon stocks and changes in carbon stocks and to predict future carbon stocks and changes in carbon stocks through scenario and risk analyses (http://carbon.cfs.nrcan.gc.ca/cbm-cfs2_e.html).

Similar to GYMs, CAMs should be properly parameterized and calibrated for developing project-level carbon flux trajectories in baseline and project scenarios.

D

In a general case, offsets generated by D projects are equal to the difference between emissions from deforestation in the baseline scenario and zero emissions or even some certain removals (negative emissions) in the project scenario.

The GHG emissions and removals in the D baseline scenario may include:
- carbon losses from the conversion of forest land into non-forest land;
- GHG emissions from biomass burning and fossil fuel used during the deforestation process; and
- carbon removals after the land is converted (e.g., carbon accumulation at agricultural lands)

The GHG emissions and removals in the D project scenario may include:
- carbon accumulation/loss at a protected forest site; and
- GHG emissions from activities to avoid deforestation (including activities to provide alternatives to deforestation).

Carbon fluxes associated with the conversion of forest into non-forest land can be estimated based on the default IPCC approach, which is based on average carbon content in different pools in a forest (before deforestation) and on land that replaces forest (e.g., agricultural land). The carbon trajectory following deforestation depends on the type of land use that replaces forest. Carbon content in forests subject to deforestation may also be estimated based on existing forest inventories and region-specific expansion and conversion factors. Carbon content associated with post-deforestation land uses may also be based on previous samples and field studies performed in similar environmental conditions.

Section D — Determination of FCM Project GHG Emissions / Removals

D.1 Description of the Project Scenario

The project scenario consists of a detailed qualitative and quantitative description of project activities and corresponding GHG emissions/removals. As the project scenario is developed after the baseline scenario, project proponents can modify the initial set of activities (as specified in Project Idea) and other project parameters (e.g., boundary, lifetime, border) to enhance the project's performance relative to the baseline scenario. The key to developing a robust project scenario is to ensure that all project activities or the level of these activities are additional to what is included in the baseline scenario (which will ensure the additionality of project related GHG emissions reductions or removals).

FM	Unlike ARD projects, FM projects are not based on complete changes in land cover in the project and baseline scenarios. Carbon offsets generated by FM projects result from incremental changes in the average carbon content at the project site relative to the baseline situation. As the land where FM projects are implemented remains under intensive management, including logging, thinning, re-planting, etc., it is very important that the project scenario includes highly discernible activities over and above the baseline scenario.

One major issue yet to be resolved in the development of the Offset Trading System is the eligible start date for a project. The *Offset System Discussion Paper* states "to ensure that the emission reductions/removals go beyond the national BAU baseline, only projects initiated after a specified 'start date' will be eligible". Currently, the federal government is proposing the earliest start date for all offset projects to be January 1, 2002. Proponents must thus provide a credible definition of what constitutes the start of their project with that restriction. The selection of the project starting date is straightforward for projects that will be initiated at some point in the future. It can be, for example, the official project registration (once a mechanism for this is established) or when the actual management activities commence. On the other hand, some proponents may wish to develop projects in which some or all of the activities have already been initiated and are expected to generate offsets during the 2008-2012 compliance period of the Kyoto Protocol. The start date for such projects has to coincide with some distinct moment in the past, when (according to verifiable information) the project scenario departed from the baseline scenario, thus ensuring that GHG reductions generated by the project do indeed go beyond business as usual. FCM project proponents will need to defend their selection of a project start date and indicate how their proposed activities differ from business as usual or the baseline selected.

D.2 Estimation of GHG Emissions / Removals in the Project Scenario (must include 2008-2012 period)

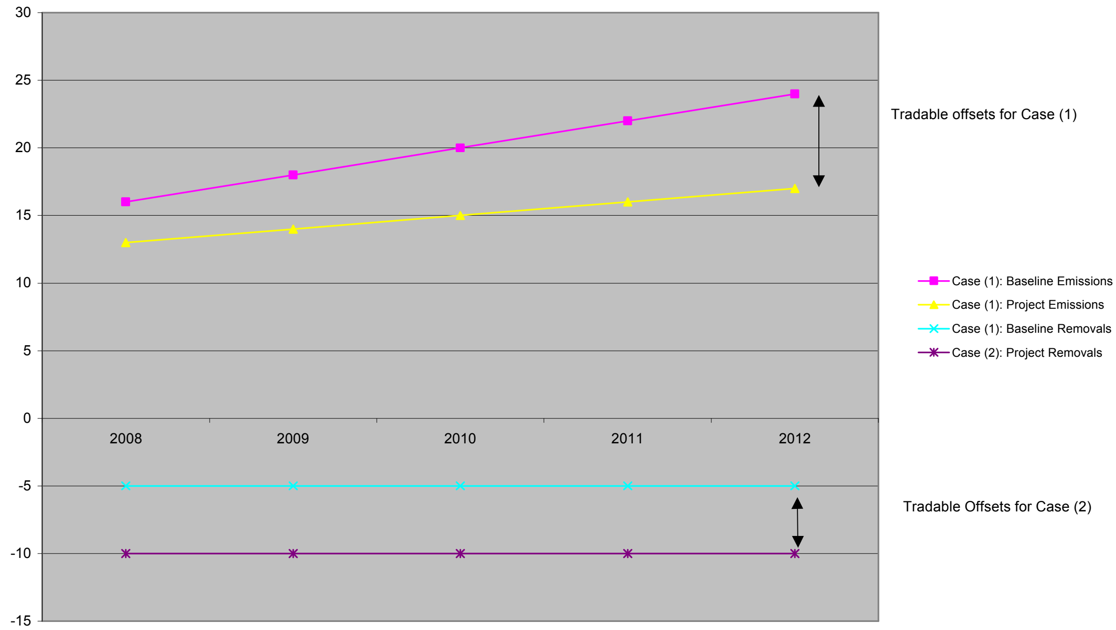
Emission offsets generated by an FCM project are equal to the difference between emissions or removals in the baseline and project scenarios (see Figure 7). An FCM project can generate tradable offsets only if during the compliance period (2008-2012):

- its net baseline emissions exceed net project emissions; or
- its baseline removals are lower than project removals.

FCM project proponents should be prepared to demonstrate the changes in all carbon pools that are expected to occur during the project lifetime as compared to the baseline scenario, with particular attention to the period 2008-2012. It will be important to document thoroughly both the baseline and project scenarios and to identify the supporting information upon which assumptions are based for use in the verification process (see Section G).

The methodology employed to estimate emissions in the project scenario should be consistent with that used to develop the baseline scenario.

Figure 7: Examples of Offsets Generated by FCM Projects.



D.3 Key Uncertainties in Estimates of GHG Emissions / Removals

FCM proponents should include a summary of the assumptions made in calculating the GHG emissions / removals that are expected to result from the project. In particular, any uncertainties that could materially affect projected GHG emissions / removals should be identified. These uncertainties should be reflected in the project's risk management plan (see Section H). Erring on the side of conservative estimates of GHG removals through an FCM project is one way in which to manage risk. As the extent of measurement and monitoring increases, the precision of estimates also increases but at some point the added cost of measurement and monitoring outweighs the benefits of increased precision. According to the IPCC *Good Practice Guidance for Land Use, Land Use Change and Forestry*, it is recommended to do a Reliable Minimum Estimate calculation for the soil carbon pool, for example. In this way, FCM proponents are less likely to commit to generating credits that they may be unable to produce, reducing risk.

Section E — Leakage and Calculation of Project-Related Offsets

While the difference between the project scenario and the baseline scenario determines the carbon offset provided by the FCM project, this estimate must be further refined to correct for potential problems arising from leakage. Leakage is defined as changes in GHG emissions and/or removals occurring outside the project boundary that result from project activities, and it can be positive or negative.

E.1 Identifying the Potential for Leakage

Leakage can either result directly from specific FCM project activities or can be caused by incremental changes in local, regional, or national markets (indirect leakage).

Direct Internal Leakage

Direct leakage is caused by actions that are verifiable consequences of FCM project activities and occur at a specific location over an identifiable period of time. Direct leakage can be both internal and external.

Direct internal leakage occurs on lands controlled/owned by the FCM project proponent/owner. For example, a forestry company could reduce logging at one of its licence areas (and present it as a distinct FCM project) and simultaneously increase logging at another license area (to compensate for lost revenue). Such direct leakage must be estimated and subtracted from the project-related offsets.

Direct External Leakage

Direct external leakage is also time- and site-specific, but actions leading to this leakage (e.g., increased logging) occur on lands that are not controlled or owned by the project proponent. For example, a woodlot owner could cease logging on his woodlot as an FCM project, but if additional lands in the region were logged as a result to satisfy market demand from a nearby mill then this would be considered to be direct external leakage from the project. (This is a situation in which the pooling of numerous small projects confers advantages.) Direct external leakage must also be estimated and subtracted from the project-related offsets.

Indirect Leakage

Indirect (or market) leakage can occur if a given FCM project or a set of projects of the same type leads to incremental reductions in the supply of forest products (e.g., timber) thus increasing commodity prices and resulting in extra supply of forest products (and associated additional emissions) from other sites perhaps far distant from the FCM project(s). There is as yet no approved methodology for estimating indirect leakage as an accurate and comprehensive analysis of indirect leakage can only be based on a national level study of forest product markets. It is recommended that FCM project proponents consider the potential for this type of leakage and be prepared to quantify and adjust for it should a common approved methodology be developed.

FM	FM projects are likely to be associated with leakage only when project activities lead to reduced timber removal from the project site which could be compensated by increased harvesting at other sites. This is why it is recommended that FM projects be conducted at the estate level. If an FM project includes substantial harvest reductions a very careful analysis of leakage needs to be conducted. *Direct Internal Leakage should* be identified during project design and addressed by incorporating it within the project boundary. *Direct External Leakage* is likely to occur as local timber markets adjust to compensate for a significant drop in timber output from a project site and should be assessed locally in conjunction with provincial regulatory authorities. Unless the FM project is on a mammoth scale, *Indirect Leakage* is almost impossible to attribute to the project. While it should be obvious that if the production of forest products remains the same or increases then indirect leakage negates all FM projects, cause and effect is difficult to prove. And if carbon storage in forest products becomes part of the calculation in future commitment periods then indirect leakage will be less of a concern.

AR	*Direct Internal Leakage* in an AR project is unlikely to occur due to the very nature of afforestation/reforestation activities. *Direct External Leakage* may, in fact, be negative; for example, when the AR project increases accessible timber supply reducing pressure on natural forests in the region. *Indirect Leakage* is not likely to be a factor in AR projects.

D	D projects have been traditionally associated with a high probability of leakage. Therefore, D project proponents need to provide solid evidence that leakage is not expected or a certain degree of leakage is expected and project-related offsets will be reduced by the amount of estimated/measured leakage. Unless a D project can seriously impact local or national timber markets its leakage will be direct, e.g., local and directly caused by project activities. For example, if a D project prevented forest clearing for development or road construction purposes, but the development and/or construction happened nearby anyway and was associated with deforestation then that deforestation would be *Direct External Leakage*. Such potential direct leakage should be detected at the project design phase and the boundaries of D project could then be extended to limit this leakage (internalizing the leakage). For example, development relocated by the D project can be steered to become more environmentally friendly, including the reduction of associated deforestation. If the D project has no ability to extend its boundaries in such a fashion, then leakage should be simply quantified and subtracted from the project-related offsets. If an estimated leakage becomes similar to the carbon offsets achieved within the project boundary such project should be completely redesigned. As in other project types, carbon offsets generated by D projects should be calculated as a difference between emissions/removals in the project scenario minus emissions/removals in the baseline scenario minus leakage.

E.2 Estimation of GHG Emissions Due to Leakage

The identification of leakage can be accomplished simultaneously with the development of an FCM project scenario. Once a specific schedule of project activities has been finalized, FCM project proponents should identify GHG emissions that are likely to result from the project implementation, but occur outside the project boundary. It may be possible to mitigate leakage by modifying the project design; for example, if a forest preservation project leads to increased logging on other lands, additional efforts can be undertaken to limit the extent of such logging by expanding the zone of preservation.

It is recommended that *Direct Internal Leakage* (e.g., when a project proponent owns/controls the land where leakage is expected to occur) should be absorbed into the calculation of project GHG emissions / removals by including the affected lands in the project boundary. If it is not possible to incorporate identified leakage within the project boundary, all expected forms of direct and indirect leakage should be documented and quantified. Leakage must then be explicitly incorporated into the project GHG accounting by adjusting the amount of project-related emission reductions or increases in removals by the amount of emissions that occur due to leakage.

FCM proponents should therefore identify and quantify:

- direct internal leakage;
- direct external leakage; and
- indirect leakage (where possible).

E.3 Net FCM Project GHG Emissions / Removals

Once any potential leakage is identified and quantified, net FCM project-related offsets should be calculated as emissions / removals in the baseline scenario minus emissions / removals in the project scenario minus leakage. It is recommended that this calculation be conducted for every year of the project lifetime. As, initially, the only carbon credits available for trading are those created during the first commitment period of the Kyoto Protocol, estimated FCM Project GHG Emissions / Removals during that period should be highlighted in reporting.

Note: FCM project proponents may choose to further discount the GHG emissions / removals arising from the project as part of their risk management plan (see Section H).

Section F — Monitoring Methodology and Plan

Note: The guidance text in this section amalgamates the requirements of sections F.1-F.3 in Appendix I.

The IPCC *Good Practice Guidance for Land Use, Land Use Change and Forestry* provides general direction on monitoring methodologies. The Canadian Forest Service's *Afforestation Measurement and Monitoring Protocol* offers very specific guidance and many of its components are also relevant to FM and D projects (see ARD box below for guidance on sample plots, for example).

FCM proponents should review these documents and develop a plan, including measurement protocols, for monitoring the actual GHG emissions / removals that occur during the life of their project and for monitoring the baseline scenario should the Control Group method be selected. Monitoring is conducted to ensure that project-related emission reductions or removals are real (i.e., they result solely and specifically from the actions taken in the project, would not occur in the absence of the project, and have not been reversed). The monitoring plan and protocols allow FCM project proponents to obtain objective information about the course of GHG emission reduction or removals performance at FCM sites.

Monitoring should be conducted over the project lifetime. The monitoring plan should include sampling design and the expected margin of error as a percentage of the mean. FCM project monitoring will likely include the establishment and maintenance of permanent sample plots for periodic measurement of changes in carbon stock at the project and baseline sites. On-site carbon flux monitoring may include either measurement of total carbon stocks or their annual or multi-year changes (i.e., using tree-ring analysis). Measurements of carbon pool sizes or increments at a specific site can be implemented using a sampling scheme that is specifically designed for the site based on its properties and the activities being undertaken. Measurements can be implemented either by field sampling or by remote sensing methods (e.g., aerial photography), or a combination of the two.

The sampling scheme for different forest carbon pools should be determined by the following key factors:
- desired margin of error;
- existing variability of a targeted site; and
- the cost of additional sampling vs. the benefits of increased accuracy.

Monitoring of other GHG fluxes can be performed using standard documentation maintained by the FCM project proponent (e.g., fuel use statistics). Figure 8 presents one option for describing proposed monitoring activities.

Figure 8: Sample Format for Monitoring FCM Project Activities and Baseline (if dynamic baseline is selected)

Data type	Data variable	Data unit	Is data measured or estimated?	Recording frequency	Proportion of data to be monitored	How will data be archived? (electronic/paper)	How long is archived data to be kept?

The monitoring plan should also include provisions for quality control and quality assurance. FCM proponents need to instill confidence in the monitoring methodology and in their ability to implement an effective and credible monitoring program. This should include a description of the actions to be taken should significant deviations occur between estimated and actual performance in project GHG emissions / removals and/or in the baseline.

FM	Monitoring of FM projects should confirm the amount of carbon present at the project sites by periodic sampling of all carbon pools that are to be included in accounting (see Figure 4). Specific sampling protocols and methods depend of the variability of the project site and the allowable error margin. If control plots are established to monitor the baseline situation (in the case of a dynamic baseline) carbon should be periodically sampled at those control plots as well.

AR	The Canadian Forest Service Measurement and Monitoring Protocol for Afforestation suggests criteria for the establishment of sample plots, as follows: • put in place prior to project establishment (where possible); • fixed tie in point; • systematic grid with random start; • plots should be no closer than 10m to plantation edge; • permanent sample plots should be used; and • individual tree growth should be measured tracking survivorship, mortality and ingrowth.

D	Monitoring for D projects should confirm the amount of carbon present at the project sites by periodic sampling of all carbon pools that are to be included in accounting (see Figure 4). Specific sampling protocols and methods depend of the variability of the project site and the allowable error margin. If control plots are established to monitor the baseline situation (in case of dynamic baseline) carbon should be periodically sampled at those control plots as well.

Section G — Verification Plan

Third party verification of the emissions reductions or removals generated by a specific FCM project is a form of quality control and assurance. Although Canada's Offset Trading System rules are not yet in place, it is likely that some form of verification will be required before any GHG emission reductions or removals generated by an FCM project can generate credits that can be traded. This is expected to take the form of independent third party verification by accredited verifiers. FCM project proponents should thus be prepared to make the data and methodology used to calculate emission reductions or removals available for evaluation and verification by an independent third party.

Verification should be conducted during the project lifetime as well as during 2008-2012. Verification can be achieved through:

- independent measurements of FCM project outputs (e.g., carbon fluxes at a project site);
- validation of baseline monitoring (if a dynamic baseline method is selected);
- crosscheck and validation of the methods, tools, and models used to estimate GHG emissions and removals in baseline and project scenarios; or
- other procedures that ensure that GHG emission reductions or removals on the project site are real and measurable.

Section H — Risk Management Plan

FCM projects face two types of risk. There is a risk that the proponent will not obtain the volume of offsets planned for. This presents a problem for the proponent but will not be of concern to the Offset Trading System. There is also the risk that offsets for which credits have been issued are subsequently lost. This type of risk affects the Offset Trading System and the integrity of credits. To address these situations, a number of options (including temporary crediting or the requirement for the seller to replace credits) are under consideration in the design of the Offset Trading System. For both types of risk, the risk factors are generally the same (fire, insects, etc.) and the main difference is timing.

A risk management plan (RMP) should be prepared for all FCM projects and should address future events that can reduce the amount of offsets to be generated or maintained by the project but which cannot be calculated reliably at its inception. These factors may include random events (e.g., fires, insect infestations, windstorms, etc.) as well as deviations of the actual project (and baseline) GHG emissions / removals (under normal conditions) from the emissions / removals estimated in the project (and baseline) scenarios. FCM project proponents can only monitor and manage risks that are likely to affect project or baseline (for the Control Groups method) sites within the selected project lifetime.

Typical risks for an FCM project may include:

- direct damage resulting from forest fires, insects and pathogens;
- lower than estimated increases in carbon from forest growth in afforestation and forest management projects;
- higher than estimated emissions of carbon (in avoided deforestation projects); and
- higher than estimated leakage from the project.

For each type of risk, project proponents should estimate the maximum impact it is likely to have (e.g., forest fires can reduce the amount of afforestation offsets by 100%, while the maximum decrease in these offsets caused by an overestimation of growth in the project scenario may only be 30%) and develop a corresponding set of risk management measures (RMMs).

RMMs can include direct interventions at the project site (e.g., fire and pest protection); intensification or expansion of the project activities or boundary (e.g., if forest management activities are not as effective as estimated, the level of these activities can be increased and/or they can be extended to a larger area). In addition, in cases in which offsets resulting from the project are recognized and rewarded before the actual reductions of removals occur, the RMP may include the acquisition of options to buy offsets from other suppliers/projects as insurance against non-delivery.

The nature and content of the RMP will strongly depend on the final structure and rules of the Offset Trading System. If offsets can enter the market only after a third-party verification that all conditions for generating the offsets are met (e.g., offsets are additional, real, surplus, etc.), the structure of the RMP will likely be dictated by the needs of project proponents. On the other hand, if offsets can be sold and bought prior to the actual delivery of projected emission reductions or removals and subsequent verification, the RMP will likely need to be more extensive and meet certain minimum pre-established standards.

FM	As FM project offsets are based on increasing the amount of carbon that can be accumulated at a project site, key risks to FM project are those that may prevent this additional (relative to baseline) accumulation. The most typical risks may include reduced effectiveness of project-specific FM activities as well as various disturbance agents (e.g. forest fires; insects and pathogens). A higher then expected leakage could also pose a substantial risk. Measures to manage risks to FM projects include activities that would reduce the likelihood of unplanned disturbance and timely detection of the below-planned performance accompanied with corresponding modification of project activities.

D	As D project offsets are based on preserving carbon that is accumulated at a project site before the project start date, key risks to D projects are those that may lead to unexpected forest disturbance and decay. The most typical risks may include forest fires; insects and pathogens; and logging. A higher than expected leakage could also pose a substantial risk. Measures to manage risks to D projects include protective and prophylactic activities that would reduce the likelihood of unplanned disturbance. For example, project proponents need to monitor the spread of insects and pathogens and/or buildup of flammable materials in and around their project sites and implement protective activities in a timely manner.

Section I — Non-GHG Impacts

All FCM projects will deliver a wide range of ancillary benefits, either to the FCM proponent or to society at large. For example, afforestation projects may increase timber supply, reduce soil erosion, increase water quality and enhance wildlife habitat. Some forest management activities may generate increased employment or may contribute to the enhancement of recreational values in the region. There are both negative and positive potential side-effects of projects and project proponents are encouraged to pay particular attention to any potential negative impacts and either mitigate them or redesign their project to avoid them. In particular, an assessment of the impacts on biodiversity and sustainable forest management should be considered as these areas are specifically referenced in international accords relating to forest offsets. The Climate, Community and Biodiversity Alliance has developed a draft standard for ensuring climate change projects have positive ancillary benefits (www.climate-standards.org/).

At the projected price per tonne of CO_2, it is unlikely that carbon will be the sole driver of an FCM project. Elaboration of the co-benefits of the proposed project can help to establish the business case for proceeding and can assist in identifying the range of partners who may become involved in making the project a reality. In addition, several of the early purchasers of offsets have indicated that they are looking for opportunities that either contribute to the achievement of other social and environmental objectives or, at the very least, do not compromise them. A thorough description of non-GHG project benefits may thus help to attract investment.

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APPENDIX I: FOREST CARBON MANAGEMENT PROTOCOL TEMPLATE

SECTION A — Proponent Identification

A.1 Name:

A.2 Address:

A.3 Contact Person:

A.4 Project Participants:
(Please list Party(ies) and private and/or public entities involved in the project activities and provide contact information)

SECTION B — General Project Description

B.1 Project Title

B.2 Project Description
(Detailed description of project activities)

B.3 Extent of the Project

B.3.1 Project Location and Border
(Geographical location and border of the project; projects can include a part of land base or an entire land base of a company)

B.3.2 Project Site Description
(Current land cover; forest type, etc.)

B.3.3 Project Lifetime
(Years)

B.3.4 Project Boundary
(*GHG fluxes directly or indirectly influenced by project activities)*

B.3.5 Eligibility for Offset Trading System
(How the project satisfies the requirements of real, measurable, verifiable, surplus and incremental)

SECTION C — Determination of Baseline GHG Emissions / Removals

C.1 Description of Baseline Scenario
(Description of activities and processes that take place in the Baseline Scenario)

C.2 Selection of Baseline Methodology
(Description of the baseline method and rationale for the method selection)

C.3 Estimation of GHG Emissions / Removals in the Baseline Scenario (must include 2008-2012 period)
(Description of the approach used for estimating and/or measuring the Baseline Scenario including procedures and formulae used to estimate annual baseline GHG emissions / removals over the project lifetime within the project boundary)

SECTION D — Determination of FCM Project GHG Emissions / Removals

D.1 Description of Project Scenario
(Description of proposed activities and processes that take place in the Project Scenario and how they differ from business as usual)

D.2 Estimation of GHG Emissions / Removals in the Project Scenario (must include 2008-2012 period)
(Procedures and formulae used to estimate annual GHG emissions/removals in the project scenario and annual emission / removal estimates - must be consistent with C.3)

D.3 Key Uncertainties in Estimates of GHG Emissions/Removals
(Discussion of major uncertainties associated with estimating GHG emissions / removals in Baseline and Project Scenarios)

SECTION E — Leakage and Calculation of FCM Project Offsets

E.1 Identifying the Potential for Leakage
(Discussion of the leakage potential with respect to the proposed project)

E.2 Estimation of GHG Emissions Due to Leakage
(*Calculations of various forms of leakage)*

E.2.1 Direct Internal Leakage

E.2.2 Direct External Leakage

E.2.3 Indirect Leakage

E.3 Net FCM Project GHG Emissions / Removals
(*Calculations of offsets attributable to the project)*

E.3.1 GHG Emission Reductions / Removals during Project Lifetime
(*Total and year-by-year GHG emissions / removals in the Project Scenario* ***minus*** *total and year-by-year GHG emissions / removals in the Baseline Scenario* ***minus*** *Leakage)*

E.3.2 GHG Emission Reductions / Removals during Kyoto Compliance Period: 2008-2012
(2008-2012 GHG emissions / removals in the Project Scenario ***minus*** 2008-2012 *GHG emissions / removals in the Baseline Scenario* ***minus*** 2008-2012 *Leakage)*

SECTION F — Monitoring Methodology And Plan

F.1 Monitoring Methodology
(Description of methodology for monitoring GHG emissions / removals in Project and Baseline (if dynamic baseline is selected) Scenarios, including sampling design and expected margin of error as % of the mean)

F.2 Schedule of Monitoring Activities

(Timeline of monitoring activities over the project lifetime)

F.3 Quality Control (QC) and Quality Assurance (QA)

(Plan to control and assure monitoring quality)

SECTION G — Verification Plan

G.1 Verification Plan

(Verification plan, including third-party independent verification of estimates of GHG emission reductions or removals achieved by the project)

SECTION H — Risk Management Plan

H.1 Project Risks

(Description of risks to achieving GHG offsets estimated in Section E and their magnitude)

H.2 Risk Management Measures

(Description of measures to manage risks)

SECTION I — Non-GHG Impacts

I.1 Non-GHG Environmental Impacts

(Discussion of potential positive and negative environmental impacts of the project)

I.2 Socio-Economic Impacts

(Discussion of potential positive and negative socio-economic impacts of the project)