

Summary Report from the Pacific Institute for Climate Solutions (PICS) Carbon Management in BC Forests Workshop

Backgrounder

On March 22/23, 2010, PICS brought experts from academic, government, environmental non-government organizations (ENGO), and industry together to discuss carbon management in BC forests. Of particular importance to the Province and to PICS, was how to maximize carbon sequestration by BC forests, often in a landscape of competing stakeholder interests and land-use demands. This summary report highlights workshop proceedings. Each presentation has been condensed into main messages. Highlights from the main group discussions are also included. The list of potential research topics for PICS to undertake culminates the report.

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Executive Summary

This summary delivers the workshop's common themes (carbon accounting and offsets, bio-energy, modelling, soils, and sustainable forest management) and consequent research recommendations for PICS. Additionally, a missing linchpin for improved carbon management in BC forests is noted.

Carbon accounting and subsequent offset projects are not accurate. Costs are underestimated and reveal little information regarding actual benefits. Analysts are forced to make arbitrary judgements due to a non-standardized process that lacks much needed market data. Government and conservationists see high offset potential; government wants a system that will generate taxable revenue and, like conservationists, desire highly credible offsets. Conservationists want involvement.

Bio-energy presents opportunities to earn revenue and reduce carbon. The European market is a potential boon to Canadian suppliers interested in carbon reduction. In terms of tonnes of GHGs displaced, wood is a superior fuel and building material. Long and short-term environmental effects are largely unknown and potentially negative. Social conflicts for unions (wood diverted), First Nations (alienation of resources) and ENGOs (wood grown to burn) exist.

Inherent misunderstanding of how models work compromises usefulness. Models provide a probability distribution for how the future could unfold. Likelihoods of outcomes must be relayed in terms of their probability distributions. Stating a simple probability of an outcome is inaccurate and misleading. Models are foundationally valid and require continuous improvement via increased data and scientific understanding.

Soils pose a large challenge to both modelling and forest carbon storage. Current soil carbon content is unknown in most of the province. Physical challenges like climate change and thick layers of chip deposits from harvest may lead to long term productivity loss. As biomass harvesting increases, a policy based on current removals may pose the biggest challenge to soil productivity.

Maximizing carbon through forest management is challenged by contentious accounting, unknown effects of current standard practices, and undecided best practices long-term. Seemingly large contributions to carbon emissions from the forest industry are countered by misrepresentation of carbon release from harvested wood products. Managers don't know the effects of current practices (e.g. slash and burn). Long-term mitigation is suggested to be either maximum carbon storage (conservation) or maximum carbon uptake (sustainable forest management).

Recommendations for PICS-supported research are numerous.

- Modelling (e.g. improved monitoring and increased data)
- Carbon in soils (e.g. management options and impacts for various soil types)
- Sustainable Forest Management (e.g. valuing ecological services, where and how much conservation?, silvicultural practices in a changing climate, barriers to improving society's wood use)
- Offsets (e.g. effectiveness, how to produce acceptable risk)
- Bio- energy (e.g. analysis of short and long term effects, efficient breeds)

Finally, the missing linchpin for improved carbon management is the need to decide our carbon management goals for BC forests and to ensure that industry, government and conservation actions reflect those goals. This issue of undecided and sometimes conflicting values was prevalent in both discussions and pervasive throughout presentations.

Workshop Goals

The workshop objective and foci were pre-defined to address the following questions. Presentations regarding these four foci were followed by group discussion. During the end of day two, a group discussion was held at greater length to discuss potential areas for PICS research revealed by previous presentations (Figure 1). To view the detailed workshop agenda listing speakers and topics please see Appendix 1.

Questions

- a. What policies and management actions for BC's forests can help reduce the concentrations of GHGs in the atmosphere?*
- b. What is the magnitude of reduction that forests can likely achieve?*
- c. How do proposed policies and actions compare in terms of co-benefits for other ecosystem services, biodiversity and adaptation while yielding economic value?*
- d. What don't we know and what do we need to know, particularly in the realm of uncertainties?*

Objective

To define tractable pieces that can be undertaken as discrete research projects, ideally (but not exclusively) via research associates, post-docs or graduate students to be supported by PICS.

4 specific foci

Focus 1: Risks and effectiveness of mitigation strategies

Focus 2: Costs, benefits and guidelines for mitigation and adaptation strategies

Focus 3: Co-benefits including conservation

Focus 4: Implementation issues

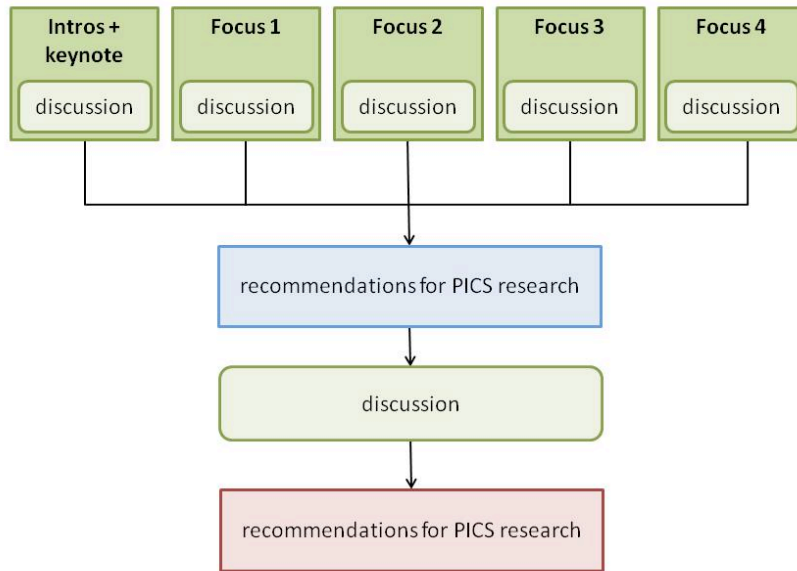


Figure 1. Flow chart of workshop process to arrive at research recommendations.

Keynote

Carbon in BC forests: climate mitigation opportunity or positive feedback to future climate change?
Werner Kurz, Canadian Forest Service (CFS)

- 1) Carbon sinks absorb human emissions but their future functioning is unknown.
- 2) Current carbon accounting of harvested wood products (HWP) misrepresents timing and location of carbon emissions and may be misleading to forest mgmt contribution to the carbon cycle.
- 3) Two opposing views of how to maximize carbon in forests (max carbon storage vs. max carbon uptake) cannot both exist in the same landscape.
- 4) Bioenergy is not carbon neutral but has high potential environmentally and economically.
- 5) There is evidence that the conclusion by the IPCC that a sustainable forest mgmt strategy that maintains or increases forest carbon stocks, while producing an annual sustained yield of timber, fibre or energy from the forest, will generate the largest sustained mitigation.

Focus 1: Risks and effectiveness of mitigation strategies

Opportunities, risks and uncertainties in future forest carbon management: *Caren Dymond, Ministry of Forests and Range (MoFR)*

- 1) Models are based on uncertainties and, as such, represent possible futures.
- 2) Future is wide open, and there is an urgency to improve modelling so the worst case scenario does not become reality.
- 3) Soils pose a large challenge to modelling.

Silvicultural opportunities and strategies: *Ralph Winter, Ministry of Forests and Range (MoFR)*

- 1) Silviculture can significantly increase carbon sequestration in BC forests.
- 2) There is no single BC wide solution on how to do this; there are 71 unique TSAs and TFLs.
- 3) Sufficient, consistent and committed funding will be required; the amount spent will affect results.
- 4) Monitoring and reporting need to be standardized.

Open discussion on the morning's presentations, Moderator: Tom Niemann, Ministry of Forests and Range (MoFR)

Mr. Neimann summarized the morning's discussion (below) and suggested thinking in terms of "triage" to steer action- where are the weak points, which are fixable and which are not.

- Terms (such as source or sink) must reflect a common understanding. The time period under consideration is significant to the definition.
- Models, and the data they use received much attention.
- Standards for models and standards for what apply in the field are required.
- Assumptions underpin these models (e.g. stable climate, climate unstable, oil, budgets, humans mostly operate with good intentions, values – personal, community, national, property – who owns it)

After Mr. Neimann's remarks, the discussion centred on two main issues: modelling and policy. Policy is required from the general to the specific. Determining how the future forest is envisioned, be it a carbon forest, a timber forest or other, is vital. Ecosystems projections would enable understanding of opportunities such as the benefit to old growth logging and the minimum required for species habitat protection. Specific policies are required immediately to address the validity of current forest practices such as slash burning and to inform forest managers of current best practices.

Models have inherent limitations, however, benefits are significant. Growth and yield models cannot project into the future, are far above averages observed, and appear to be generally viewed with caution. Modellers countered this by noting that models work as they are supposed to, however people do not understand how they are supposed to work. They work well on average and can be considered similarly to life insurance estimates. Models elevate discussion by illuminating topics such as substitution and carbon as an indicator. They can be used to explore the 71 TFLs and determine whether they are sources or sinks. The importance of data required in support and verification of models, however, cannot be understated. Improvement requires greater monitoring and better access to existing data.

Focus 2: Costs, benefits and guidelines for mitigation and adaptation strategies

Carbon accounting and the offsets potential of BC forests: *Tony Lempriere, Canadian Forest Service (CFS)*

- 1) Mitigation potential of BC forests is largely unknown.
- 2) Many different mitigation options exist.
- 3) Assessing mitigation (offset) potential requires clear definitions and carbon accounting from the outset of the process.
- 4) Assessing mitigation (offset) potential involves both biophysical and economic potential; however, from the government's perspective economic potential is more useful.
- 5) Decision making must balance desired and existing objectives.
- 6) Government will use a diversity based portfolio approach that incorporates short-term and long-term gains in decision making.

Economics of carbon offsets: *Cornelis van Kooten, University of Victoria*

- 1) Studies reveal costs and benefits of carbon offset credit projects calculated too simply, underestimate costs and reveal little information on actual benefits.
- 2) Offset projects are only as good as their duration.
- 3) To judge sink projects without market data requires arbitrary judgment.
- 4) Sink offset credits cannot be traded one-for-one for emission reduction credits. In the absence of a certifying authority that guarantees equivalence of and, thereby, resolves uncertainty, sink credits will be worth a lot less.
- 5) Credits for forest conservation? Incentive by penalizing deforestation could lead to corruption.

Life cycles and opportunities in wood use: *Elaine Oneil, Consortium for Research on Renewable Industrial Materials (CORRIM)*

- 1) Wood is a valuable substitute for energy intensive building materials and as a fuel (in terms of GHG displacement)
- 2) CORRIM study found disincentives and unintended consequences in BC Forests mitigation and adaptation (e.g. 100 year permanency rule ignores LCA, delaying harvest reduces storage)
- 3) CORRIM study found better incentives to increase carbon sequestration (e.g. credits for builders to displace fossil fuel intensive products)
- 4) Carbon estimates of BC forests have many unknowns that require further research (e.g. ensure representative sites are representative – if not adjust scale, improved biomass equations, ID 'carrying capacity' of different forest types, disturbance (fire + MPB) impact on forest carbon, various soil carbon issues)

Focus 3: Co-benefits, including conservation

Credible Conservation Offsets for Natural Areas: *Richard Hebda, Royal BC Museum (RBCM)*

- 1) The conservation movement sees forests as more than commodities.
- 2) Land Trust Alliance of BC (LTABC) views offsets as a valid response to current land issues (e.g. conversion and degradation) that increase CO₂ emissions and reduce capacity to remove CO₂.
- 3) Offset challenges centre around accurate measurement and a lack of standardization.
- 4) Offset programs must be highly credible and provide accountable CO₂ reduction.
- 5) LTABC wants to lead, promote and deliver credible offset programs.

Managing BC's Forests for a Cooler Planet: carbon storage, sustainable jobs and conservation: *Ben Parfitt, Canadian Center for Policy Alternatives (CCPA)*

- 1) CCPA project to address socio-economic impacts of climate change and develop innovative green policies for BC.
- 2) To better balance forest carbon balance must broaden thinking. How can we increase resilience? Promote carbon storage? Address dependant rural communities?
- 3) Forestry practices could be improved to increase carbon storage (e.g. limits for wood waste).
- 4) To improve carbon accounting, it must account for more.
- 5) Promoting solid wood's carbon storage could have positive impacts on resource dependent communities.
- 6) Carbon plantations are suggested, however, bio-energy presents potential conflicts for First

Biomass harvesting and implications: *Shannon Berch, Ministry of Forests and Range (MoFR)*

- 1) Current soil conservation and biodiversity policy reflects current volumes removed and a focus on 'waste wood'. As biomass harvesting intensifies, is there need for a new soil conservation and biodiversity policy?
- 2) Soil productivity faces substantial challenges
 - a. Thick layers of chip deposits from harvest.
 - b. Little information for provincial sites.
 - c. Climate change disturbance.
 - d. Long term productivity loss.
- 3) Do we want this? Do solutions of biomass outweigh other decisions?

Open discussion on knowledge gaps and key research questions arising from the earlier talks, *Moderator: Tim Lesiuk, Climate Action Secretariat (CAS)*

Mr. Lesiuk asked participants to focus on what needs to be known in order to manage carbon in BC's forests, ecological values and adaptation. Suggestions ranged from the broad (e.g. determining values) to the specific (e.g. is slash and burn an appropriate practice?) and encompassed three topics (Fig.2).

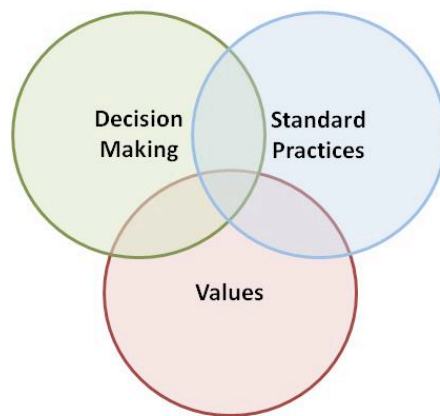


Figure 2. Visualizing the second discussion into three overlapping topics.

Understanding how standard forestry practices impact carbon emissions would enable forestry managers to make carbon wise decisions now and to inform future policy. The effects of the major land management activities undertaken by managers are unknown (e.g. slash and burn). Tackling a relatively simple task (such as understanding the carbon implications of current forestry practices) with a clear message has proved successful in the past (e.g. elimination of the NSR by year 2000).

Streamlining decision making with a holistic approach in the form of a factor weighted matrix was suggested. However, a matrix could change dramatically under a different climate scenario. Additionally, decisions need to be area specific. Whether a blanket matrix could be used in diverse regions is questionable.

Models aid decisions. Models provide a probability distribution as to how the future could unfold. Likelihoods of outcomes must be relayed in terms of their probability distributions. Stating a simple probability of an outcome is inaccurate and misleading. Managers must understand this inherent aspect of models when interpreting results.

Finally, questions were raised over the values that underpin decisions. Is there a need for a values talk? What are our common values on this? Should we treat them together or separately? Does disconnect exist between the mechanisms we have and what we want to do? Do we need new mechanisms?

Focus 4: Implementation issues

Government concerns- resource and offsets ownership: *Tim Lesiuk, Climate Action Secretariat (CAS)*

- 1) The government has multiple obligations to sustain jobs, revenue, environmental quality, and observe climate benefits.
- 2) The government is concerned over how to best manage the following issues:
 - a. Managing a carbon project whose developer is not the same as the tenure holder.
 - b. A large scale reversal event that leaves the province liable for future emissions reductions.
 - c. Mechanisms to achieve permanence related to continued access to productive forest land.
 - d. Ultimately, government wants to sustain revenue (tax base) from projects, however, currently little revenue.

Carbon Management in BC – Implementation Issues, Industry Perspectives and Concerns: *Shannon Janzen, Western Forest Products (WFP)*

- 1) Being part of the solution is incentive for the forest sector. Funds through offset generation could help with the costs of implementation (e.g. lifecycle analysis).
- 2) Credibility is key. Knowledge about carbon and climate change needs to be separate before it's incorporated into Sustainable Forest Management (SFM).
- 3) A decision framework is required to optimize the carbon stored in forests and in forest products in the context of SFM. Climate change, substitution and leakage needs to be part of this framework.
- 4) A policy framework should be sophisticated enough to adapt as new information is gained, at the very least, to avoid unintended outcomes.

ENGO Perspectives and Issues on Forests and Carbon Management in BC: *Marlene Cummings, ForestEthics*

- 1) Forest conservation should be part of BC's climate action approach because forests here store globally significant levels of carbon.
- 2) Like the rest of society, the forest sector needs to do everything in its power to keep rising temperatures below 2⁰C increase. It is not clear they are doing this currently.
- 3) Suggestions for PICS research that focus on carbon neutrality (e.g. examining wood burning) and sustainable forest management (e.g. mapping initiative, forest practices).
- 4) Suggestion to research barriers to resistance to large-scale conservation as a climate action.

Research Recommendations for PICS

Modelling

1. More data needed for modelling.
 - a. How to construct them re: growth & yield curves?
 - b. How does this strategy work when climatic baselines keep changing?
 - c. Validation requires greater data, particularly monitoring. The following suggestions were made.
 - i. Linking existing monitoring networks in BC.
 - ii. Creating a high resolution map of province (a “provincial climatologist”) to give past history for an area temperature, precipitation (maximum and minimum).
 - iii. Link this project with the monitoring needs of the Ministry of Forests and Range

Soils

2. Increase understanding of soil carbon.
 - a. Pick 3-4 representative forest areas to assess forest management options and impacts on BC forest type soils. Spatial variability is extremely high, therefore, sample very close to sample site. If observations show that soil carbon is changing as a result of activity, protocols should be adjusted (e.g. sampling is currently an option not a requirement).
 - b. Monitor emissions from forest zones (e.g. From which areas do slash burning emissions derive? Can policy be adjusted to limit such burning/ use biomass for energy?).

Sustainable Forest Management

3. Silvicultural practice(s) in the face of a changing climate (with attendant issues of pests, fire frequency, etc.).
 - a. This encompasses fertilization (e.g. N₂O fluxes), wildlife and biodiversity issues.
 - b. Data required to implement such a project wisely may take 10-15 years. Maybe best to do nothing.
 - c. If we know what to do, why is it not being implemented?
 - d. Three New Ideas:
 - i. Maintain ongoing projects that have been terminated as a result of budget cuts.
 - ii. How do we deal with discount rates? Today’s benefits vs. future benefits.
 - iii. If we stop harvesting forest today will we get an immediate benefit to the atmosphere? Maybe different answer over 10, 15, 50, yrs.
4. Valuing ecological services
 - a. Address “how” and “how much” (e.g. monetized value, other values such as environmental services like water).
5. Conservation. Where, how and what makes sense?
 - a. Map carbon storage per hectare in province.
 - b. How will climate change impact conserved forests? US found set asides to be insufficient. How do you grow habitat (e.g. transition zones)?
 - c. Examine integrated management versus zoning.
6. Examine downstream use of wood products because they store carbon.

- a. What are the barriers to bringing about improvement of the use of wood products in society?

Offsets

- 7. Examine property rights issues (e.g. tenure relative to carbon-uptake schemes). This issue is publicly debated and integrated with First Nations claims.
- 8. Examine the prospects for offsets (e.g. value, effectiveness).
 - a. Which of these different tools are most likely to succeed given a particular mitigation goal?
 - b. What should government do (of the suit of options) rather than set up an offsets bureaucracy? (e.g. cost benefit of spacing, using stumpage fee as an incentive, environmental tax shifting)
 - c. Environmental tax shifting as specifically applied to forests.
- 9. How can we produce an acceptable level of risk in the offsets business (e.g. pooling risk)?
 - a. Scientifically quantify risk (e.g. future fire frequency).
 - b. Examine best practices elsewhere (e.g. how is risk determined, buffer size).

Bio-energy

- 10. Should BC have intensive biomass cultivation for energy production as in Sweden and Austria?
 - a. Forwar
d looking analysis to examine short, medium and long term time frames (e.g. implications on soils, services, technical advances, habitat issues, changes in the energy landscape, changing market impacts).
 - b. Breeds
efficiency assessment.
 - c. Collabo
rate with BC Bioenergy Network on emissions impact. BC Bioenergy Network is currently assessing economic, social and environmental implications for remote communities powered by diesel. They have not yet attempted the emissions component (e.g. transport of diesel to communities, etc.).
 - d. Why is
there a lack of standardization regarding this issue? This has dramatic impacts on what people assume to be the best answer (e.g. big difference in emission factors for wood combustion in US and Canada).
 - e. Issues
with this could include impacts on AAC, wood sourcing, collaborative standards development for ecological values.
 - f. New
idea: Research best basic practices (e.g. better to burn wood or pellets).



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for Climate Solutions
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CARBON MANAGEMENT IN BC FORESTS WORKSHOP

March 22/23, 2010 | Inn at Laurel Point, Victoria, BC
Workshop: Merino Rooms | Meals: Café Laurel

WORKSHOP OBJECTIVES | **To define tractable pieces that can be undertaken as discrete research projects**, ideally (but not exclusively) via research associates, post-docs or graduate students to be supported by PICS. The challenge will be to design the workshop in such a way that information is shared, and a research agenda is produced that is designed to deliver products that can help address the following overarching questions:

What policies and management actions for BC's forests can help reduce the concentrations of GHGs in the atmosphere, what is the magnitude of reduction that forests can likely achieve, and how do proposed policies and actions compare in terms of co-benefits for other ecosystem services, biodiversity and adaptation while yielding economic value?

And,

What don't we know and what do we need to know, particularly in the realm of uncertainties?

Specific foci:

Focus 1: Risks and effectiveness of mitigation strategies

- Relative roles of specific activities in different regions of the province (e.g. silviculture, biomass utilization/slash burning, forest protection). To include estimates of the costs per tonne of avoided CO₂e emissions for each of the activities.

Focus 2: Costs, benefits and guidelines for mitigation and adaptation strategies

- How quickly, at what cost, and at what spatial and temporal scales could/should mitigation/adaptation activities be implemented?

Focus 3: Co-benefits, including conservation

- How can we create an optimum combined benefit to help meet emissions targets while respecting non-carbon values (e.g. biodiversity, recreation)?
- Encouraging maximization of wood use to constrain CO₂ emissions

Focus 4: Implementation issues

- Addressing major constraints, e.g.: costs, including C pricing; resource ownership; institutional and legal issues; technological approaches and issues, including the GMO moratorium.

Workshop Structure

Monday, March 22

0800: Continental breakfast and registration

0830-0840: Opening remarks: Minister Bell (10 minutes- broad governmental perspective on carbon management in BC forests)

0840-0855: Workshop introduction: (Tom Pedersen, 15 minutes-- PICS background and workshop objectives)

0855-0910: The view from the Climate Action Secretariat (James Mack, 15 minutes)

0910-0950: Keynote, to set the stage: Carbon in BC forests: climate mitigation opportunity or positive feedback to future climate change? (Werner Kurz, CFS; 30 min)

Discussion: 10 min

Focus 1: Risks and effectiveness of mitigation strategies

0950-1030: Opportunities, risks and uncertainties in future forest carbon management (Caren Dymond, MoFR; 30 min)

Discussion: 10 min

1030-1050: Nutrition break

1050-1130: Silvicultural opportunities and strategies (Ralph Winter, MoFR; 30 min)

Discussion: 10 min

1130-1200: Open discussion on the morning’s presentations. Moderator: Tom Niemann, MoFR.

1200-1300: Catered lunch on site

Focus 2: Costs, benefits and guidelines for mitigation and adaptation strategies

1300-1340: Carbon accounting and the offsets potential of BC forests (Tony Lemprière, CFS; 30min)

Discussion: 10 min

1340-1420: Economics of carbon offsets (Cornelis van Kooten, UVic; 30 min)

Discussion: 10 min

1420-1500: Life cycles and opportunities in wood use (Elaine Oneil, CORRIM; 30 min)

Discussion: 10 min

1500-1520: Nutrition break

Focus 3: Co-benefits, including conservation

1520-1600: The value of conservation (Richard Hebda, RBCM; 30 min)

Discussion: 10 min

1600-1640: Carbon storage in forest products (Ben Parfitt, CCPA; 30 min)

1640-1730: OPEN DISCUSSION, with a focus on knowledge gaps and key research questions arising from the earlier talks. Moderator: Tim Lesiuk, CAS

1830-2030: Workshop Dinner (Milestones, 812 Wharf St., Inner Harbour, Victoria, BC)

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Tuesday, March 23

0800: Continental breakfast

Focus 3: Co-benefits (continued)

0830-0910: Biomass harvesting and implications (Shannon Berch, MoFR; 30 minutes)

Discussion: 10 min

Focus 4: Implementation issues

0910-0940: Government concerns: Resource and offsets ownership (Tim Lesiuk, CAS; 20 minutes)

Discussion: 10 min

0940-1010: Industry perspectives and concerns (Shannon Janzen, Western Forest Products; 20 minutes)

Discussion: 10 min

1010-1030: Nutrition break

1030-1100: ENGO perspectives and concerns (Marlene Cummings, ForestEthics; 20 minutes)

Discussion: 10 min

1100-1200: Facilitated discussion, singling out key issues that offer tractable targets for research (Moderator: Tom Pedersen or delegate)

1200-1300: Catered lunch on site

1300-1600: Facilitated discussion, continued

1445-1500: Nutrition Break

We will have a rapporteur for the workshop and a summary report will be issued shortly after the event. PICS will then decide how best it can support the questions/needs that arise.

Name	Institution
(Minister)Pat Bell	Ministry of Forests and Range
Shannon Berch	Ministry of Forests and Range
Andrew Black	University of British Columbia
Jessica Clogg	West Coast Environmental Law
Peter Constabel	University of Victoria
Marlene Cummings	ForestEthics
Caren Dymond	Ministry of Forests and Range
Christine Fletcher	Ministry of Forests and Range
Arthur Fredeen	University of Northern British Columbia
Richard Hebda	Royal BC Museum
Rachel Holt	Veridian Ecological Consulting Ltd.
Shannon Janzen	Western Forest Products
Graham Kissack	Catalyst Paper Corp.
Chris Koski	Climate Action Secretariat
Werner Kurz	Canadian Forest Service
Tony Lempriere	Canadian Forest Service
Tim Lesiuk	Climate Action Secretariat
James Mack	Climate Action Secretariat
Anne Mauch	Council of Forest Industries

PICS Carbon Management in BC Forests Workshop Participants List

Katharine McCallion (workshop recorder)	Pacific Institute for Climate Solutions
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Jeff Monty	Pacific Carbon Trust
Name	Institution
Dave Neads	BC Spaces For Nature
Tom Niemann	Ministry of Forests and Range
Elaine Oneil	University of Washington, CORRIM
Dennis Paradine	Climate Action Secretariat
Ben Parfitt	Canadian Center for Policy Alternatives
Tom Pedersen	Pacific Institute for Climate Solutions
Briony Penn	Land Trust Alliance of British Columbia
Lawrence Pitt	Pacific Institute for Climate Solutions
Anna Rozwadowska	Pacific Institute for Climate Solutions
David Spittlehouse	Ministry of Forests and Range
Darren Sleep	National Council for Air and Stream Improvement
Scott Stanners	BC Bioenergy Network
Cornelis van Kooten	University of Victoria
Clive Welham	University of British Columbia
Jens Wieting	Sierra Club, BC Chapter
Ralph Winter	Ministry of Forests and Range