Forest carbon offset projects in Canada: their robustness as climate change mitigation measures

The assessments in the matrix below are based solely on potential or proposed project-specific activities. No attempt has been made to assess the scale of the potential impact, or the long-term landscape-level impacts. The reliability assessments are relative values only; relative to an "ideal" project. An effort has been made to assess all projects on the same criteria, without considering their biodiversity risks and benefits.

Project	Relative reliability of climate change mitigation measurements/ease of reducing uncertainty	Is the benefit irreversible?	Relative reliability of avoiding leakage/demonstrating additionality	In Canada's Kyoto commitment?
a) Projects that enhance biodiversity conservation				
Protected areas (e.g., logging deferral in an FSC-certified forest)	Low (Requires use of a hypothetical "counterfactual baseline" to project the amount of carbon on-site if the region was not protected, with many variables)	No	Medium (Is the AAC reduced? Where does the "missing" fibre come from? How is additionality defined?)	No
Longer rotation ages	Medium (At a landscape level this can be done with reasonable accuracy, but at a smaller scale it gets tricky)	No	Medium (Leakage could be a problem if the company makes up for a short-term reduction in available volume by intensifying logging elsewhere)	No
Enhanced post-harvest retention (e.g. FSC requirements for stand-level retention, riparian areas, residual patches, etc)	Low (Requires use of a hypothetical "counterfactual baseline" projecting the onsite carbon as a result of a wide range of regulatory requirements)	No	Medium (Leakage is a risk here, since logging may simply expand to cover a broader area)	No
Restoration of degraded lands (e.g. replanting of NSR sites that were poorly logged in the past)	Medium (Need to know the likely long-term condition of the land if no restoration takes place, which will vary from site to site)	No	High (But should a company be rewarded for fixing a problem that it caused?)	Depends (on prior land use)
Avoided deforestation (e.g. woodlot owners sign "working forest easements" that require the land to be returned to forest after logging)	High (assuming that the existing forest cover is contrasted with the removal of all forest cover)	No	Low (Difficult to document the site-specific threat of deforestation; leakage is a problem)	Yes
b) Projects with mixed or uncertain impacts on biodiversity				
Enhanced fire protection	Low (Generalizations at a landscape level cannot reliably be applied to any specific management unit)	No	Medium-high	No
Urban forest conservation (e.g. a new tree cutting bylaw)	Low (Difficult to estimate the impact of a policy)	No	Low (Difficult to demonstrate that a policy is "additional")	No
Carbon in forest products (e.g. the forest products that emerge as a result of a new forest license)	Medium (Quantifying the carbon is easy, but estimating decay rates requires broad generalizations)	No	Low (Leakage is a big issue here, unless one accepts that supply drives demand)	No
Carbon in forest products (e.g. use of 2x4s instead of steel studs)	High	No	High (provided that the steel option is demonstrably cheaper)	No (except for energy saving)

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c) Projects that are non-beneficial or harmful to biodiversity conservation				
Plantations of fast-growing species (e.g. on abandoned agricultural land)	Medium- High (Requires adequate accounting of emissions due to site preparation)	No	High (there may be synergies – i.e. "reverse leakage" – if the additional volume reduces logging pressure in natural forests)	Yes
Enhanced insect protection	Low (Generalizations at a landscape level cannot reliably be applied to any specific management unit)	No	Low (It's difficult to determine a "normal" level of insect protection, and therefore the "additional" component is difficult to quantify)	No
Intensive forestry (e.g. salvage logging – the carbon loss due to logging is the same as what would eventually occur naturally, and is offset by carbon in forest products as well as by more rapid forest regeneration)	Low (Generalizations at a landscape level cannot reliably be applied to any specific management unit)	No	Low (Difficult to determine a "normal" level of salvage logging, and therefore difficult to quantify the "additional" component)	No
Intensive forestry (e.g., use of enhanced seedling stock in place of natural regeneration)	High (Presuming that reliable growth and yield curves exist for both the natural and "enhanced" stock)	No	High (provided that the natural option is demonstrably cheaper)	No
Biofuels from forest biomass (e.g. replacing fossil fuels)	High (The fossil fuel reduction can be precisely measured, but the embodied energy in transportation and processing is variable)	Yes	High	Yes
d) Non-forest projects (included for comparison)				
Renewable energy (e.g. a wind farm)	High (benefit is based on comparison to the marginal energy emissions in a particular region, which are already established for Canada)	Yes	Medium-High (Leakage is only a problem to the extent that new energy supply drives additional demand. Additionality issues do not apply in the case of an energy producer already subject to legislated caps)	Yes
Energy efficiency (e.g. process changes in a factory)	Low-High, depending on the project	Yes	Low-high, depending on the project	Yes