

Conversion to Native Grasslands: Offset Project Protocol Framework

Prepared for

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ABBREVIATED EXECUTIVE SUMMARY¹

Grasslands management strategies (including conversion of croplands to grasslands, avoided conversion of grasslands and improved grasslands management) on a worldwide basis have received significant attention as a GHG reduction strategy. The objective of this project is to identify, research and describe technical requirements and issues for a quantification and monitoring protocol focused on conversion of croplands to native or natural grasslands offset projects in southern Ontario.

The framework focuses on the likely quantification and monitoring requirements and issues for conversion to grasslands offset projects in the Norfolk County area of southern Ontario but its concepts have general applicability for native grasslands conversion offset projects in other parts of North America. The research is not directed at developing a protocol for one particular offset system. However, the Ontario Government is developing a cap and trade system that is consistent with its participation in the Western Climate Initiative (WCI) and agricultural offset projects are one of the WCI's designated acceptable offset categories so WCI system design expectations and directions are referenced in this framework. As well, there is ongoing interest from larger corporations in acquiring offsets from terrestrial carbon offset projects that help sustain natural ecosystems. North American located projects that use Voluntary Carbon Standard (VCS) approved methodologies and registration or Climate Action Reserve (CAR) protocols and registration are particularly favoured by these voluntary market buyers so the general requirements of each of these offset programs are also referenced in this framework.

This discussion of the strengths and weaknesses of each of the various options for addressing scientific knowledge and protocol technical and methodological issues provides a future native grasslands protocol development process with a pathway to filling any knowledge gaps.

The framework is divided into two sections: the first presents the North American state of the science on soil organic carbon sequestration and GHG flux in native grasslands and the second section presents the issues and options for addressing each key element of a conversion to grasslands offset protocol.

¹ This report is the sole work of its authors, Éco Ressources Carbone, and reflects their analysis alone. The analysis and recommendations do not represent the official views Environment Canada or the Federal, Provincial, and Territorial governments participating in the Value of Nature to Canadians Study.

State of Science

The success of an offset project depends on accurate quantification of its GHG emissions and removals through direct measurement of GHG flows within the boundaries of the offset project or estimation using indirect methods or a combination of the two. While GHG measurement techniques and technologies for soils and plant ecosystems are available and precise, they are expensive and often time consuming to implement, hence alternative but accurate estimation approaches have to be applied to assist in the estimation of the GHG emission reduction achieved by converting lands from cropping systems to native or natural grasslands.

These estimation approaches fall into two categories. The first one is the use of sequestration or emission factors or co-efficients calculated, mainly, from results of experiments involving direct measurement of carbon and GHGs. The other approach is to use computer process models that calculate key growth, yield, carbon and N:N₂O parameters for plant and soil systems. Although these estimation methods are not as accurate as direct measurement of GHG flows they are much more cost effective to implement, can be structured to offer acceptable levels of accuracy and are based on direct measurement of GHG flows, albeit not measurement undertaken for the offset project. There are numerous examples in protocols, for terrestrial carbon offset projects, in well established offset systems or programs, such as the Climate Action Reserve (CAR), Alberta Offset System, and Voluntary Carbon Standard (VCS), where project proponents are allowed to use either co-efficients and/or computer process models to help quantify the GHG reduction.

A combination of estimation with computer process models and a modest level of direct measurement to help calibrate the models with local conditions appears to offer a suitable combination of quantification accuracy and cost effectiveness for this offset project type.

Key Protocol Elements

A protocol provides rules and guidance for quantification and monitoring of the GHG reduction resulting from the conversion of marginal croplands to native grasslands.

This section of the report is divided into seven key topics that are either critical protocol elements or directly related to fulfilling well-established criteria underlying high quality offsets. Verification and crediting are not protocol elements *per se*, but several protocol elements will be designed based on verification and crediting features (e.g. monitoring procedures or crediting period). The seven topics are as follows:

- Offset project boundary
- Estimation, measurement and monitoring
- Baselines and additionality
- Leakage
- Permanence and risk of reversal management
- Verification
- Crediting

This work was guided by best available practices in protocol preparation, including the directions and guidance of the ISO 14064-2 standard. It also draws from the knowledge and experience of those who have been involved in preparing and developing offset protocols, standards and projects in the terrestrial carbon sector.