EXECUTIVE SUMMARY

With increasing levels of greenhouse gases (GHGs) in the atmosphere and concerns over their effects on climate and weather, a momentous surge in interest in the various methods of carbon sequestration is occurring. Among them is terrestrial sequestration, the process of removing carbon dioxide (CO₂) from the atmosphere by plants via photosynthesis and storing the carbon in biomass and soils. Terrestrial carbon sequestration projects offer an immediate and cost-effective strategy to reduce atmospheric emissions while advancements in technologies for other methods (i.e., geologic sequestration) are made. Secondarily, land-use practices that enhance terrestrial sequestration generally also enhance soil, air, and water quality and improve wildlife habitat.

As part of the U.S. Department of Energy (DOE) Plains CO₂ Reduction (PCOR) Partnership Phase II Program, the Energy & Environmental Research Center; Ducks Unlimited, Inc.; the U.S. Geological Survey Northern Prairie Wildlife Research Center; and North Dakota State University have demonstrated optimal practices for terrestrially sequestering CO₂ at multiple sites located in the Prairie Pothole Region (PPR) of North America. A terrestrial field validation test was initiated to develop the technical capacity to systematically identify, develop, and apply alternate land-use management practices to the Prairie Pothole ecosystem (at both local and regional scale) that results in net GHG reductions and marketable carbon offsets. As part of this project, PCOR Partnership partners collected soil and gas samples from various age cohorts of restored grasslands, native prairie, cropland, and wetlands throughout Montana, North and South Dakota, Minnesota, and Iowa. In addition to carbon uptake and storage measurements, methane (CH₄) and nitrous oxide (N₂O) gas fluxes were also measured to estimate the net GHG flux of each management practice. These data have been instrumental in advancing terrestrial carbon credits from the PCOR Partnership region into the marketplace.
Terrestrial sequestration projects create carbon credits that can be transacted in voluntary or mandatory regional, national, or international carbon markets. Under a mandatory GHG reduction program, these credits provide entities with alternative compliance options, in addition to direct reductions, to reduce GHG emissions while new less carbon-intensive fuels and technologies are developed.

Many carbon market stakeholders are involved in bringing terrestrial offsets to end users, including those involved in financing, producing, generating, providing, aggregating, and/or marketing GHG emission reductions. The PCOR Partnership project results have supported the development of protocols for terrestrial carbon credit development and trading and are intended to serve as a model to promote and implement terrestrial sequestration across the PPR. The launch of the Ducks Unlimited Carbon Credit Program provides landowners with a revenue stream novel to the agricultural economy of the plains, sequestered carbon. Through this program, landowners sign perpetual grassland easements while, at the same time, they are conveying carbon rights to be bundled and sold on the open market. Results from this project have provided the science and business processes framework needed for project developers and investors to advance emission reduction targets as well as achieve financial returns in this rapidly emerging market.

This Regional Technology Implementation Plan (RTIP) outlines the framework developed for full-scale deployment of grassland-based terrestrial carbon sequestration methods in the PPR. The plan includes methodologies for project development, characterization, comprehensive monitoring, and modeling methods for verification; regulatory, permitting, and accounting frameworks; and public outreach and education strategies. Also included in the RTIP are legal documents for purchasing GHG and carbon rights and for carbon ownership transfer from private landowners to an aggregation entity and from the aggregation entity to the investor, as well as a site management plan that specifies best management practices for carbon sequestration and emission reduction in wetland and grassland complexes throughout the PPR. The RTIP also provides background information on voluntary and regulatory carbon markets in the United States and various GHG registries and programs.

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