

Introduction

Global climate change is considered to be one of the most pressing environmental concerns of our time. This is due in part to the potential magnitude of the changes it could cause and also to the immense economic, technological, and lifestyle changes that may be necessary in order to respond to it. Although uncertainty still clouds the science of climate change, there is strong indication that we may have to significantly reduce anthropogenic greenhouse gas (GHG) emissions. Carbon sequestration offers a promising set of technologies through which carbon dioxide (CO₂) and potentially other GHGs can be stored for long periods of time in sinks represented by biologic materials, geologic formations and, possibly, other places such as oceans. Within central North America, the Plains CO₂ Reduction (PCOR) Partnership is investigating sequestration technologies in order to provide a safe, effective, and efficient means of managing the carbon dioxide emissions across the center of the continent.

The regional characterization activities conducted under the initial effort of the PCOR Partnership confirmed that while there are numerous large stationary CO₂ sources, the region also has a variety of sinks that represent a tremendous capacity for CO₂ sequestration. The varying sources reflect the geographic and socioeconomic diversity of the region. In the upper Mississippi River Valley and along the shores of the Great Lakes Michigan and Superior, large coal-fired electrical generators power the manufacturing plants and breweries of St. Louis,

Minneapolis, and Milwaukee. To the west, the prairies and badlands of the north-central United States and central Canada are home to coal-fired power plants, natural gas processing plants, ethanol plants, and refineries that further fuel the industrial and domestic needs of cities throughout North America.

The PCOR Partnership region is rich in agricultural lands, forests, and wetlands that hold tremendous potential for terrestrial sequestration. The Prairie Pothole Region, which stretches from northwestern Iowa, across the Dakotas, and into Saskatchewan and Alberta, holds promise as an area that can be transformed into a significant terrestrial CO₂ sink. Deep beneath the surface of the region lay geologic formations that hold tremendous potential to store CO₂. Oil fields well suited for sequestering CO₂ can be found in roughly half the region, while formations of limestone, sandstone, and coal suitable for CO₂ storage exist in basins that, in some cases, extend over thousands of square miles. In many cases, large sources in the region are proximally located to large-capacity sinks, and in some cases, key infrastructure is already in place.

This atlas provides an introduction into the concept of global climate change and a regional profile of CO₂ sources and potential sinks across nearly 1.4 million square miles of the PCOR Partnership region of central North America.