

Climate change is now accepted as a reality, and has the potential for severely affecting ecological and economic systems in Saskatchewan. Carbon dioxide (CO<sub>2</sub>) concentrations in the atmosphere have increased from 280 parts per million before the industrial revolution to about 370 ppm today. This increase is thought to play an important role in the global warming that has been observed in the past few decades; this could have important consequences for Saskatchewan. Recent analyses (IPCC 2001) indicate that north-central North America could experience mean annual temperature increases of 3°C - 5°C, with greater than average warming in both winter and summer. Precipitation will likely increase in the winter, but changes in summer precipitation are not well understood. Under a warmer summer climate, evaporation will increase, so soil moisture deficits could become more common. Increased temperatures will allow plants to grow more quickly, but increase growth will be limited where soil moisture availability declines. There is an expectation of increases in plant insect and disease outbreaks, and of increase frequency and severity of forest fires. Many other impacts are likely in the Canadian prairies; for further details see Herrington et al. 1997; IPCC 2001; Johnston 2001a,b; Kulshreshtha 2001; Nyirfa and Harron 2001 and Wheaton 2001a,b,c.

Society's response to climate change falls into two broad categories: adaptation and mitigation. Adaptation refers to changing human activities in order to cope with and perhaps reduce the severity of climate change impacts; the implicit assumption is that climate change will occur and that prevention is not possible. In contrast, mitigation refers to activities designed to prevent climate change from occurring. This would be accomplished by reducing the atmospheric concentration of greenhouse gasses (GHGs), either through reducing emissions to the atmosphere or increasing removals from the atmosphere by biological or geological sequestration. Removal of GHGs through biological sequestration is referred to as a biological carbon sink, and is the subject of this report.