

accidents in the air and road sectors were at a twenty-five-year low. The number of marine and rail accidents was up slightly over 1998 levels, but were still below the five-year average.

### *Environmental Impacts*

Although transportation provides many economic and social benefits, the movement of people and goods can have significant environmental consequences, which can in turn have social and economic repercussions. Sustainable transportation calls for ensuring that the environment is considered along with economic and social considerations in transportation decision making. Environmental impacts of transportation include air and water pollution, greenhouse gas emissions, and the use of land and other natural resources. A range of transportation activities contribute to these pressures, including the construction of infrastructure; road system operation and maintenance; the production, operation, maintenance, and disposal of vehicles; and the provision of energy and fuel, including nonrenewable resources. Social and economic repercussions can include higher health care expenses and the costs of cleaning up pollution.

Greenhouse gas emissions and the resultant environmental effects are a major issue for Canada. Among the major sources of greenhouse gases in Canada, transportation is the single largest, accounting for about 25 percent of total emissions. In December 1997, Canada and other developed countries negotiated the Kyoto Protocol to the United Nations Framework Convention on Climate Change. The protocol commits Canada to reducing its greenhouse gas emissions to 6 percent below 1990 levels during the five-year period from 2008 to 2012. If current trends continue, greenhouse gas emissions from transportation are expected to exceed 1990 levels by 32 percent by 2010 and by 53 percent by 2020.

Exhaust emissions release nitrogen oxides (NO<sub>x</sub>), volatile organic compounds (VOCs), carbon dioxide (CO<sub>2</sub>), and particulate matter into the air. These emissions contribute not only to climate change and acid rain, but also to air pollution and smog, particularly in urban areas. Transportation in Canada accounts for about 52 percent of all NO<sub>x</sub> emissions, 40 percent of CO<sub>2</sub>, 20 percent of VOCs, and 5 percent of particulate matter—the major constituents of urban smog.

Spills and leaks of fuels, oils, and solid and hazardous waste by-products, can contaminate land, surface water, and groundwater. Spills and illegal discharges of oil and oily wastes by ships travelling