



Policies Improving Environment in North America, but New Challenges Such as Climate Change Need Attention

Environmental conditions in North America have improved due to policies, institutions, data collection and assessment, and regulatory frameworks. Air quality, in particular, continues to improve in response to concerted policy action and favorable trends in technology and energy markets. Drinking water quality is extremely good, although water scarcity is of increasing concern in the region. Meanwhile, a rich network of well-managed protected areas is in place and is helping to conserve biological diversity.

However, in recent years environmental challenges have emerged, posing new risks to human wellbeing and ecosystems. Climate change is generating impacts across the region, and aggressive hydrocarbon extraction methods bring the possibility of increased emissions, water use and induced seismicity. However, ongoing trends in renewable energy, rising efficiencies, and energy storage technologies demonstrate the potential to achieve a sustainable energy system.

The GEO-6 report looks at the state of play in key areas, including the following:

Air Quality

Regional, national, and local efforts to improve air quality are having substantial, measurable, and important public health benefits. Robust regulatory systems in Canada and the US have been successful in significantly reducing air pollution. Despite significant progress, the improvements in air quality are not evenly distributed, with approximately 140 million people exposed to pollution above regulatory thresholds, exceeding levels considered harmful to public health. Providing information to the public about air pollutant emissions, concentrations, and health implications has helped individuals mitigate their own exposure and create public demand for air pollution control.

Trends

- Anthropogenic air pollution emissions are driven by population, economic activity, energy consumption and technology. Between 1970 and 2013, US GDP increased by 234 per cent, vehicle miles travelled by 168 per cent, population by 54 per cent and energy consumption by 44 per cent.
- However, through implementation of pollution controls and improved efficiency measures, both Canada and the US have seen a decoupling of gross domestic product (GDP) and other economic and behavioural drivers from emissions. Total emissions of the six main air pollutants – sulphur dioxide, nitrogen oxides, volatile organic compounds, carbon monoxide, particulate matter and lead – fell by 68 per cent. However, between 1970 and 2012, CO₂ emissions increased by 24 per cent.
- The health benefits of action on air quality have estimated value in the order of \$2 trillion. In 2011, the US Environment Protection Agency estimated that by 2020 air pollution controls resulting from the 1990 Clean Air Act Amendments would prevent more than 230,000 early deaths per year.

Biodiversity

North America is home to very rich biodiversity and a confluence of different ecosystems reflecting its geography, geology, natural history and climate. An impressive network of well-managed protected areas across North America is in place and is helping to conserve biological diversity. While progress has been made to improve the conservation status of many individual species, much biodiversity is at risk in North America, with increasing pressures from land use change, invasive species, climate change, and pollution affecting species, both on land and in the coastal marine environment. Resource extraction, particularly for energy production, has been a major driver of land-use change across North America, and restoration efforts are important for both the regeneration of wild spaces and the survival of endangered species.

Trends

- **Urban encroachment:** If long-term trends continue, another 17 million housing units will be built within 50 km of protected areas by 2030, greatly diminishing their conservation value.
- **Climate change**, which alters habitat, temperature, and phenology, and thus has a direct impact on biodiversity. The biggest concern is that species are in effect losing habitat; this has been predicted for more than half of American bird species as migration patterns are being changed.
- Canada has lost 97 per cent of tallgrass/savannah in southern Ontario, 70 per cent of prairie grasslands, by far the largest of Canada's grasslands, and 19 per cent of bunchgrass/sagebrush in British Columbia.
- According to the US Geological Survey, between 1898 and 2010, 57 North American species and subspecies and three unique populations have gone extinct; the rate of extinction is estimated at 877 times the background extinction rate over geological time.

Land

North America's land resources are generally in good shape. Developed landscapes are largely meeting society's needs. Natural landscapes are providing clean fresh water, healthy habitats for wildlife and fish, quality outdoor recreation opportunities, and satisfying many food and fiber needs of North Americans while also contributing to global food and fiber supplies. Large-scale disruptive land-use and land cover changes are kept in check by effective governance policies and regulations. However, natural landscapes are becoming more fragmented in some areas in response to both natural causes, such as wildfires and pest outbreaks, and decisions made about land management activities, ownership transfers to heirs, and development decisions.

Trends

- From 1993 to 2013, 405,000 ha of Canadian forest were converted to cropland use. This is down from the 1,286,000 ha of forest converted to cropland from 1970 to 1990.
- The land area dedicated to crop production in the US 2012 was 146.9 million hectares. This is an increase of 1.56 million hectares since 2007; the first reported increase since 1982 (USDA 2015a). Despite this recent overall gain, the longer term trend was loss of cropland. Increases in urban land are responsible for part of this decline.
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Climate Change

Observations in North America, and beyond, unequivocally demonstrate that the climate is indeed changing and that the warming of the past 50 years is largely due to human-induced greenhouse gas emissions. The impacts of climate change are increasingly being felt across the entire region, affecting human health, wellbeing, and in some cases human security. The prospect for these impacts to worsen in both the near and long term constitutes a priority issue for North America. Canada and the US are taking steps both to mitigate the unmanageable and adapt to the unavoidable impacts of climate change across the region and beyond. Efforts to mitigate climate change through reductions in greenhouse gas emissions and enhanced carbon sequestration are beginning to show tangible results and to create a foundation for potentially major advances. Mitigation successes derive from a wide range of measures, across the federal, regional and local levels and across the public and private sectors, energy efficiency product standards, low-carbon electricity generation, transportation plans, building codes and standards, and other efforts.

Trends

- A prominent five-year drought around the state of Texas ended in the spring of 2015 with devastating floods. The persistent drought conditions migrated north and westwards to California, the source of a significant proportion of US food production. Findings suggest that global warming exacerbated the drought by approximately 15-20 per cent.
- Hurricane Sandy was directly responsible for approximately 150 deaths and \$70 billion in losses. The 30 centimetres of sea level rise off New York City since 1900 likely expanded Hurricane Sandy's flood area by approximately 65 square kilometres, flooding the homes of more than 80 000 additional people in New York and New Jersey alone.
- Solar deployment has increased dramatically, capturing 40 per cent of the market for new electric generating capacity in the US in the first half of 2015. Solar capacity now has reached 22.7 gigawatts nationwide. Solar now powers 4.6 million homes and individual homeowner and utility-scale installations are becoming more common.
- Energy efficiency is also growing. In California, the Energy Commission's energy efficiency standards for buildings have also resulted in savings for consumers. These initiatives have saved more than \$74 billion in electricity costs since 1977.

A Rapidly Changing Arctic

The Arctic is experiencing a profound transformation that is having important impacts on North America and the world as a whole. These rapid changes in the Arctic are driven largely by interacting forces of climate change and increased human activities. As one of the first areas of the world to experience the impacts of climate change, the Arctic region serves as a barometer for change in the rest of the world. Warming in the Arctic has increased at twice the global average since 1980. Other prominent processes that signal greater climate change impacts include glacier and ice sheet melt, altered salinity concentrations and ocean circulation patterns, sea level rise, and ocean acidification.

Trends

- Over the past twenty years, a progressive and dramatic decrease in summer sea ice extent has led to an increased surface area of blue water during the summer months.
- The largest contributions to global glacier ice loss during the early 21st century were from glaciers in Alaska, the Canadian Arctic, and the periphery of the Greenland ice sheet, as well as in the Southern

Andes and Asian mountains. Together these areas account for more than 80 per cent of the total ice loss.

- The melting of sea ice has created new expanses of open ocean, allowing large populations of phytoplankton to bloom and alter the marine food chain.