

Confronting Climate Change in the Great Lakes Region

Technical Appendix Climate Change Solutions

MINIMIZING HUMAN PRESSURES ON THE ENVIRONMENT

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Reducing or eliminating human pressures on the environment often results in long-run economic benefits even though there may be some initial cost. The benefits of such an approach, apart from strengthening the resilience of ecosystems to climate change, include human health benefits from air quality improvements (see [Opportunities for Air Quality Improvements](#)), water purification and water supply protection (see [Opportunities for Water Quality Protection](#)), improved agricultural and forestry productivity, flood protection (see [Opportunities for Urban and Land Use Planning](#)), protection of habitat for important species, as well as aesthetics and recreational opportunities (see [Opportunities for Habitat Protection and Restoration](#)). Minimizing the human impact on the environment is one of three complementary and necessary strategies to comprehensively deal with climate change.

Below we provide examples of strategies and activities already being undertaken in the Great Lakes region (note this list aims not to be comprehensive, but illustrative).

Opportunities for Air Quality Improvements

Air pollution has negative consequences for human health as well as causes environmental damage (particularly high ozone levels). Strategies to reduce heat-trapping gas emissions often have the ancillary benefit of reducing air pollution.

Ontario In 1988, the city of Mississauga in southern Ontario's industrial and commuter belt established the Mississauga Air Quality Advisory Committee and has been implementing a comprehensive air quality improvement plan (with more than 30 separate strategies) ever since. As a result, the community achieved significant utility savings, reductions in energy use and waste, an expanded transit service and bike path network, greater tree cover, and reduced air pollution. See: http://www.fcm.ca/scep/case_studies/air_quality/mississauga_air_sum.htm

New York New York is one of the states in which the Advanced Travel Center Electrification (ATE) program has been implemented. It provides energy-efficient heating, ventilation, and cooling systems (HVAC) for use by truckers at travel centers and other areas where drivers stop and idle their vehicles. The ATE systems reduce idling, fuel consumption, and associated emissions. Air pollutants from trucks are particularly problematic for human health (e.g., particulates, ozone precursors). See: <http://www.pewclimate.org/states/stateprogram.cfm>

Opportunities for Water Quality Protection and Demand/Supply Management

Protecting water supplies – both ground- and surface water – as well as the ecological quality or aquatic habitats and the species that live there, has human health benefits and positive impacts for the quality of life in this water-rich region. Water management also increases reliability for economic sectors and industries dependent on a steady supply of high-quality water.

Throughout the region Efforts are underway throughout the Great lakes region to upgrade sewer and septic systems, and to contain non-point source pollution (e.g., run-off contaminated with toxics from roads, or with animal waste and agricultural chemicals from farm land). These efforts need to be expanded. See: <http://www.gca.ca/water.htm>

Throughout the region All Great Lakes states. Ontario and Quebec are already dealing with the controversial question of water diversion from the Great Lakes outside the basin. Such diversion would entail the resolution of legal, policy, and procedural questions involving all Basin members. See: <http://www.mlui.org>

Michigan Water supply concerns can be addressed by developing more effective water conservation schemes during the summer months and in water-intensive agricultural and industrial operations. Michigan is currently considering legislative proposals that would improve monitoring of groundwater pumping and regulate heavy water users.
See: <http://www.mlui.org/landwater/fullarticle.asp?fileid=16453>

Opportunities for Urban and Land Use Planning

Urban and rural land use planning can reduce sprawl, which reduces GHG emissions from transportation; avoid habitat destruction and fragmentation; reduce or at least contain the area of impervious surfaces, in turn decreasing flooding potential; limit the loss of valuable agricultural land; and through the types of land uses also affect the reflectance of the landscape and hence local and regional climate.

Michigan In Grand Rapids, for example, a civic movement led to comprehensive land use policy reforms, including the preservation of connected open lands and natural areas, the establishment of compact business centers served by mass transit, encouragement for infilling and redevelopment into compact neighborhoods and communities close to the business centers, and the limits on extending water and sewer services.
See: Schneider, K. (1999). Acting as a region to tame sprawl: Grand Rapids leads the way in Michigan. *Great Lakes Bulletin* 4, 2: 7-12.

Ontario In January 1996, the city of Ottawa began its Natural and Open Spaces Study (NOSS) to evaluate all remaining natural and open spaces in the city with respect to their environmental and social values. Based on the results of this study, the city set targets for the preservation of these natural areas and corridors and assigned areas different protection levels. Now accessible through a Geographic Information System, the database is the foundation of land management recommendations. The city aims at the long-term sustainability, enjoyment and enhancement of its green spaces.
See:
http://www.fcm.ca/scep/case_studies/land_use/ottawa_landuse_Sum.htm

Opportunities for Habitat Protection and Restoration

Healthy natural and well-managed ecosystems are more resilient to external stresses stemming from natural or human sources. It is thus vital to maintain ecosystem functioning, the structure and viable sizes of habitats.

- Throughout the region** Given the already large threat to Great Lakes biodiversity from invasive species, it is vital to continue to implement strong protection against invasive aquatic and terrestrial organisms, and maintain regional biodiversity to the extent possible. One example is the Great Lakes-wide effort to contain the spread and expansion of the exotic Eurasian water milfoil. This aquatic species forms thick mats, which shade water bodies, use up oxygen and crowd out native plants.
See: <http://www.great-lakes.net/envt/flora-fauna/invasive/milfoil.html>
- Indiana** Maintaining wetlands and requiring mitigation when wetlands are destroyed by development, provides an array of ecosystem services from flood control and water purification to preservation of important species habitat. In Indiana, a rare type of wetlands – oak dune savanna – was recently donated by the Save the Dunes Council to be integrated into the Indiana Dunes National Lakeshore. It is believed to sustain populations of the endangered Karner blue butterfly.
See: <http://www.indystar.com/print/articles/9/031289-6539-009.html>
- Michigan** Michigan's Natural Rivers Program and its Old Growth and Biodiversity Stewardship Planning process are aimed at rehabilitating wooded riparian buffer strips, restoration of floodplain forests, and wetland preservation and restoration. Together they can help maintain and restore valuable habitat and improve the recreational experience while hiking, boating, swimming, fishing and hunting.
See: http://www.michigan.gov/dnr/0,1607,7-153-10367_11852-34663--,00.html
- Ontario** Ontario's Living Legacy program aims to enlarge the province's protected areas system by 2.4 million hectares, bringing Ontario's total protected lands to more than 9.5 million hectares. This project is the biggest expansion of the parks system in Ontario's history.
See: <http://www.ontarioslivinglegacy.com/>