

**Health Priority: Environmental and Occupational Health Hazards  
Objective 5: Environmental Health Indicators for Air, Land, and Water  
(Template)**

**Long-term (2010) Subcommittee Outcome Objective:**

By 2010, enhance the quality of life in Wisconsin through improvements in environmental health indicators for air, land, and water.

Long-term outcome objective updated as of: Sept 2004

<b>Wisconsin Baseline</b>	<b>Wisconsin Sources and Year</b>
This is a developmental objective. Refer to Attachment I for an in depth discussion on the scope and measurement challenges of this objective.	Specific indicators under development.

<b>Federal/National Baseline</b>	<b>Federal/National Sources and Year</b>
See Appendix A - Reduction in Air Pollutants baseline and target data.	<i>Healthy People 2010</i> , November 2000, United States Department of Health and Human Services cites the following sources for this baseline data: Aerometric Information Retrieval System, Environmental Protection Agency, Office of Air and Radiation.
See Appendix A - Increase in Use of Alternative Modes of Transportation baseline and target data.	<i>Healthy People 2010</i> , November 2000, United States Department of Health and Human Services cites the following sources for this baseline data: Nationwide Personal Transportation Survey, U.S. Department of Transportation.

<b>Related USDHHS Healthy People 2010 Objectives</b>			
<b>Chapter</b>	<b>Goal</b>	<b>Objective Number</b>	<b>Objective Statement</b>
8 – Environmental Health	Promote health for all through a healthy environment.	8-1	Reduce the proportion of persons exposed to air that does not meet the U.S. Environmental Protection Agency’s health-based standards for harmful air pollutants.
		8-2	Increase use of alternative modes of transportation to reduce motor vehicle emissions and improve the Nation’s air quality.

<b>Definitions</b>	
<b>Term</b>	<b>Definition</b>
None identified.	

--	--

**Rationale:**

Recent decades have spawned a vast body of knowledge on the close and complex relationships between changes in environmental quality and adverse human health outcomes. These relationships are grounded in the basic human necessity for air, water, and food that are both pure and plentiful, and the range of impacts that historical and recent environmental contamination has had on these resources. Acceleration in the decline in animal and plant species provides evidence that stresses in the environment are negatively affecting the ability to sustain the range of biological processes required to provide our own species with its necessary biological infrastructure. Recent discoveries of the effects of a wide array of chemical substances on the endocrine system and elevated burdens of dozens of contaminants in human tissue demonstrate that hazards in the present environment represent an aggregate health risk that defies our current capacity for definitive identification, evaluation, and control.

Unfortunately there are few data sources available that can be used to provide a comprehensive assessment of environmental problems as health hazards. There are few diseases for which clear environmental etiologies have been established. Environmental health assessment efforts need information not only for the diseases that are environmentally related, but also for the concomitant potential environmental hazards and exposures. We do not yet have biological markers that can tell us which disease may be caused by specific exposures. While we do have laboratory assays that are highly sensitive for measuring levels of a wide variety of chemicals and compounds in human blood and tissue, we do not yet have sufficient information on the adverse health effects of these chemicals when detected at low levels in humans.

One key step in advancing environmental public health is to develop indicators for environmental exposures and adverse health effects that will allow a quantitative and qualitative understanding of progress or decline. The National Research Council, in their 1999 report Health Performance Measurement in the Public Sector, noted that “Efforts to monitor environmental health risks and steps taken to control them...requires a mix of information on the hazards (e.g., specific air or water pollutants), the exposures (e.g., biological markers, such as blood lead levels) and health outcomes (e.g., asthma, birth defects, and cancer)... A crucial factor for performance measurement is a lack of consensus on appropriate indicators of environmental health status or of capacity and processes in environmental health services.”

In a 1999 position statement, the Council of State and Territorial Epidemiologists underscored the seriousness of the barriers in delivering environmental health programs and services. “Rebuilding public health environmental capacity will lead to a more credible, scientific basis for environmental and occupational regulation. Public health can assist in integrating advances in a variety of scientific disciplines to understand mechanisms, exposure and effects for environmental pollutants.”

Wisconsin must strengthen the links between fundamental science, toxicology, and epidemiology if we are to achieve and measure improvement in our quality of life.

## **Outcomes:**

### **Short-Term Outcome Objective (2002-2004)**

- Improve attitudes toward individual behaviors that contribute positively to environmental quality.
- Increase awareness of health concerns related to decreased environmental quality.
- Promote creation of local groundwater protection advisory committees.
- Increase use of Geographical Information Systems to link environmental and epidemiological data.
- Increase collection and analysis of environmental data.

**Inputs:** (*What we invest – staff, volunteers, time money, technology, equipment, etc.*)

- Media
- Health and environmental educators
- Community-based organizations
- State and local health agencies
- Tribes
- Academic institutions
- Wisconsin Department of Natural Resources
- Department of Agriculture, Trade and Consumer Protection.
- Local governments

**Outputs:** (*What we do – workshops, meetings, product development, training. Who we reach-community residents, agencies, organizations, elected officials, policy leaders, etc.*)

#### Activities:

- Increase the capacity and motivation of individuals to contribute positively to environmental preservation.
- Increased motivation to take individual action to preserve public health by maintaining environmental quality.
- Increased local understanding and input on groundwater quality efforts.
- Increased ability to identify and critically investigate relationships between health outcomes and environmental exposures.
- Increase quality and quantity of environmental data available for health-related analysis.

#### Participation/Reach

- Citizens
- Healthcare providers
- Policymakers
- Public institutions
- Private/non-profit
- Business
- Schools
- Faith-based communities

- Home owners
- Industry
- Health agencies
- Tribes
- Federal government
- Laboratory staff
- Individuals
- Legislators

**Medium-Term Outcome Objective (2005-2007)**

- Increase use of integrated pest management techniques.
- Increase use of environmentally-friendly consumer packaging.
- Increase use of pollution prevention practice in industry (e.g., waste minimization, alternative chemicals, etc.).
- Increase use and capacity of public transportation.
- Increase use of alternative fuels.
- Increase use of ‘no-till’ and other erosion control strategies.
- Develop and implement sound regional land use planning strategies.
- Reduce per capita water consumption.
- Reduce non-point sources of water pollution.
- Increase capacity of local governments to assess land, water, and air quality issues.

**Inputs:** (*What we invest – staff, volunteers, time money, technology, equipment, etc.*)

- State Agencies:
  - Wisconsin Department of Health and Family Services
  - Wisconsin Department of Agriculture, Trade and Consumer Protection
  - Wisconsin Department of Natural Resources
  - Wisconsin Department of Commerce
- Federal agencies
- University of Wisconsin-Extension
- Industry
- Federal, state, tribal, and local governments
- Legislature
- Regional and local planning agencies
- Federal and state agricultural agencies
- Community-based organizations
- Academic institutions
- Water utilities
- Local planning and zoning agencies
- Industrial sector

**Outputs:** *(What we do – workshops, meetings, product development, training. Who we reach-community residents, agencies, organizations, elected officials, policy leaders, etc.)*

Activities:

- Decreased dependence on chemical pesticides in the agricultural community.
- Decreased disposal of product packaging in Wisconsin landfills.
- Reduced emission of industrial chemicals.
- Decreased transportation-related air pollution.
- Decreased transportation- and energy-related air pollution.
- Decreased erosion of Wisconsin agricultural land.
- Increased consideration of environmental concerns in local and regional planning efforts.
- Eliminate decline in water tables in Wisconsin.
- Decreased contribution of non-point pollution to surface water and groundwater.
- Increase ability of localities to comprehensively address declining environmental indicators.

Participation/Reach:

- Citizens
- Healthcare providers
- Policymakers
- Public institutions
- Private/non-profit
- Business
- Schools
- Faith-based communities
- Home owners
- Industry
- Health agencies
- Tribes
- Federal government
- Laboratory staff
- Individuals
- Legislators

**Long-term Outcome Objectives (2008-2010)**

- Preserve and protect wetlands and forested, agricultural and recreational land.
- Reduce industrial and transportation-related air pollution.
- Preserve and protect groundwater, surface water and recreational water resources.
- Preserve and protect species diversity.

**Inputs:** (*What we invest – staff, volunteers, time money, technology, equipment, etc.*)

- State agencies:
  - Wisconsin Department of Health and Family Services
  - Wisconsin Department of Natural Resources
  - Wisconsin Department of Agriculture, Trade and Consumer Protection
  - Wisconsin Department of Commerce
  - Wisconsin Department of Transportation
- U.S. Department of Energy
- Community-based organizations
- Legislators
- Local and tribal governments
- Environmental Protection Agency, Department of Interior
- Industry
- Community-based organizations

**Outputs:** (*What we do – workshops, meetings, product development, training. Who we reach-community residents, agencies, organizations, elected officials, policy leaders, etc.*)

- Ability to effectively sustain land resources for full range of current and anticipated recreational and commercial uses.
- Reduction of air pollution below levels which may contribute to existing, anticipated and unanticipated adverse health outcomes.
- Ability to sustain pollutant and natural contaminant levels in surface water and groundwater at levels that contribute to existing, anticipated and unanticipated adverse health outcomes.
- Sustain current range of animal, plant, and microbial species that provide biological and ecological infrastructure for human health.

Participation/Reach:

- Citizens
- Healthcare providers
- Policymakers
- Public institutions
- Private/non-profit
- Business
- Schools
- Faith-based communities
- Home owners
- Industry
- Health agencies
- Tribes
- Federal government
- Laboratory staff
- Individuals
- Legislators

## **Evaluation and Measurement**

Many of the environmental changes of concern addressed by this objective, such as air pollutant levels or surface water and groundwater contamination, can be directly monitored on an ongoing basis. Developmental work will be needed to fully assess success in maintaining the quality and quantity of wetlands, forested, agricultural, and recreational land. While means of assessing the maintenance of species diversity are available on a state and national basis, the manner in which relevant data are interpreted in the public health community has not been fully developed.

## **Crosswalk to Other Health and System Priorities in Healthiest Wisconsin 2010**

There are significant relationships between this objective and nearly all the other priorities addressed by subcommittees. Environmental factors associated with air, water, and land interact with all human activities and contribute actively and passively as disease modifiers. The environment can facilitate healthy behaviors or serve as a barrier to improving health status. Some specific crosswalks are discussed below.

*Existing, Emerging, and Re-emerging Communicable Diseases:* Environmental media such as water (drinking or recreational surface use), soil contamination (use of sewage sludge) and air contamination are likely to contribute as exposure routes for communicable diseases. Environmental megatrends such as global warming will also contribute.

*Overweight, Obesity, and Lack of Physical Activity:* Lack of access to environments that facilitate physical activity contributes to the national epidemic of obesity. The issue of urban sprawl with inadequate sidewalks, lack of urban bicycle trails, and recreational activities only accessible through the use of automobiles, are environmental factors which contribute barriers to the goals of this priority.

*Integrated Electronic Data and Information Systems:* The development of data systems that can integrate health data with environmental exposure information will be critical in identifying exposure-response relationships related to environmental and/or occupational determinants. Such data systems will be critical to allowing analyses that will support the need for environmental regulation and control.

*Coordination of State and Local Public Health System Partnerships:* Most of the environmental regulations and enforcement is done by agencies other than public health. It is especially important that public health partnerships be established in environmental health if these non-traditional public health areas are to be adequately addressed.

## **Significant Linkages to Wisconsin's 12 Essential Public Health Services**

Because this objective covers all environmental media it relates to all 12 essential public health services. However, the specifics of the objective relate most directly to two essential public health services: the identification, investigation, control and prevention of environmental health hazards and the enforcement of laws and regulations related to health and safety. Because much work is needed and current tools are inadequate, important components of the objective also relate to the research service “conduct research to seek new insights and innovative solutions to health problems.”

*Identify, investigate, control, and prevent health problems and environmental health hazards in the community:* Meeting this objective falls squarely in the domain of preventing health problems related to environmental health hazards and developing the tools to assess progress.

*Enforce laws and regulations that protect health and insure safety:* Effective occupational and environmental standards exist for many substances and work practices, the enforcement of these standards often remains inadequate to protect the most vulnerable. Tracking environmental health indicators will help determine the impact of regulatory failure and indicate where we have succeeded and where greater efforts or new approaches are needed.

*Conduct research to seek new insights and innovative solutions to health problems:* In addition, conducting research in seeking new insights into health problems that may be associated with environmental degradation will be important in assessing those environmental interventions that will be most beneficial in improving public health.

### **Connection to the Three Overarching Goals of Healthiest Wisconsin 2010**

*Protect and promote health for all:* Protecting the quality of air, water, and agricultural land offers assurance that these basic resources will be protected and represent a population-wide public health assurance.

*Eliminate health disparities:* Because of statewide variations in the quality of air, water, and land resources, addressing this objective naturally represents an effort to eliminate health disparities in the state.

*Transform Wisconsin's public health system:* Viewing species diversity and other environmental quality parameters as stand-alone public health determinants requires taking on a transformed public health paradigm and will accordingly require that new partners be identified and empowered.

### **Key Interventions and/or Strategies Planned:**

Communicating the need to view environmental quality as a critical public health endpoint will require interventions among legislators and other high-level policymakers, local and regional planners as well as the general public. Legislators and policymakers will need data and new information as public health science becomes better informed on the impact of environmental changes on health outcomes. Making local and regional governments (e.g., land use planning and zoning agencies) aware of the public health implications of their decisions will be key to making progress on this objective. Finally, it will be necessary to bring about behavior change among consumers, commuters, well owners, and other sectors of the public if sustainable changes in environmental quality are to be made.

## References:

- Burke T., Anderson H., et al. (1992). Role of exposure databases in risk management. *Arch Environ Health* 47.6:421-429.
- Friedman, et al. (2001). Impact of transportation and commuting behaviors during the 1996 Summer Olympic Games in Atlanta on air quality and childhood asthma. *JAMA* 285(7):897-905.
- Institute of Medicine (1988). *The Future of Public Health*. National Academy of Sciences. Washington, DC.
- Jackson, R.J., & Kochtitzky, C. (2002). *Creating a Health Environment: The Impact of the Built Environment on Public Health*. Strawl Watch Clearinghouse Monograph Series, 1400 16<sup>th</sup> St., NW, Suite 225, Washington, DC 20036.
- National Association of County and City Health Officials. (2000). *Protocol for assessing community excellence in environmental health* (PACE-EH).
- Pastides, H. (1995). An epidemiological perspective on environmental health indicators. *Wld hlth statist quart* 48:140-3.
- Rothwell, C.J., Hamilton, C.B., & Leaverton, P.E. (1991). Identification of sentinel health events as indicators of environmental contamination. *Environmental Health Perspectives* 94:261-3.
- Thacker, S.B., Stroup, D.F., Parrish, R.G., & Anderson, H.A. (1996). Surveillance in environmental public health: issues, systems, and sources. *Am J Public Health*, 86:633-638.

## APPENDIX A

*Healthy People 2010*, November 2000, United States Department of Health and Human Services cites the following baseline and target data:

Reduction in Air Pollutants.	1997 Baseline (Percent)	2010 Target (Percent)
(8-1a) Ozone*	43	0
(8-1b) Particulate matter*	12	0
(8-1c) Carbon monoxide	19	0
(8-1d) Nitrogen dioxide	5	0
(8-1e) Sulfur dioxide	2	0
(8-1f) Lead	<1	0
	Number	
(8-1g) Total number of people	119,803,000	0

\* The targets of zero percent for ozone and particulate matter are set for 2012 and 2018, respectively.

*Healthy People 2010*, November 2000, United States Department of Health and Human Services cites the following baseline and target data:

Increase in Use of Alternative Modes of Transportation	1995 Baseline (Percent)	2010 Target (Percent)
(8-2a) Trips made by bicycling	0.9	1.8
(8-2b) Trips made by walking	5.4	10.8
(8-2c) Trips made by transit	1.8	3.6
(8-2d) Persons who telecommute	Developmental	Developmental