Alternative Landscaping Equipment Grant

Project evaluation methods

This document outlines the methods used to develop criteria for project selection for the Minnesota Pollution Control Agency's (MPCA) Alternative Landscaping Equipment Grant.

The MPCA has worked with the Minnesota Department of Health (MDH) and the MPCA's Environmental Justice Advisory Group on these methods.

Environmental justice (EJ)

The MPCA is committed to making sure that pollution does not have a disproportionate impact on any group of people – the principle of environmental justice.

The MPCA defines areas of concern for environmental justice as:

- Census tracts where more than 50% of residents are people of color or American Indians
- Census tracts where more than 40% of the households have an income of less than 185% of the federal poverty level
- Tribal lands

Click here to see a map of areas of concern for environmental justice in Minnesota.

The MPCA's environmental justice mapping tool identifies areas of concern for environmental justice at the census tract-level. Since landscaping equipment moves around, census tracts are too small a geography to reasonably identify as a primary place that a piece of equipment operates. So for the Alternative Landscaping Equipment application, MPCA identified ZIP codes where none of the area had identified census tracts of concern for environmental justice, ZIP codes where less than 49% of the acres are areas of concern for environmental justice, and ZIP codes where more than 50% of the acres are areas of concern. Projects that reduce emissions in these ZIP codes will receive 0, 15, or 30 points, respectively.

Health

To consider the potential health benefits of reduced pollution in a community, an inter-disciplinary team at MDH worked to develop a science-based method for identifying areas of the state overburdened with air quality-related health concerns. MDH relied on multiple MDH data sources, covering representative health conditions that can either be worsened by air pollution exposure or make individuals more vulnerable to air pollution exposure.

MDH considered a variety of health indicator data and among these selected indicators that best and most uniquely represent health vulnerability to air pollution exposure. The four health indicators they selected – respiratory and cardiovascular diseases, adverse birth outcomes, and obesity – are summarized in Table 1. For data privacy reasons, health data is available at the ZIP code level for the Twin Cities Metropolitan Area, but only at the county level in Greater Minnesota.

Table 1. Indicators included in health vulnerability index

Health indicator	Years	Greater MN counties	Metro ZIP codes
Asthma emergency department visit rate, all-ages, age-adjusted	2013-2017	✓	✓
Heart attack hospitalization rate, among adults over 35, age-adjusted	2013-2017	✓	✓
Premature (< 37 weeks gestation) birth rate, among singleton births	2012-2016	✓	✓
Obesity rate, among adults over 18*	2014-2017	✓	
Obese or overweight rate, among children enrolled in the MDH Women, Infant & Children (WIC) Information System*	2013-2017		✓

* Note that data sources for the obese/overweight indicator are different for Metro zip codes versus Greater MN counties, due to data availability and resolution.

MDH staff determined that a health vulnerability index was the best way to combine multiple important conditions in a single health metric for scoring project applications. They calculated the index using standard public health methods. MDH examined indicator distributions and explored multiple cut-points to create "high" and "low" vulnerability categories. Due to the positive skew of health indicator distributions, they stratified each indicator at the 75th percentile to better target the areas with highest health vulnerability.

They then assigned each area a score of 0 or 1 depending on whether the health condition was below or above that cut-point, respectively. For example, if the rate of asthma emergency department visits in a given county fell above the overall statewide 75th percentile, then that county would be assigned a score of 1 for the asthma indicator. The scores assigned for each of the four indicators were then summed for each geographic area. The index range is 0 to 4, with higher scores indicating higher health vulnerability to air pollution. For simplicity, we compressed the index to a three-level score to assign the 15 points for health criteria in the overall project scoring (Table 2).

Table 2. Health criteria scoring

Health vulnerability index, by geographic area	Health criteria points
All health indicators below the 75th percentile (score 0)	0
One health indicator above the 75th percentile (score 1)	7.5
Two or more health indicators above the 75th percentile (score 2 to 4)	15

Detailed information about each of the health data sources can be found on the MN Public Health Data Access Portal.

Air pollution concentrations

To consider the potential exposure benefits of reducing pollution, the MPCA developed a method to consider air pollution concentrations in different parts of the state. Because it is not feasible to monitor air quality on every block in the state, the MPCA must use its MNRISKS computer model to understand potential air pollution concentrations in a fine scale. MNRISKS uses reported and estimated air pollution emissions from all kinds of sources, including traffic (2011 air emissions inventory), along with meteorological and topographic conditions, and modeled understanding of chemical reactions in the atmosphere, to determine estimated air pollution levels across the state.

The MPCA used modeled air concentrations of fine particles and nitrogen dioxide because these are the primary pollutants associated with pollution and the MPCA has substantial data on their emissions. Using the emissions data, MPCA produced a modeled air pollution concentration map for the entire state for the two pollutants.

We then used the federal Air Quality Index (AQI) breakpoints for good, moderate, unhealthy for sensitive groups, and unhealthy AQI levels to identify areas of the state that have modeled higher air pollution concentrations, for purposes of scoring. The health benchmarks used for calculating the AQI are pollutant specific and are established by the U.S. Environmental Protection Agency through the National Ambient Air Quality Standards. The points for both pollutants for their ZIP code will be summed for a total of 15 points for air emission criteria.

Cost effectiveness

Cost effectiveness will be calculated using the amount the applicant is requesting be covered by the grant funds and dividing by volatile organic compounds (VOC) emissions reductions of the project. In evaluating project proposals, the equipment that achieve the greatest emissions reductions will be awarded the most points based on the system outlined in Exhibit A of the Request for Proposals (RFP). If interested, applicants can calculate their VOC emission reductions using the Handheld 2-cycle engine emissions calculator (p-sbap5-36).