Healthy Planning 2:
Incorporating Local Policies
and Strategies on
Health and Climate Change
into Comprehensive Plans

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EXECUTIVE SUMMARY

From 2011 to 2012, MDH reviewed the "developed community"[i] comprehensive plans (comp plans) in the Twin Cities seven-county metro area to assess whether communities in Minnesota were planning for climate change and public health. MDH used a set of 23 health indictors to review the plans. An initial report was released in spring 2012 with results from 11 health indicators that were relevant to the regional planning process overseen by the Metropolitan Council ("Met Council"). The first report, *Healthy Planning: A Review of the Seven County Metropolitan Area Developed Community Comprehensive Plans*, is available online at www.health.state.mn.us/topics/places/plans.html.

This report discusses the 12 health indicators that are important for healthy planning but were beyond the scope of the Met Council regional planning process. MDH reviewed the same 52 developed community comp plans as the report completed in 2012 for a second time with the new 12 health indicators. See sidebar for a list of the 12 health indicators and summary of findings. MDH considered a comp plan as achieving a health indicator if it met certain key-word searches. Search terms for each health indicator are described in the full body of the report. Each indicator could be met in one of three ways: 1) the indicator was achieved by an adopted plan, program or policy; 2) the comp plan provided direction through goals and strategies that have been established to meet the health indicator's objective; or 3) the comp plan referenced or discussed the health issue, but there was little or no direction

12 Local Health Indicators	YES	NO
#1. Does the plan address energy-efficient buildings?	38	14
#2. Does the plan provide direction on brownfield cleanup?	21	31
#3. Does the plan provide guidance on separating incompatible land uses with residential areas and natural resources?	45	7
#4. Does the plan provide guidance on travel demand management (TDM) strategies?	29	23
#5. Does the plan address vegetated buffers along water bodies?	29	23
#6. Does the plan address the maintenance and preservation of the community's tree canopy?	40	12
#7. Does the plan address the views of greenery or vistas?	29	23
#8. Does the plan address crime prevention through environmental design (CPTED)?	9	43
#9. Does the plan address access to healthy food sources, such as grocery stores and farmers' markets?	8	44
#10. Does the plan discuss local food production?	7	45
#11. Does the plan address extreme heat events?	5	47
#12. Does the plan provide strategies to convert community facilities, fleets and operations to a carbon-neutral environment?	8	44

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[i] The developed communities are the cities where more than 85% of the land is developed, infrastructure is well established and efforts must go toward keeping it in good repair. (Source: Met Council's 2030 Regional Development Framework, adopted January 14, 2004 and amended December 14, 2006.)

in achieving the outcome.

MDH found that three health indicators were met by over 75% of the comp plans, including separating incompatible uses, tree canopy cover, and energy-efficient buildings. Recommendations in this report for communities to support these issues further include implementing performance-based codes and vegetative screening to protect incompatible uses; adopting a municipal tree ordinance or an urban forestry master plan to improve tree canopy cover; and making green building certification a requirement for future public or publicly supported building projects.

Over 50% of the comp plans addressed the health indicators for travel demand management, vegetative buffers along water bodies, and views of greenery. Recommendations in this report for the communities that did not address these issues or want to improve on them include focusing on strategies that reduce vehicle-miles traveled and congestion regionally, such as incentivizing flexible work hours and telecommuting for public and private employers and promoting ride-share programs; restricting development in critical areas, such as shorelines and protecting natural vegetation; and encouraging new developments to design windows that overlook trees and landscaping rather than parking lots, particularly for schools, hospitals and other sensitive uses.

Less than 15% of the comp plans addressed the following four health indicators: access to healthy foods, local food production, extreme heat events/urban heat island, and carbon reductions/neutrality. Recommendations in this report for all communities to increase healthy food consumption and production include reducing barriers to and actively attracting healthy food retailers (e.g., farmers' markets, mobile vendors and grocery stores), providing links to existing retailers (e.g., public transit and bicycle and pedestrian infrastructure), supporting small urban and community gardens or policies to preserve remaining agricultural land (e.g., zoning and transferable development rights), and promoting programs such as farm-to-school initiatives that support local food production and access to healthy foods for school children. Recommendations for all communities to reduce the urban heat island effect and carbon emissions include increasing urban green spaces and shading of impervious surfaces (e.g., tree canopy and green roofs); measuring the carbon footprint of community facilities, fleets and operations; and developing a Climate Action Plan to reduce emissions across sectors (e.g., public and private; buildings and transportation).

The findings from this report provide a list of health issues that may be missing from consideration when planning the built environment. The recommendations for addressing the health issues include policies and language that can be included in comprehensive plans. Communities interested in incorporating more health impacts into future planning processes should go to the MDH Healthy Places website at www.health.state.mn.us/topics/places/plans.html for the Healthy Planning Training and How-To Guide. The Training describes eight overarching health goals that planners can achieve by implementing a number of strategies. The How-To Guide provides a more in depth discussion of the strategies introduced in the Training. Planners and policy makers should be cognizant of the local context when addressing the health goals and focus on the health goals and strategies that are most appropriate for their community.

Comp plans can be an effective tool for promoting the health of community residents by ensuring the built environment is design to encourage safety and healthy behavior. Because communities are very different, the scope and focus of comp plans varies; some strategies may already be in place, but others can be incorporated to better respond to health needs of each individual community.

The mission statement of the Minnesota Department of Health (MDH) is to: "*Protect, maintain and improve the health of all Minnesotans*." The agency's guiding framework for accomplishing this mission includes three goals that are relevant to local planning and comprehensive plans (comp plans). They are the following:

1. *Promote health throughout the lifespan*

2. *Make physical environments safe and healthy*

3. *Prepare for and respond to disasters and emergencies*

MDH promotes its mission and health goals through a "Health in All Policies" approach. The Health in All Policies approach recognizes that most decisions related to health are made by other sectors, such as transportation, housing and industry, and that in order to have a healthy society health departments need to take an active role in demonstrating how other sectors' programs, plans and policies promote or hinder health. The Health in All Policies approach helps integrate the consideration of health impacts into other sectors' programs, plans and policies.

The World Health Organization (WHO) Adelaide Statement on Health in All Policies describes how a health in all policies approach leads improved health outcomes because health is determined by more than just health care decisions.[1]

> ***The Adelaide Statement on Health in All Policies*** *is to engage leaders and policy-makers at all levels of government—local, regional, national and international. It emphasizes that government objectives are best achieved when all sectors include health and well-being as a key component of policy development. This is because the causes of health and well-being lie outside the health sector and are socially and economically formed. Although many sectors already contribute to better health, significant gaps still exist.*
>
> *The Adelaide Statement outlines the need for a new social contract between all sectors to advance human development, sustainability and equity, as well as to improve health outcomes.*
>
> *- World Health Organization*

MDH encourages all sectors to consider health in its programs, plans and policies. This report provides information on how comprehensive planning impacts health, and what planners can do to promote better health of their communities. All disciplines and sectors, including planners, play a role in creating policies and plans that protect, maintain and improve people's health.

BACKGROUND

In 2010, MDH received funds from the Centers for Disease Control and Prevention (CDC) to review the regional comprehensive planning process used for the Twin Cities seven-county metropolitan (metro)

area. The purpose of the review was to determine if public health and climate change adaptation and mitigation are being addressed within the comp plans for the metro area.

Comp plans are one of the primary tools used by local governments to achieve their vision, regulate land uses and guide future investments over a specific period of time. Comp plans influence the design of communities, which can promote public health and healthy behavior. In the metro area, communities must update and submit a comp plan every 10 years to the Metropolitan Council ("Met Council") – the regional planning agency. Comp plans must include a background section; a land use section, which includes a housing plan; a public facilities section for transportation, aviation, water resources and parks plans; and an implementation plan. The most recent comp plan updates were due in 2008.

In 2012, MDH released the first report on 11 health indicators that were relevant to the regional planning process overseen by the Met Council. MDH presented the findings and recommendations from the first report to the Met Council's Community Development Committee on May 21, 2012, asking that the Met Council support the findings and recommendations to include more guidance on health and climate change in the Regional Development Framework and Policy Plans.[ii] MDH also shared its recommendations with Met Council staff. On September 20, 2012, MDH presented the findings to the Met Council Land Use Advisory Committee members who work on and provide feedback to the update of the Regional Development Framework, "Thrive MSP 2040." The Regional Development Framework will guide the next round of comp plan updates due to the Met Council in 2018.

Additionally, MDH reviewed 12 health indicators relevant to local planning. The additional 12 indicators were addressed separately because they require initiative by local communities and were outside the jurisdiction of the regional planning processes of the Met Council. MDH reviewed the same 52 developed community comp plans, updated in 2008, as the report completed in 2012 for a second time with the new 12 health indicators. The review determined whether the 12 health indictors were addressed in the most recent plans, and if so, how they were incorporated into local plans. The relevance of the health indicators are supported by research on the association of the built environment, climate change, and health outcomes. The findings from the review of the 12 indicators are summarized in this report.

Best practices from the first and second reports have been incorporated into a training and how-to guide for planners who are interested in addressing health and climate change in future comp plans. All materials can be found on the MDH Healthy Places website at: www.health.state.mn.us/topics/places/plans.html.

[ii] The Council's policy documents include the Transportation Policy Plan, the Water Resources Management Policy Plan, and the Regional Park Policy Plan.

The United States spends more money on health per person than any other country; yet U.S. citizens' life expectancy is nearly four years shorter than expected based on health expenditures.[2] Also, approximately 10% of preventable mortality can be attributed to direct medical care, while social circumstances, environmental exposure, and behavioral patterns are estimated to account for 60% of the risk of premature death.[3] See Figure 1: Proportional Contributions of Contributing Factors to Premature Death.

Figure 1: Proportional Contributions of Contributing Factors to Premature Death (Source: Braunstein & Lavizzo-Mourey, 2011)
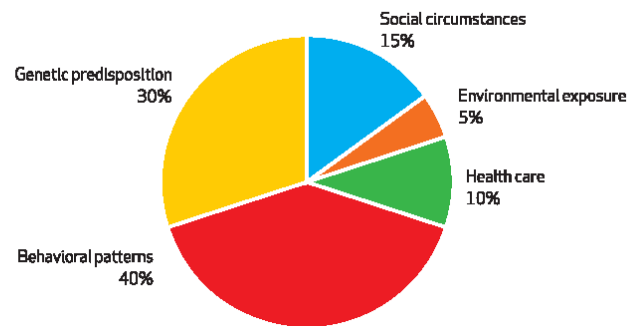
Social circumstances, environmental exposures and behavioral patterns are related to where you live, work and play and the quality of those environments. Social circumstances are often characterized by education and income, and research has shown that achieving higher levels of education and income is related to

your neighborhood.[4] Environmental exposure from where you live pertains to personal safety, quality of housing and even air pollution emissions, such as from a freeway running through your neighborhood. Behavioral patterns, such as physical activity and consumption of healthy foods, are influenced more by availability of safe infrastructure (e.g., streets, sidewalks and parks), accessibility, and cost than personal preference. A report by the Robert Wood Johnson Foundation states, "The solutions to our health problems lie not principally in hospitals and doctors' offices but in our homes, our schools, our workplaces, our playgrounds and parks, our grocery stores, sidewalks and streets, in the air we breathe and the water we drink."[5] More directly put, the choices planners and public officials make on the development of the built environment are critical to the health of residents.

Fast Facts:

- Almost half of preventable deaths in the United States are related to behaviors such as poor dietary practices or inadequate physical activity.[6]

- Authors of a study in Atlanta, GA reported that car-friendly communities had almost double the rate of obesity as pedestrian-friendly communities (22% vs. 12%).[7]

- Access to public parks and recreational facilities has been linked to reductions in crime and juvenile delinquency.[8]

- Introduction of electronic toll collection (E-ZPass), which lowered concentrated idling emissions at the toll plaza, reduced prematurity and low birth weight among mothers within 2 km of a toll plaza by 10.8% and 11.8% respectively, relative to mothers 2-10 km from a toll plaza.[9]

The climate also directly and indirectly influences our health and environment. Observed changes in Minnesota's climate can exacerbate health issues related to our built environment. For example, rising temperatures combined with existing levels of air pollution emissions from power plants and motor vehicles have the potential to increase the development of ozone. High levels of ozone may have severe health effects on persons with asthma and other respiratory conditions, and also negatively affects people without preexisting respiratory conditions.[10] Higher temperatures and likely increases in the number of days with high dew point temperatures (>70 degrees Fahrenheit) may drive the development of more summer-time extreme heat events[11] and correspondingly increase the number of heat-related illnesses and deaths. Heat events can be worse in urban areas due to the urban heat island effect. An increase in the intensity and frequency of precipitation events may result in increased flooding and flash floods, which can cause personal injury, property damage, displacement from damaged homes, health issues related to mold, and water-borne disease outbreaks.[12] Additionally, Minnesota may experience more incidences of weather extremes in which the state can simultaneously have counties under flood advisory and others in a drought watch.[13] Floods and droughts can disrupt agricultural production and threaten our food security.

Local governments and planning departments have the power to affect the health of their residents through the promotion of climate-sensitive, healthy planning. The American Planning Association ratified a policy guide on climate change, charging planners to include mitigation and adaptation strategies that have environmental, health and economic benefits.[14]

ORGANIZATION OF THE REPORT

This report discusses the results from a review of 'developed community' comp plans for 12 health indicators that are important for promoting healthy planning and climate change adaptation and mitigation. See sidebar for a list of the 12 health indicators.

The comp plans achieved a health indicator if they met certain key-word searches. The plans were in a PDF format and searches were done using the Adobe Acrobat search function. A few of the documents had been scanned and/or were not compatible with the search function. In those cases, the reviewer read the entire document looking for the specific search terms. Search terms for each health indicator are described in the chapters that follow. The indicator could be met in one of three ways: 1) the indicator was achieved by an adopted plan, program or policy; 2) the comp plan provided direction through goals and strategies that have been established to meet the health indicator's objective; or 3) the comp plan referenced or discussed the health issue, but there was little or no direction in achieving the outcome.

12 Local Health Indicators
#1. Does the plan address energy-efficient buildings?
#2. Does the plan provide direction on brownfield cleanup?
#3. Does the plan provide guidance on separating incompatible land uses with residential areas and natural resources?
#4. Does the plan provide guidance on travel demand management (TDM) strategies?
#5. Does the plan address vegetated buffers along water bodies?
#6. Does the plan address the maintenance and preservation of the community's tree canopy?
#7. Does the plan address the views of greenery or vistas?
#8. Does the plan address crime prevention through environmental design (CPTED)?
#9. Does the plan address access to healthy food sources, such as grocery stores and farmers' markets?
#10. Does the plan discuss local food production?
#11. Does the plan address extreme heat events?
#12. Does the plan provide strategies to convert community facilities, fleets and operations to a carbon-neutral environment?

The next twelve chapters provide a definition of each indicator, its impact on health, the specific key word searches to achieve the indicator, the number of plans that met the indicator, an example of a comp plan that did an exceptional job at meeting the indicator, and recommended actions planners can take to incorporate the health indicator into comp plans. The final chapter of the report provides a summary of the findings and recommendations for local planners.

HEALTH IMPORTANCE

The movement towards adopting energy-efficient buildings has gained significant ground over the last decade. Programs through the U.S. Department of Energy (DOE) and the U.S. Green Building Council (USGBC) have advocated for commercial builders, businesses and homeowners to invest in energy-efficient and renewable energy technologies. Promoting energy-efficient buildings addresses more than just building material. It also encompasses the building's orientation with the natural and built environment, shading, water conservation strategies, and indoor air quality.

Indoor air quality can be a concern in highly efficient homes, especially those with building envelopes that do not "breathe." Air-tight homes can cause air quality issues such as mold growth. The U.S. Environmental Protection Agency (EPA) estimates that Americans spend about 90% of their day indoors.[15] Poor indoor air quality can cause negative health outcomes including coughing, wheezing, nasal and throat conditions, and worsened asthma or allergy symptoms. Lead and radon are other hazardous elements that can affect the health of building occupants. Lead and radon issues can be avoided through proper air exchange and lead-free materials without compromising the energy efficiency of the building.

Adopting and implementing energy-efficient buildings can have a significant impact on reducing energy consumption, life-cycle operating costs and air pollutant emissions. In 2009 the U.S. Energy Information Administration reported that Minnesota's energy consumption in the residential sector totaled 408.1 trillion Btu, approximately 22.5% of the total energy consumption in the state.[16] See Table 1 for Minnesota energy consumption data. More than one-third (39%) of this energy was lost during transmission and distribution. Between 1960 and 2009, residential sector energy consumption increased by 107%. However, per capita residential energy consumption only increased by 34%.[17]

TABLE 1 2009 MINNESOTA ENERGY CONSUMPTION (REPORTED IN TRILLION BTU)			
	NET ENERGY	ELECTRICAL SYSTEM LOSSES	TOTAL CONSUMPTION
RESIDENTIAL SECTOR	249.9	158.2	408.1 (22.5%)
COMMERCIAL SECTOR	192.1	160.2	352.3 (19.5%)
INDUSTRIAL SECTOR	435.7	141.0	576.7 (31.9%)
TRANSPORTATION SECTOR	472.2	0.2	472.4 (26.1%)
TOTAL END-USE ENERGY CONSUMPTION	1,350.0	459.5	1,809.5 (100.0%)

The Energy Information Administration's 2012 Annual Energy Outlook projects an increase from 94.7 quadrillion Btu of total energy consumption in 2009 in the U.S. to 108 quadrillion Btu in 2035, a 14% increase in total energy consumption. The projected growth in energy consumption is based on 0.2% annual increase in transportation energy demand and 0.8% annual increase in electricity demand. Energy consumption per capita is estimated to decrease 0.5% annually from 2010 to 2035.[18]
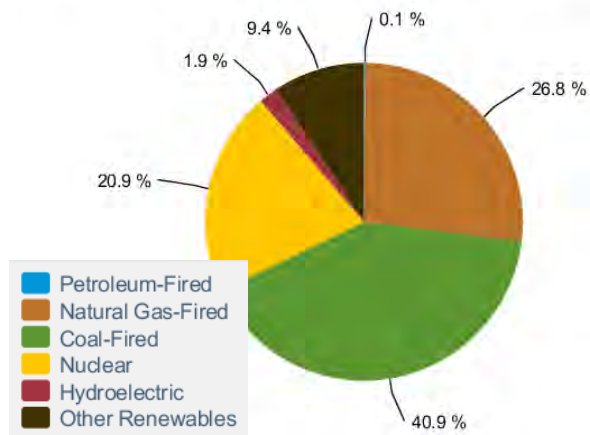
Figure 2: Minnesota Net Electricity Generation by Source

Reducing energy consumption is important for reducing the harmful effects of air pollutant emissions on human health. Electricity is generated primarily through the combustion of fossil fuels including coal and natural gas, as well as nuclear, hydroelectric and other renewables. See Figure 2: Minnesota Net Electricity Generation by Source. The combustion of coal and natural gas releases air pollutants including particulate matter, nitrogen oxides, sulfur oxides, volatile organic compounds (VOC) and toxic air contaminants.[19] The health effects of particulate matter include aggravation of asthma, increased risk of respiratory conditions such as chronic cough, bronchitis and chest illness and can lead to deaths from cardiovascular and cardiopulmonary diseases as well as lung cancer.[20] Nitrogen oxides can also increase risk of negative respiratory conditions, and cause bronchitis and pneumonia. Nitrogen oxides and VOCs are precursor emissions to ozone and in the presence of heat and sunlight, form ground-level ozone (i.e., smog) that has additional negative health impacts, especially for the elderly and young children.[21]

Additionally, many of these pollutants contribute to the atmospheric greenhouse effect which is driving climate change.[22] The introduction of this report mentioned a number of negative health outcomes from climate change including increased heat-related illnesses and deaths; injuries and deaths from severe storm events; waterborne disease outbreaks; and infectious disease outbreaks. Climate change also can influence the forces that worsen air pollution, such as ground-level ozone and allergens.[23] Some events driven by climate change, such as extreme heat events, will increase air conditioning, energy consumption and the combustion of fossil fuels, resulting in an endless cycle, unless solutions are found to reduce energy use and power buildings more efficiently and sustainably (i.e., renewable energy sources that do not emit greenhouse gas (GHG) emissions).

The data shows that buildings have a significant impact on the total consumption of energy in Minnesota and across the U.S. Energy efficient building design has become more popular as businesses and homeowners try to cut costs or promote environmentally friendly practices. A major resource for energy-efficient buildings is the USGBC's Leadership in Energy and Environmental Design (LEED) rating system. LEED was established in 2000 to provide developers a framework for implementing energy efficient building standards, which has helped set the industry standard for energy-efficient buildings. To date, the program has certified 7,568 buildings in the U.S., 143 of those buildings are located in Minnesota. See the sidebar for more information and a link to the program's website.

Leadership in Energy and Environmental Design (LEED), U.S. Green Building Council (USGBC)

LEED promotes sustainable building and development practices through a suite of rating systems that recognize projects that implement strategies for better environmental and health performance.

Energy efficiency "encourages a wide variety of energy-wise strategies: commissioning; energy use monitoring; efficient design and construction; efficient appliances, systems and lighting; the use of renewable and clean sources of energy, generated on-site or off-site; and other innovative measures."[i]

LEED is flexible enough to apply to all building types – commercial as well as residential. It works throughout the building lifecycle – design and construction, operations and maintenance, tenant fitout, and significant retrofit. And LEED for Neighborhood Development extends the benefits of LEED beyond the building footprint into the neighborhood it serves.

Source: www.usgbc.org

DEFINING THE INDICATOR

The health indicator assessed the number of comp plans that supported energy-efficient buildings, including but not limited to the LEED program. The specific key-word searches included the three terms "energy efficiency," "green building," and "LEED."

COMPREHENSIVE PLAN REVIEW FINDINGS

Thirty-eight of the 52 communities (73%) included language related to energy-efficient building material or site design. LEED was the most recognized approach used to address the health indicator. The City of St. Paul is one example of a comp plan that developed policy statements and action steps related to energy-efficient building codes.

St. Paul included discussion of energy efficient building design in the following sections of the comprehensive plan:

Land Use Plan - Solar energy: The necessity to conserve on the use of fossil fuels and to take advantage of other energy sources has become, arguably, the defining issue during the 1990s and the first decade of the 21st Century.

- *3.19 Promote access to sunlight for solar energy systems in new or rehabilitated residential, commercial, and industrial developments to the extent possible. Prepare a study on tools, techniques, and regulations to facilitate increased usage of solar energy systems, either as standalone systems or as supplements to conventional energy sources, including, but not limited to:*
- *Orientation of buildings, lots, and streets to capture the maximum amount of sunlight;*
- *Building and site design, and the permissible levels of shading by structures and vegetation; and*
- *Determination of minimum degree of solar access protection needed to produce maximum amount of solar energy.*

Housing Plan – Strategic Housing Growth: 1.4. Implement citywide policies for new housing developments to promote sustainability.

- *New housing construction in the city can be inherently more sustainable than new housing built on previously undeveloped land on the edge of the metropolitan area, the latter often having high household, social, and public infrastructure costs. Projects developed with City/HRA financial assistance should result in reduced greenhouse gas emissions and increased energy, water, and resource usage efficiencies above conventional standards in the housing industry.*
- *a. Create policies and other incentive tools for all housing developed in the city to ensure reduced greenhouse gas emissions and increased energy, water, and resource usage efficiencies above conventional standards in the industry; and*
- *b. Consider fast-track approval processes for projects that meet best practices in "green" design, potentially including zoning, site plan, and other permitting reviews.*

Housing Plan – Aggressive Rehabilitation: 2.4. Improve energy efficiency and water conservation within the existing housing stock.

Implementation Plan : "Pursue projects and programs to reduce the carbon footprint." Which includes "managing development activities so that buildings are constructed to reduce the amount of energy used during their operation."

RECOMMENDATIONS

State Statute requires that comp plans provide protection and development access to direct sunlight for solar energy systems. This requirement is the only direction given for the comp plans that addresses energy efficiency or renewable energy. All of the Developed Communities addressed solar access. The comp plans should set the stage for additional regulatory tools that emphasize the importance of energy-efficient buildings. Planners can support the implementation of LEED and general green building design principles through new regulatory requirements and regulatory reform. New requirements can include requiring LEED certification for public buildings or private buildings with public assistance, open

space preservation and park dedication, water-saving landscaping, and the installation of cool roofs. Regulatory reform may include support for Minnesota in adopting energy-efficient building codes and subsequent local adoption of the codes, and resolving conflicts such as active or passive solar design and historic preservation guidelines to increase the amount of renewable energy in the state's energy portfolio.[24]

For more resources on green and healthy buildings, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

HEALTH INDICATOR #2: DOES THE PLAN PROVIDE DIRECTION ON BROWNFIELD CLEANUP?

HEALTH IMPORTANCE

The Environmental Protection Agency defines a Brownfield as "real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant." Reuse of remediated Brownfields can fill a gap within an existing community and relieve pressure on development of undeveloped land, thereby increasing connectivity for active transportation, reducing vehicle miles traveled, and preserving "greenfields" (i.e., undeveloped land) for local food production or ecosystem services, such as flood protection.[25]

One of the major on-going Brownfield cleanup sites in the metro area is the Twin Cities Army Ammunition Plant (TCAAP) federal Superfund site in Arden Hills. The 2,370 acre TCAAP site has undergone significant remediation, including continued groundwater treatment through 2040, and master planning initiatives to facilitate redevelopment.[26] Notable successful cleanups include the Twins Ballpark Stadium built in 2009 which was previously railroad warehousing contaminated with polyaromatic hydrocarbons, metals and petroleum, and the Ripley Gardens mixed housing development that cleaned up lead and asbestos from the maternity hospital that originally occupied the site.

"Historical records, toxicological information, and environmental fate data, in general, illustrated that brownfields properties are not benign. Despite their dormant status, brownfields properties may pose potential chemical and physical risks to communities."[27] In addition to risk of exposure to hazards, Brownfields are significant for local communities because they often have a negative effect on surrounding property values and create an eyesore in the community.[28] "In neighborhoods dominated by brownfields, AIDS, homicide, infant mortality, teenage pregnancy, and tuberculosis are high because only the poorest and sickest remain in these communities."[29]

Brownfield clean up and redevelopment will be most successful if it is part of a collaborative approach to help local leaders build community pride; attract private, government, and nonprofit investments; improve transportation and employment opportunities; and focus on health promotion opportunities.[30] Integrating urban Brownfield cleanup and redevelopment with job creation and a reduction in the "spatial mismatch"[iii] can promote better livelihoods for inner city residents. Brownfield redevelopment also can increase the number of people walking or taking public transit to work, promoting physical activity and health.[31]

[iii] Spatial mismatch is a phenomenon in which inner city residents are no longer close to employment opportunities.

The Minnesota Pollution Control Agency (MPCA) maintains a list called "What's In My Neighborhood" that includes all of the potentially hazardous sites in the state. MDH used the MPCA's "What's In My Neighborhood" database to determine the number of Developed Communities that contain potentially contaminated sites. The MPCA sites that pose the greatest risk for potential contamination and health concerns include the following: Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) sites, federal and state Superfund project sites, Resource Conservation and Recovery Act Cleanup Sites (RCRA), State Assessment Sites, Unpermitted Dump sites, Voluntary Investigation & Cleanup (VIC) sites, Leak sites, and Petroleum Brownfield sites.[iv] MDH mapped all the above sites with an active status[v] within the seven-county metro area and found 439 active potentially contaminated sites, including three Superfund project sites, 112 Petroleum Brownfield sites, 113 VIC sites, and 211 Leak sites. See Figure 3: Potentially Contaminated Sites.

MDH concluded that 39 of the 52 communities contained at least one or more active potentially contaminated site. Each site varies in levels of importance and contamination. The analysis provided a benchmark to compare the number of Developed Communities comprehensive plans that recognized Brownfields or contaminated sites to the number of communities identified as having an active potentially contaminated site. The specific key-word searches included 'brownfield,' 'contaminated/contamination' specifically in regards to a site or land, 'superfund,' or 'polluted/pollution' specifically in regards to a site or land.

Twenty-one of the 52 communities (40%) mentioned contaminated sites or specifically Brownfields. As mentioned above, MDH identified 39 communities that had at least one contaminated site. The number of comprehensive plans that addressed Brownfields and/or contaminated sites may be a result of the variation in the sites' importance and level of contamination. For example, a community may contain several sites that are not considered important enough to warrant discussion at the comp plan level. Regardless of the level of contamination or importance, the comp plans should provide direction on how to identify these sites and recognize their potential health issues and opportunities for redevelopment. Thirteen communities did not contain active Brownfield sites, so there was no reason for the community to discuss them in the comprehensive plan.

[iv] Descriptions of these sites can be found in the "What's in my Neighborhood? Programs and activities document from the MPCA, available online at: http://www.pca.state.mn.us/index.php/view-document.html?gid=14049

[v] Active status signifies that the cleanup process has not been complete, or the current use has an active permit. Sites are either active or inactive.

Figure 3: Potentially Contaminated Sites in the Seven-County Metro Area

Developed Communities Included in the Review

1. Anoka
2. Apple Valley
3. Arden Hills
4. Bloomington
5. Brooklyn Center
6. Burnsville
7. Champlin
8. Circle Pines
9. Columbia Heights
10. Coon Rapids
11. Crystal
12. Edina
13. Excelsior
14. Falcon Heights
15. Fridley
16. Golden Valley
17. Greenwood
18. Hopkins
19. Lauderdale
20. Lilydale
21. Little Canada
22. Long Lake
23. Loretto
24. Mahtomedi
25. Maplewood
26. Mendota

27. Mendota Heights
28. Minneapolis
29. Minnetonka
30. Mound
31. Mounds View
32. New Brighton
33. New Hope
34. Newport
35. North St. Paul
36. Osseo
37. Richfield
38. Robbinsdale
39. Roseville
40. St. Louis Park
41. St. Paul
42. St. Paul Park
43. Shoreview
44. Spring Lake Park
45. Spring Park
46. Stillwater
47. Tonka Bay
48. Vadnais Heights
49. Wayzata
50. White Bear Twp.
51. White Bear Lake
52. Woodland

Potentially Contaminated Sites

Active Sites

- Leak Site
- Petroleum Brownfield
- Superfund Project
- Voluntary Investigation & Cleanup (VIC)

Metro Area Communities

- Non-Council Areas
- Rural Areas
- Developing Areas
- Developed Areas Not Reviewed
- Developed Areas Reviewed

MDH - EH - EIA
January 2013

9.5
Miles

Source: MPCA, 2011, What's in my Neighborhood?
http://www.pca.state.mn.us/index.php/data/whats-in-my-neighborhood/index.html

New Brighton's plan had a very comprehensive and resource extensive discussion on Brownfields. In the Land Use chapter of the comprehensive plan, the Redevelopment Potential section states that the city should encourage private redevelopment efforts on areas or site that generally contain "Brownfield" sites, and area or sites that pose a threat to the environment. The section states that priorities should be based on "the removal of barriers to redevelopment (environmental hazards, contaminated soils, dilapidated buildings)."

Figure 4: Schematic of New Brighton Exchange redevelopment
Source: New Brighton website

The plan even lists potential funding sources. See the Box on page 14 for the list of funding sources available for cleanup. The comprehensive plan includes a chapter on Environmental Protection. One of the implementation strategies is brownfield cleanup. The section acknowledges the federal and regional assistance available for cities to "bridge the financial gap of redevelopment and clean up environmentally hazardous sites."

RECOMMENDATIONS

Brownfield redevelopment provides an opportunity for urban infill and neighborhood revitalization. Comprehensive plans may initially provide goals or policy statements around prioritizing Brownfield cleanup and redevelopment prior to new greenfield development. Communities should provide direction on how to identify these sites and recognize their potential health issues and opportunities for redevelopment. Comp plans can support private sector redevelopment by providing a list of financial resources (e.g., New Brighton's comp plan) to deal with the significant costs of investigation and clean-up of Brownfield sites. In addition to financial incentives, communities can support brownfield cleanup and redevelopment by removing barriers to development, including undertaking public cleanup, allowing limited liability for potential contamination, or other public-private partnerships. Brownfield cleanup programs at a local level are most effective when cities identify parcels that are desirable for cleanup and provide assistance to private developers throughout the cleanup and redevelopment process.

For more resources on Brownfield cleanup and redevelopment, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

Funding Sources for Brownfield/contamination cleanup (adapted from New Brighton comp plan)

Programs and grant funding are available at many levels of government: Federal, state, regional (Met Council), county, and municipal. Many of these funding mechanisms may even be combined.

Environmental Protection Agency (EPA)

Minnesota Department of Employment and Economic Development (DEED)
Contamination Cleanup/Investigation Grant Program: This program provides grant monies towards contamination investigations and the development of a Response Action Plan (RAP) or for the cleanup of contamination on sites, which will be redeveloped. The Contamination Cleanup grants address the growing need for uncontaminated, developable land. Grants are awarded to those sites where there is serious, imminent private or public development potential.

Metropolitan Livable Communities Tax Base Revitalization Account Grants and low interest loans are awarded on a competitive basis from this fund to cities participating in the Metropolitan Livable Communities Housing Incentives Program. The purpose of the grants is to help clean up polluted lands to provide economic redevelopment and job growth opportunities.

Hennepin County has two programs: the Brownfields Cleanup Revolving Loan and the Environmental Response Fund.

Tax Increment Financing (TIF) Depending upon which district is being used (e.g., Redevelopment Districts, Renovation and Renewal Districts and Soils Condition District), TIF can generally be spent on the following uses: land acquisition, site improvements, public and on-site utilities, demolition, relocation, cleanup of contaminated soils, and administrative costs.

HEALTH INDICATOR #3: DOES THE PLAN PROVIDE GUIDANCE ON SEPARATING INCOMPATIBLE LAND USES WITH RESIDENTIAL AREAS AND NATURAL RESOURCES?

HEALTH IMPORTANCE

Incompatible land uses can pose significant health risks to nearby populations depending on the type of operations, chemicals, and waste removal and remediation activities on a site. Recent Environmental Protection Agency (EPA) regulations have improved the safety of chemical use, emissions, and waste disposal, but conflicts with proximate residential areas may still occur. Some sources of contaminants include manufacturing activities like fertilizers, pesticides, textiles and leather goods, as well as major highways or landfills. Additionally, smaller operations like dry cleaners and automotive shops that use harsh chemicals and petroleum products can release pollutants.

Incompatible land uses can cause a range of impacts from mild nuisance to severe health effects. For example, industrial processes and major transportation routes produce noise pollution which may only cause mild irritation, or cause sleep disturbance and impact the cognitive function in children.[32,33] Living near major transportation routes can be convenient but also come with potential negative air quality impacts. In addition to pollutants like carbon dioxide (CO_2) and volatile organic compounds (VOCs), motor vehicles emit "air toxins" including benzene, formaldehyde, and diesel particulate matter (PM). Exposure to concentrations of the pollutants can cause reduced lung function, chronic respiratory illness and even premature death.[34]

A 2000 Environmental Health Perspectives article reported some of the health effects of residence near hazardous waste landfill sites; health effects included certain types of cancer, skin irritation, low birth weight, birth defects, fatigue, sleepiness, and headaches.[35]

Separating and buffering incompatible uses can provide both aesthetic relief and reduce the risk of negative health outcomes related to potentially polluting activities. Buffers can include sound barriers on highways and vegetative buffers around industrial uses. Separating incompatible uses is often accomplished through zoning; providing a transition of use-intensity from industrial to commercial to high density residential to low density residential is common.

DEFINING THE INDICATOR

The purpose of the health indicator was to determine if the comp plans were addressing incompatible land uses with residential uses. Ultimately, the indicator would have assessed each community's land use plan with the location of hazardous sites to determine their proximity to one another. This assessment fell outside the scope of this report. Instead, the health indicator reviewed the plans for policy statements and strategies related to land use adjacencies. The specific key-word searches included: 'incompatible,' 'buffer' as it related to land use, 'adjacent,' and 'screen.'

The review found that 45 of the 52 comp plans (87%) addressed the separation or buffering of incompatible land uses. Columbia Heights provides an example of how the communities incorporated strategies to address incompatible land uses. In Columbia Heights Land Use Chapter, the section on Goals and Objectives includes the following goal and objective:

> *Goal: Provide a natural buffer between housing and industrial zones to promote community health.*
>
> *1. As redevelopment occurs in industrial areas require an increase in the amount of landscaping or other buffering as well as improvements to the building aesthetics.*

The unique aspect of Columbia Heights' goal is that it mentions the potential health outcomes of incompatible uses. Later in the Land Use Chapter, the comp plan provides a list of areas for future redevelopment opportunity. The specific sites are directed towards appropriate land uses and incorporate the goals and objectives outlined earlier. For example, one site on University between 37th and 40th Ave (west side of University) includes the following direction (bolding by MDH):

> *This site currently includes a mix of industrial, low density, and medium density residential. To eliminate conflicts between residential properties and industrial areas, the City has identified the parcels along University Avenue as Industrial, with a commercial node at the corner of University and 40th Avenue. Efforts will need to be made to attract clean industry such as a high-tech incubator business that is not dependent on a large warehouse, access or visibility. **Upon such redevelopment boulevard trees could be added along 3rd Street behind the Industrial district, to provide a natural buffer between housing and industrial zones.** A sidewalk connection from University Avenue to existing neighborhoods could also enhance the pedestrian connection to University Avenue. As another gateway into the community, future redevelopment in this area should be attractive, well maintained, and promote a positive image for Columbia Heights.*
>
> ***This project aligns with several of the community's goals and policies.*** *Any new development and landscaping along the University Avenue corridor will enhance the image and viability of this commercial corridor. **Boulevard trees are proposed along 3rd Street west of the Industrial district, to provide a natural buffer between housing and industrial zones.** Redevelopment could also provide an opportunity to rehabilitate, or redevelop if necessary, substandard or functionally obsolete development, and to improve the appearance of industrial districts within the community. Improvements to the industrial area may provide valuable employment opportunities for Columbia Heights residents. The industrial district will also provide the opportunity for the City to create an industrial identity to help recruit additional industrial to Columbia Heights.*

In addition to natural buffers, Columbia Heights' plan identifies medium density residential as a buffer between single family residential and more intense developments, and in some areas where residential and commercial have been intermixed, the future land use is guided to Mixed Use to facilitate redevelopment that would integrate these potentially incompatible uses.

Many comp plans provided information on how to transition between incompatible land uses through design standards, buffering techniques, zoning updates and redevelopment strategies. All of these approaches help address incompatible land uses. For example, buffering or screening can be accomplished using both natural buffers and intermediate land uses to step-up development intensity. Zoning (use or performance-based) is another option to ensure appropriate land use and scale (single family transition to low-density multi-family not high density residential). Natural or vegetative buffers such as parks, boulevard trees, and other green spaces provide additional benefits such as aesthetics, air quality improvements to both noise and pollution, and mental health benefits of views of greenery. (See indicator #7)

For more resources on separating incompatible uses, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

HEALTH INDICATOR #4: DOES THE PLAN PROVIDE GUIDANCE ON TRAVEL DEMAND MANAGEMENT (TDM) STRATEGIES?

HEALTH IMPORTANCE

Transportation systems are networks of roads, paths and sidewalks that are essential to travel from one point to another, whether it is by car, transit, bike or foot. The U.S. transportation system is heavily fossil-fuel based and contributes to deleterious health effects from air pollution, automobile accidents, and physical inactivity. The mode people use to travel is a function of available infrastructure, ease of movement and personal choice. Travel demand management (TDM) strategies focus on reducing the number of single-occupancy trips and providing the user more mode choices.

Human health is affected by available transportation options. A 2012 study on air quality and exercise-related health benefits from reduced car travel in the Midwest[vi] found that eliminating short car trips (less than or equal to 2.5 miles) and completing 50% of them by bicycle would result in:

- 1,295 fewer deaths/year
    - 608 fewer deaths due to improved air quality
    - 687 fewer deaths due to increased physical activity
- $8.7 billion/year in net health benefits
    - $4.94 billion/year due to reductions in particulate matter ($PM_{2.5}$) and ozone
    - $3.8 billion/year in savings from physical fitness[36]

Managing traffic will become more important in today's society as we cannot continue to build our way out of congestion by adding new roadways. This challenge continues to grow as the cost of constructing infrastructure rises and the funding sources become more limited. According to the National Surface Transportation Policy and Revenue Commission ("Commission"), the U.S. currently has 68 billion dollars per year to spend on the U.S. highway system. This level of funding would result in 50% increase in average traveler delay and double total delay on urban principle arterials by 2035 based on projected increases in vehicle miles traveled (VMT).[37] The Commission reports that aggressively implementing TDM strategies could reduce future delay scenarios by 40% over 50 years, resulting in less of an increase in highway system delay.

The cost of maintaining infrastructure is another factor facing the U.S. transportation system. In 2008 the American Society of Civil Engineers (ASCE) released a report card grading America's Infrastructure. The ASCE reported on Minnesota's major infrastructure including the status of roads, bridges and transit. The following statistics highlight some of the transportation infrastructure issues Minnesota is facing:

[vi] Midwestern study area included the urban areas of Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin.

- 13% of Minnesota's bridges are structurally deficient or functionally obsolete.
- 32% of Minnesota's major roads are in poor or mediocre condition.
- 76% of Minnesota's major urban highways are congested.
- Vehicle travel on Minnesota's highways increased 47% from 1990 to 2007.

TDM strategies, such as public transit, carpooling, flexible work-hours, telecommuting, biking and traffic calming techniques, can play a positive role in reducing pressure on Minnesota's congested transportation network and promote safety and health benefits. Flexible work-hours and telecommuting, such as working earlier hours, later hours, or working from home, are strategies that could significantly reduce rush-hour congestion if implemented widely. The public health impacts of PM2.5 emissions from traffic congestion alone include thousands of premature deaths per year, at a monetized value of tens of billions of dollars per year.[38] Traffic calming, or reducing traffic speed, can significantly reduce the risk of pedestrians being killed in a motor vehicle accident; the probability of death is 83% for a pedestrian-motor vehicle collision at 44mph, but only 3.5% at 15 mph.[39]

DEFINING THE INDICATOR

Metro Transit is the division of the Metropolitan Council that operates the regional transit system for the Twin Cities metro area. Some TDM elements, such as transit, Park-and-Ride facilities and the Rideshare commuter program, provide benefits to the regional transportation system by reducing single-occupancy trips. Additional TDM strategies fall outside the Metro Transit's regional transit system, such as flexible work hours and telework that can be promoted by employers and businesses. This assessment determined the communities that provided additional information in their comp plans on reducing single-occupancy trips through TDM strategies. Specific key-word searches included the following: 'travel demand management,' 'TDM,' 'vehicle-miles-traveled,' 'VMT,' and 'single-occupancy.'

COMPREHENSIVE PLAN REVIEW FINDINGS

Twenty-nine of the 52 comprehensive plans (56%) recognized TDM. The comp plans for the cities of Anoka, Bloomington, St. Louis Park, Richfield and Golden Valley contained some of the more notable initiatives. For example, Anoka provides a flex work program for city employees. Bloomington offers reduced parking requirements for sites with approved TDM plans. St. Louis Park identified a TDM District as part of its Zoning Code (article IV- Zoning Districts; Division 10 - Travel Demand Management District; section 36) that outlines requirements that must be met with respect to development or redevelopment in the district. Finally, Golden Valley requires developers to submit a Travel Demand Management Plan (TDMP) to the City for approval if they are significantly changing traffic volumes and flow.

Golden Valley Travel Demand Management Plan

Traffic Impact Plan

Golden Valley is committed to creating and maintaining a transportation system that is safe and efficient for all users. Any holder of a commercial or residential building permit application that will result in added traffic must submit a traffic impact analysis statement to the City. The statement must outline the type of development and types of traffic associated with the new development. If the City determines the traffic impact on the surrounding transportation network will be significant, the City may request that the applicant complete a Travel Demand Management Plan for the proposed development.

If a new development generates more than 1,000 trips per day or 100 trips in the morning or afternoon peak hour, the developer should provide the City with a traffic impact study.

Travel Demand Management Plan Guidelines

Any construction within the Golden Valley city limits that significantly changes traffic volumes and directional flow on the development's surrounding transportation network, as determined through the traffic impact plan process, must provide a Travel Demand Management Plan (TDMP) to the City for approval.

Requirements

Each TDMP must include a site plan, proposed square footage or units of each use type, forecasted trips at full build-out, and operational measures of the surrounding transportation network.

Traffic Mitigation Methods

Different methods may be used to reduce the impact of a new development on the surrounding transportation network. Examples include, but are not limited to:

- *connection to transit*
- *carpool parking spots*
- *bike lockers*
- *flexible work hours*
- *telecommuting*
- *restricted hours of operation*
- *construction of additional traffic lanes*
- *construction of traffic signal*
- *installation of traffic signage*

It is important to note that while possible methods are listed here, they may not apply to a development, reduce the traffic impact, or be feasible and therefore will not be considered as a trip-reducing mitigation method.

Approval Process

The TDMP must be submitted to the City for approval. The City will respond by either approving the TDMP or requesting further information. Applicants may respond to the City's request for further information or withdraw their TDMP from consideration.

Effectiveness of Traffic Mitigation Measures

If a development has a significant impact on the surrounding transportation network and if mitigation measures were included as part of the approved TDMP, then follow-up data must be collected to verify the development is in compliance with limits set by the approved TDMP.

Transportation Management Organizations (TMOs) are another means to help promote TDM strategies. TMOs provide workers and employers resources to make different travel choices rather than single-occupancy trips. Local examples of TMOs include Commute Solutions Anoka County TMO, St. Paul Smart Trips, 494 Commuter Services, and Commuter Connections (Minneapolis).

RECOMMENDATIONS

The Met Council 2030 Transportation Policy Plan specifically requests communities to "support strategies including Travel Demand Management (TDM), transit investments and land use changes, to reduce future demand on the Metropolitan Highway System." Not all communities are large enough to support transit service, have employers that could promote flexible work hours or telework, or even experience congestion internally. However, regional congestion and vehicle miles traveled are the result of all the communities in the metro area and are therefore a shared responsibility. Communities in the metro area should include goals or policy statements supporting the adoption of TDM strategies such as public transit, carpooling, flexible work-hours, telecommuting, bicycle parking, bicycle and pedestrian infrastructure, traffic calming techniques, and involvement in area-based TMOs. TDM strategies can provide innovative solutions to reducing the number of single-occupancy trips, overall VMT and traffic congestion.

For more resources on addressing and implementing TDM strategies, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

HEALTH IMPORTANCE

Prior to settlement, Minnesota contained watersheds that consisted of vegetative cover (e.g., prairie, oak savanna, etc.), which maximized infiltration and minimized runoff. Over time the landscape has been developed into agricultural and urban uses, which caused substantial changes in precipitation runoff to surface water bodies such as wetlands, lakes and streams.[40] Reduction in the natural vegetative cover has decreased infiltration, increased runoff, and subsequently increased the nutrient load and contaminants in wetlands, lakes and streams.

Runoff from impervious surfaces often contains contaminants such as pathogens, metals, sediment, and chemical pollutants that can degrade water quality and potentially impact ecological and human health. These contaminants collect on surfaces such as roofs, roads, and parking lots, and are conveyed to receiving waters as storm water runoff during rain and snowmelt events.[41] The contaminants introduced to water bodies from runoff with high nutrient loads such as fertilizers, and vegetative and animal debris affect water quality by promoting growth of algal blooms and reducing dissolved oxygen, which can destroy aquatic habitat. Harmful algal blooms, such as blue-green algae, can cause skin irritation or upper respiratory problems in people and animals; in extreme cases, dogs and other animals have died after drinking water containing these toxins.[42]

"Vegetated shoreline is a critical part of nature's system for cleansing runoff water of pollutants."[43] Vegetative buffers can prevent pollution of surface and groundwater by managing the volume of stormwater runoff, improving water quality, and recharging groundwater aquifers. Vegetated buffers filter as much as 75 to 100% of sediment, capture nutrients, degrade pollutants into less toxic forms, and remove up to 60% of some pathogens.[44] Removal of these pathogens and pollutants can reduce exposure to storm water contaminants in water bodies used for recreation, fisheries, or drinking water sources. Care should be taken to ensure that stormwater runoff does not directly infiltrate into the recharge area of a groundwater aquifer that is used for drinking water.

Figure 5: Vegetative buffer on Loring Pond, Loring Park, Minneapolis, MN

In addition to vegetative buffers, a number of site design measures may be applied to a development to protect water bodies and groundwater, in addition to managing stormwater. This approach is commonly referred to as Low Impact Development (LID). See box below for a description.

Low Impact Development (LID)

According to the U.S. Environmental Protection Agency (EPA), LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions. LID has been characterized as a sustainable stormwater practice by the Water Environment Research Foundation and others.

Source: Environmental Protection Agency (EPA) – www.epa.gov/owow/NPS/lid/

DEFINING THE INDICATOR

The health indicator was met if the comprehensive plan mentioned the use of vegetative buffers. Specific key-word searches included 'set-back,' 'vegetated buffer' or 'buffer' related to protecting the shoreline of water bodies.

COMPREHENSIVE PLAN REVIEW FINDINGS

Twenty-nine of the 52 communities (56%) met this indicator. Some communities addressed the indicator in the summary description of the stormwater management plan, a water resources chapter, or in a parks and natural resources chapter of the comprehensive plan. Not all communities have surface water resources within the city boundary, such as Falcon Heights and Osseo, and therefore may not have addressed this issue. See Figure 6: Seven-County Metro Area Water Resources.

Additionally, the health indicator may have been address through local surface water management plans. All metro area cities are required to adopt a local surface water management plan that describes how the municipalities will protect the quality and quantity of surface water and ground water. These

Figure 6: Seven-County Metro Area Water Resources: Lakes and Rivers

Developed Communities Included in the Review

1. Anoka
2. Apple Valley
3. Arden Hills
4. Bloomington
5. Brooklyn Center
6. Burnsville
7. Champlin
8. Circle Pines
9. Columbia Heights
10. Coon Rapids
11. Crystal
12. Edina
13. Excelsior
14. Falcon Heights
15. Fridley
16. Golden Valley
17. Greenwood
18. Hopkins
19. Lauderdale
20. Lilydale
21. Little Canada
22. Long Lake
23. Loretto
24. Mahtomedi
25. Maplewood
26. Mendota
27. Mendota Heights
28. Minneapolis
29. Minnetonka
30. Mound
31. Mounds View
32. New Brighton
33. New Hope
34. Newport
35. North St. Paul
36. Osseo
37. Richfield
38. Robbinsdale
39. Roseville
40. St. Louis Park
41. St. Paul
42. St. Paul Park
43. Shoreview
44. Spring Lake Park
45. Spring Park
46. Stillwater
47. Tonka Bay
48. Vadnais Heights
49. Wayzata
50. White Bear Twp.
51. White Bear Lake
52. Woodland

Legend

Seven-County Metro Communities

- Non-Council Areas
- Rural Areas
- Developing Areas
- Developed Areas Reviewed
- Developed Areas Not Reviewed
- Lakes
- Rivers

10 Miles

Source: Lakes and rivers from
Geographic Data Technology (GDT), 2009

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plans include measures that protect wetlands and water bodies. Each plan must align with the local Watershed Management Organization's (WMO) plan based on the rules established by the Board of Water and Soil Resources. This process has been outlined in the Local Planning Handbook. MDH did not review water management plans. As a result, more than 29 communities may have achieved this health indicator, but were not counted in the review because vegetated buffers were not specifically called out in the comp plan.

Circle Pines included a water quality objective in Chapter 4: Water Resources Management Plan. Section 4.2 Surface Water Management Plan, subsection B. Water Quality, objective 6, states: "The City will encourage homeowners with properties adjacent to water resources to establish a vegetative buffer strip at the shoreline. This strip should consist of legumes or other perennial grasses to limit erosion and nutrient transport across the buffer strip." White Bear Lake included a similar objective in Chapter 5: Parks, Recreation and Natural Resources. The section on Parks and Natural Resource Needs related to wetlands, includes Objective 2 that states, "Encourage the establishment of appropriate vegetated buffer zones around wetlands and the use of permanent markers to communicate the location of the buffer edge and no-mow zone."

Communities also mentioned Best Management Practices (BMPs).[vii] BMPs can be used to avoid, minimize or mitigate adverse impacts to water quality. Cities that did not mention vegetative buffers specifically may have included them in their suite of stormwater BMPs that were defined in more detail in another plan that was not reviewed.

RECOMMENDATIONS

Cities can protect water quality through policy statements that support the establishment of vegetative buffer zones, shoreline ordinance, and preservation of native vegetation. The Minnesota Pollution Control Agency (MPCA) "Stormwater Best Management Practices Manual" provides guidance for establishing a buffer zone ordinance. Recommended distance of the buffer is around 50 feet wide with specific guidance of at least 25 feet for stormwater management; at least 50 feet for bird habitat preservation, protection from human encroachment and some protection for threatened, rare or endangered species; and over 100 feet for the preferred distance.[45]

The MPCA "Stormwater Best Management Practices Manual" includes a number of recommended practices for community planning, including the appropriate amount of impervious surfaces for watershed quality, concept details of cluster development, and suggested distances for a water body buffer ordinance. See Table 2 for a list of potential BMPs. The Manual is available online at: http://www.pca.state.mn.us/water/pubs/sw-bmpmanual.html.

[vii] "Best Management Practices" are practices, techniques, and measures that prevent or reduce water pollution from nonpoint sources by using the most effective and practicable means of achieving water quality goals. Best management practices include, but are not limited to, official controls, structural and nonstructural controls, and operation and maintenance procedures.

TABLE 2: LIST OF POTENTIAL BEST MANAGEMENT PRACTICES	
Information and Education - Catch basin stencils - Erosion control information - Fertilizer and pesticide application - Illicit dumping and littering information - Landscaping information to reduce runoff - Maintenance of lots (parking and vacant) - Proper storage of chemicals - Proper yard waste disposal - Information on hazardous waste and used motor oils **Ordinances and Regulations** - Erosion-control ordinances - Comprehensive management plans for developments - Elimination of illegal connections - Fertilizer and pesticide licensing - Illicit dumping and littering enforcement - Land use controls - Landscaping requirements to reduce runoff - Special commercial or industrial requirements - Pet ordinances **Elimination of Discharges** - Infiltration basins - Pervious structures - Diversion or off-line infiltration devices	**Source Controls by the City** - Limiting infiltration to storm sewers - Effective use of deicing chemicals - Management of hazardous waste and used motor oils - Management of commercial and residential yard wastes - Monitoring programs - Storm sewer outlet and stream bank erosion prevention and maintenance - Spill response and prevention - Street cleaning - Storm sewer maintenance **Minor Structural Controls** - In-line sediment traps - Skimmers and separators **Treatment Measures** - Detention basins - Stormwater-treatment facilities - Swirl concentrators - Alum treatment
Source: Minnesota Pollution Control Agency (MPCA) Stormwater Best Management Practices Manual	

Cities may also want to review development standards for inconsistencies. Developers can receive conflicting messages from cities; they often have to meet minimum parking requirements (i.e., large amounts of pavement) but at the same time, use BMPs to infiltrate runoff and improve water quality. Cities should avoid layering BMPs on top of existing 'minimums' requirements and standard practices. MPCA recommends that cities undertake a "thorough review of land-development regulations and standards to remove requirements that ultimately work against the goals of maintaining predevelopment hydrologic conditions and improving water quality. The best approach is to avoid creating a problem in the first place. One important way to avoid problems is to re-think standard approaches in terms of the broad context."[46]

Overall recommendations of site development with water quality and health in mind are:

- "Restrict development in critical areas: shoreline, natural drainage ways, steep slopes and erodible soils," and low-lying areas.
- "Reproduce hydrologic conditions: preserve vegetation, provide infiltration, fit development to the terrain, and preserve and utilize natural drainage ways." More specifically, "policies are needed that decrease impervious surface and that decrease pipes, sewers and ditching while providing infiltration and protecting natural systems."[47]

For more resources on vegetated buffers and green infrastructure, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plan.html.

HEALTH INDICATOR #6: DOES THE PLAN ADDRESS THE MAINTENANCE AND PRESERVATION OF THE COMMUNITY'S TREE CANOPY?

HEALTH IMPORTANCE

Preserving a healthy tree canopy can serve a number of public health benefits. For instance, trees provide shade during hot days,[48,49] reduce heat island effects,[50,51] improve air quality,[52] improve water quality,[53] improve livability,[54] provide mental health benefits[55,56,57] (see Health Indicator #7), and serve as a refuge for wildlife. Trees have been shown to improve the aesthetic character of an area and enhance property value.[58]

Tree canopy reduces the urban heat island[viii] in two ways: 1) by providing shading for buildings and other impervious surfaces that absorb and retain heat from the sun; and 2) through evapotranspiration[ix]. The urban heat island can increase temperatures in an urban area more than 5°F during the day and as much as 22°F at night over surrounding rural areas.[59] For more information on the urban heat island, see Health Indicator #11. Studies have measured tangible temperature reductions in tree groves, irrigated agricultural fields and grass sports fields compared with areas without vegetation.[60,61] One of the studies showed that suburban areas with mature trees are 4 to 6°F cooler than new suburbs without trees. Cooling from trees and vegetation is most effective when planted in strategic locations around buildings and other impervious structures that retain heat from the sun.[62,63,64] Reducing air temperatures in the summer is particularly important to public health, as very hot days can cause heat-related illnesses and even heat-related deaths. It is predicted that

Figure 7: Tree canopy, Minneapolis MN
Source: Ann Forsyth, University of Minnesota, Design for Health

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[viii] The urban heat island effect is characterized by an urban area that is significantly warmer than the surrounding rural areas where natural ground cover has been replaced with pavement, buildings, or other materials that tend to absorb and retain heat.

[ix] Transpiration and evaporation are referred to as evapotranspiration. Transpiration is the loss of water vapor from parts of a plant. Trees and vegetation absorb water through their roots and emit it mostly through their leaves. A large oak tree can transpire 40,000 gallons of water per year, and an acre of corn can transpire 3,000 to 4,000 gallons a day. (U.S. Geological Survey, 2011) Evaporation, the conversion of water from a liquid to a gas, also occurs from the soil around vegetation and from trees and vegetation as they intercept rainfall on their leaves and other surfaces. Evapotranspiration cools the air by using heat from the air to evaporate water.

Minnesota will experience more days with high temperatures.[65] Trees and vegetation can help reduce both indoor and outdoor temperatures, minimizing adverse health effects from extreme heat.

Trees and plants contribute to improved air quality by removing certain gases in the air that cause air pollution.[66] Trees and plants can reduce various pollutants found in the urban environment, including PM, NO_x, SO_x, CO, and ground-level ozone. A 2006 study of urban trees in the U.S. estimated total annual air pollutant removal at 784,000 tons, with a value of $3.8 billion.[67] However, certain trees emit pollutants, so it is important to plant the right trees to gain a positive environmental effect.

Also, trees help improve water quality by slowing down the rate of water entering the stormwater system during heavy rainstorm events.[68] Trees reduce stormwater runoff by capturing and storing rainfall in the canopy and releasing water into the atmosphere through evapotranspiration. In addition, tree roots and leaf litter create soil conditions that promote the infiltration of rainwater into the soil and help recharge groundwater reservoirs.

Despite the many benefits of trees, it has become more difficult in recent years to preserve a healthy tree canopy. Invasive species (e.g., Emerald ash borer) and diseases (e.g., Dutch elm disease) continue to kill trees, reducing local tree canopies. It is important to manage for tree pests and diseases.

DEFINING THE INDICATOR

The health indicator for tree canopy was defined by explicit community support for protecting, preserving, and replanting trees in the comp plan. Specific key-word searches included 'tree canopy,' 'boulevard trees,' 'tree coverage,' and 'tree preservation.'

COMPREHENSIVE PLAN REVIEW FINDINGS

Forty communities (77%) recognized trees as an important asset to their community, in addition to being a natural resource for wildlife refuge and improving air quality. Tree preservation or maintenance is not required within the comprehensive planning process. These initiatives are often addressed at the local level through ordinances and tree preservation programs. Trees were discussed in the natural resource chapters or early-on in background reports that defined the community's character and assets. The importance of trees was mentioned in design guidelines for transportation and pedestrian corridors and downtowns and business districts.

Wayzata addressed tree canopy in the Natural and Community Resources section of the comprehensive plan.

Wayzata

A. Summary of Natural and Community Resource Issues

#3. Maintaining and Enhancing Tree Coverage and Streetscaping

This issue identifies the community's desire to maintain attractive, mature, and healthy tree-lined streets, boulevards, and open spaces within the City. Healthy tree coverage serves important ecological functions and provides numerous water, health, and air quality benefits. Existing significant tree coverage is depicted on Map 6.2. The primary factors influencing this issue are:

- *The need to maintain neighborhoods that preserve and protect mature trees and other foliage.*
- *The need for improved streetscaping and landscaping efforts.*
- *The importance of City's flower program and gardens in creating Wayzata's sense of place.*

B. Natural and Community Resources Objectives and Policies

Objective 5: Support a healthy tree coverage

1st Tier Priority Tree Coverage and Streetscape Policies

- *5.1 Review and modify, if necessary, the Municipal Tree Ordinance to ensure that the tree removal, replanting, and tree care standards for development projects and construction processes are clear, prohibits clear-cutting, and properly specifies appropriate replacement of dead trees or trees that must be removed for development.*
- *5.2 Require all development proposals to indicate the location, type, and condition of existing vegetation, and preserve existing trees wherever feasible.*
- *5.3 Utilize the Design Standards to implement streetscaping and landscaping standards for all development projects which require Design Review.*
- *5.4 Preserve and protect existing stands of mature trees on public and private property when at all possible.*
- *5.5 Establish green corridors and entrances to the City that are identified by tree-lined boulevards, signage, landscaping buffers, and other appropriate features.*

Another program to promote healthy tree canopy is through the Tree City USA program. See box below for more information about the program. The City of White Bear Lake has participated in the Tree City USA program since 1989. The program is designed to recognize communities that effectively manage their public tree resources and to encourage the implementation of community tree management. There are 98 Tree Cities in Minnesota, including 23 of the 53 reviewed Development Communities: Anoka, Apple Valley, Bloomington, Brooklyn Center, Champlin, Columbia Heights, Coon Rapids, Crystal, Edina, Golden Valley, Mahtomedi, Maplewood, Minneapolis, Minnetonka, Mounds View, New Brighton, New Hope, Richfield, Robbinsdale, Roseville, St. Louis Park, St. Paul, and White Bear Lake.

Tree City USA®

The Tree City USA® program, sponsored by the Arbor Day Foundation in cooperation with the USDA Forest Service and the National Association of State Foresters, provides direction, technical assistance, public attention, and national recognition for urban and community forestry programs in thousands of towns and cities that more than 135 million Americans call home.

To qualify as a Tree City USA community, a town or city must meet four standards established by The Arbor Day Foundation and the National Association of State Foresters:

1) A Tree Board or Department
2) A Tree Care Ordinance
3) A Community Forestry Program With an Annual Budget of at Least $2 Per Capita
4) An Arbor Day Observance and Proclamation

The many benefits of being a Tree City include creating a framework for action, education, a positive public image, and citizen pride.

- There are more than 3400 communities that are currently a Tree City USA.
- There are more than 500 communities that received a Growth Award.
- Over 135 million people live in a Tree City USA.

Source: Arbor Day Foundation, http://www.arborday.org/programs/treeCityUSA/about.cfm

RECOMMENDATIONS

Comprehensive plans can support a healthy tree canopy through goals, objectives and policies that support the preservation and replanting of trees in places that increases shading and infiltration. Communities can support the creation and adoption of a municipal or community tree ordinance or an urban forestry master plan to establish goals for tree canopy cover and rules for tree removal and planting. Urban shade trees and boulevard trees should be incorporated into municipal or community design standards. Additionally, communities that are not currently a member of the Tree City USA program may consider joining.

For more resources on preservation and maintenance of the urban tree canopy, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

HEALTH INDICATOR #7: DOES THE PLAN ADDRESS THE VIEWS OF GREENERY OR VISTAS?

HEALTH IMPORTANCE

Offering views of greenery can help reduce stress levels and provide a connection to nature.[69] A number of studies have shown a connection between nature and people's mental and physical health.[70] Roger Ulrich, a professor at Texas A&M University, in a seminal and oft-cited 1984 study, found that patients who had a view of trees out the window of their hospital room needed less medication and recovered more quickly from surgery than patients without a view.[71] Since that study, research has mounted showing a positive overall effect of "nature."

Simply viewing trees can provide mental restorative benefits. Experiencing nature by visiting gardens, forests and parks provides healing benefits as well. A large population-based study in Sweden reported people who visited open green spaces had less stress than those who didn't visit green spaces or visited them less often.[72] Another study showed that residents of neighborhoods with extensive green space enjoyed better health than neighborhoods without green space.[73] Research shows that people have a more positive outlook and higher life satisfaction when in proximity to nature.[74] Exposure to natural environments enhances the ability to cope with and recover from stress and observing nature can restore concentration and improve productivity.[75]

Figure 8: Man watching the river, Boonville, MO
Source: Ann Forsyth, University of Minnesota, Design for Health

Providing trees, green spaces and view sheds of greenery may be challenging in the built environment, considering building heights, existing infrastructure and manmade barriers. However, communities can implement design standards, regulate building heights and preserve areas for green space to improve the public's health and mental wellbeing.

DEFINING THE INDICATOR

The purpose of this health indicator is to determine if the plan recognizes opportunities to preserve trees, view sheds and green spaces for public health benefits. Specific key-word searches included 'views' and 'vistas' of greenery or natural features (e.g., rivers or lakes). Comp plans achieved the indicator even if they did not mention the association between providing views of greenery and health benefits.

Twenty-nine of the 52 communities (56%) included language that promoted views or vistas of greenery. Communities containing large water bodies and those along the Mississippi River, particularly those located in the Mississippi River Critical Area Corridor (MRCAC) provided the best examples of addressing the health indicator. Communities located along the MRCAC are required to manage land uses to meet federal and state guidelines, which includes the protection and enhancement of views and vistas of the Mississippi River. The cities of Anoka, Champlin, Fridley, Minneapolis, New Port and St. Paul are located within the MRCAC and recognized the importance of preserve natural views of the river in their comp plans.

The St. Paul comprehensive plan includes polices on views and visual beauty. The third of three main strategies in the Land Use plan is to "promote aesthetics and development standards." See below for the policies on views and visual beauty.

Views and visual beauty

Many features of the natural environment and the built environment enhance a sense of place as long as they remain prominently visible.

3.17 Preserve significant public views (see map of significant public views below) through standards that regulate such impacts as height, bulk, scale, and view corridor. These standards should be included in the site plan review process.
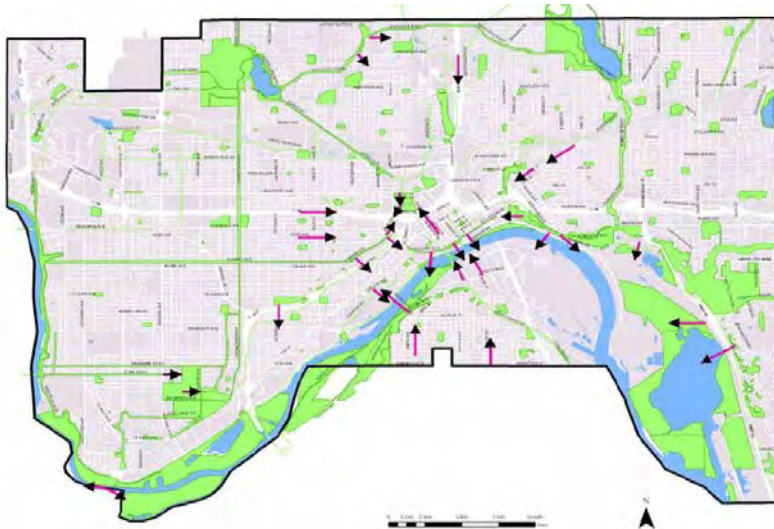
3.18 Support the protection and enhancement of the visibility of architectural landmarks. Examples of such landmarks are the Capitol, the Cathedral of St. Paul, the Highland Park Water Tower, and Landmark Center.

Other communities, including Falcon Heights, Long Lake, Mendota and St. Paul Park, stressed the importance of preserving views of their water bodies and open spaces by using general policy

statements. Communities including Edina, Minneapolis, Newport, St. Paul and Wayzata, emphasized stronger implementation strategies by discussing building heights and site distances needed to preserve views of important community assets.

RECOMMENDATIONS

Communities can begin by defining what 'views of greenery' means for the community. Views of greenery can include views of community parks, tree canopy, lawns and other green spaces, water bodies, or significant sightlines of community assets, such as the Mississippi River. Policies that are particularly important for health recovery and cognitive functioning include developing additional views of green spaces for important institutions, such as schools and hospitals.

Communities can support preservation of views of greenery through standards that regulate such impacts as height, bulk, scale, and view corridor (site distances). However, providing trees, green spaces and vistas may be challenging in the built environment, considering building heights, existing infrastructure and manmade barriers. Additionally, there may be conflicts between promoting views of greenery and strategies to promote other positive health outcomes (i.e., increase density to promote walkable communities). Less prohibitive policies may include site design guidelines for development and redevelopment that ensure windows overlook trees and landscaping rather than parking lots or other intensive uses.

For more resources on incorporating views of greenery and other natural features, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

HEALTH INDICATOR #8: DOES THE PLAN ADDRESS CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN (CPTED)?

HEALTH IMPORTANCE

Safety is an important factor for determining whether community residents will use public spaces, such as sidewalks and parks, and be physically active. Community design can play a significant role in creating environments where residents feel safe to walk for leisure or as a means to get to destinations, such as the corner store or school. There are many design strategies to increase community safety. For instance, integrating lighting into public spaces and along sidewalks provides pedestrians the opportunity to see others in the distance during nighttime hours. Crime Prevention Through Environmental Design (CPTED) provides a multi-disciplinary approach to creating environments that helps reduce criminal activity through design techniques. See box below for more details.

Four Principles of Crime Prevention Through Environmental Design (CPTED)

- **ACCESS CONTROL:** This involves designing streets, sidewalks, building entrances, and neighborhood gateways to clearly indicate transitions from the public environment to semi-private and private areas.
- **SURVEILLANCE:** A design principle that maximizes the visibility of people, parking areas, vehicles, and site activities. Strategies involve the strategic placement of windows, doors, walkways, parking lots, and vehicular routes.
- **TERRITORIAL REINFORCEMENT:** Sidewalks, landscaping, and porches help distinguish between public and private areas. This helps users display signs of "ownership" that send "hands off" messages to would-be offenders.
- **MAINTENANCE:** This addresses management and maintenance of space.
    - Proper upkeep (mowing grass, trimming trees and landscaping, picking up trash, repairing broken windows and light fixtures, and painting over graffiti)
    - Helps signal that a location or facility is well cared for and therefore would be inhospitable to a criminal
    - It also signals that an owner, manager, or neighbor is watching out for the property and could spot illegal behavior.

Source: National Crime Prevention Council, *Best Practices for Using Crime Prevention Through Environmental Design in Weed and Seed Sites*, 2009

CPTED techniques have been commonly used by planners for years. Jane Jacobs, a pioneer in the planning field stressed a number of design components that would create safer communities. In her book, "The Death and Life of Great American Cities," (1961) Jacobs emphasized design techniques that create active streetscapes by orienting buildings to the street, increasing density, providing clearly marked public and private spaces, and integrating street amenities, such as benches and lights. These measures are important from a public health perspective as they create safer environments, build social cohesion and improve mental health.

CPTED as an urban planning tool originated with a book by Ray Jeffrey in 1971. According to Jeffrey, "The two basic aims of CPTED are, first, to reduce opportunities for crime that often are inherent in the structure of buildings and the layout of neighborhoods, and second, to promote changes in attitudes among the population at risk. By reducing the apparent opportunity for crime, people should be less fearful of moving freely about their environment."[76]

In 1974 the state of Minnesota received a grant for a CPTED Residential Environment Demonstration on a neighborhood in Near-North Minneapolis.[77] Residential properties in the neighborhood were the primary crime targets at the time, with robberies, assaults and purse snatches occurring on the streets and in alleyways. The alleys in particular caused fear for residents, primarily due to poor lighting and entryways that were easy for burglars to access undetected.

A number of CPTED strategies were implemented, including dwelling unit specific strategies, block-level strategies, and neighborhood-wide strategies. Dwelling unit strategies included target-hardening[x] to improve access control and design modification to improve surveillance. Block level strategies included housing rehabilitation (especially vacant and abandoned structures), alley modification (territoriality and access control), housesitting and alleyway patrol, and a block watch project. Neighborhood-wide strategies were designed to develop social cohesion and identity, participation of residents, and social programming for youth.

DEFINING THE INDICATOR

The health indicator reviewed each comp plan to determine if communities addressed crime prevention through environmental design. Specific key-word searches included 'crime prevention through environmental design' and 'CPTED.'

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[x] Target-hardening for residences can include ensuring all doors and windows are locked when residents are not home, removing any tress or bushes that provide concealment for burglars or could be used to climb to a higher level of the property, and good exterior lighting as a psychological barrier to intruders. Source: Alaska Department of Public Safety
http://www.dps.alaska.gov/Ast/crimeprevention/residentialtargethardening.aspx

COMPREHENSIVE PLAN REVIEW FINDINGS

Only nine (17%) of the comp plans specifically talked about CPTED. The cities of Burnsville, Minneapolis, Richfield, St. Paul and Wayzata were the only communities that have incorporated policy statements in reference to CPTED.

Burnsville's comprehensive plan addressed CPTED in Chapter II – Future Land Use Guide Plan. Section 13.0 Land Use Guide Plan Strategies and Options, Part B: Promote Appropriate Density/Intensity and Development Design to Ensure Future Development is Sustainable, includes a bullet that states: "Add Development Review guidelines to promote transit oriented development, connectivity, crime prevention through design, and healthy living components as part of the general development review process."

Additionally, Chapter V - Neighborhoods Plan includes a section specifically addressing CPTED under "Safety Oriented Neighborhood Tools," along with Neighborhood Watch, National Night Out, Speed Reduction program, Community Resource Unit (out of the Police Department), Fire and EMS, and Neighborhood Street lighting. See the box on the following page for detailed content.

Some communities did not address CPTED directly, but included policy statements that encouraged design standards to improve personal safety in public spaces. Policy statements were typically found in the parks chapter (e.g., Arden Hills, Coon Rapids, Long Lake and Robbinsdale). Communities like Apple Valley, Colombia Heights, Edina, Lauderdale and Shoreview also provided components in their comp plan that talked about personal safety in public spaces.

The review did not assess measures comp plans took to address public safety unless CPTED was specifically mentioned. For instance, many of the plans discussed design strategies to create vibrant streetscapes, which in turn promote public safety. The assessment also discovered a number of communities that incorporated a community facilities chapter that discussed police, fire and emergency response services, in addition to neighborhood watch programs.

RECOMMENDATIONS

Communities should include goals, objectives or policy statements to adopt CPTED in the land use, housing, parks and community facilities chapters of the comprehensive plan. One method to do this is through the development review guidelines, as outlined by the Burnsville comprehensive plan. Cities may choose to follow the lead of the Richfield, St. Paul and Minneapolis comp plans which outline the use of CPTED in the development of public realm projects, specifically parks and recreation projects.

For more resources on CPTED, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

Burnsville Comp Plan: Chapter V, Section 4.1.10 Crime Prevention through Design (CPTED)

The Burnsville Police Department and other city staff that comprise the Development Review Committee (DRC) attend periodic training for crime prevention through environmental design. CPTED, is a multi-disciplinary approach to reducing crime and increasing perceived safety within neighborhoods.

CPTED relies upon the influence of offender behavior and seeks to dissuade offenders from committing crimes by manipulating the physical environment in which those crimes occur. As a result, it relies upon an understanding of what about the environment influences offenders. As city staff becomes educated about design alternatives, these ideas can be discussed with developers and incorporated into design guidelines and development related ordinances. The design standards and tactics do not necessarily prevent crime but have the potential to deter crime by influencing environmental features that may impact behavioral decisions of potential offenders. Some of the benefits of implementing CPTED are:

1. Law enforcement benefits from:

- Sustainable links with planning, development, code enforcement, and other local agencies
- Clarification and action on neighborhood priorities related to crime and quality of life
- New crime prevention and problem-solving techniques

2. City leaders see:

- Less crime in neighborhoods and business areas
- Improved perceptions of safety and livability in public areas and neighborhoods
- Enhanced consideration of public safety in planning development and redevelopment projects

3. Community residents have:

- Opportunities to play meaningful roles in community crime prevention
- An improved sense of security and quality of life through reduced fear of crime
- Increased interaction and stronger neighborhood bonds

HEALTH INDICATOR #9: DOES THE PLAN ADDRESS ACCESS TO HEALTHY FOOD SOURCES?

HEALTH IMPORTANCE

Sixty-three percent of Minnesotan adults and over 23% of Minnesota youth (ages 10 to 17) are overweight or obese. [78,79] Overweight and obesity are associated with increased risk for chronic diseases such as type 2 diabetes, cardiovascular/heart disease, kidney disease, stroke, arthritis, hypertension, and certain types of cancer.[80] Overweight and obesity are caused by consuming more calories than are burned. Eating more nutritious, less calorie-dense foods and promoting regular exercise are the best ways to prevent being overweight or obese. Eight-five percent of adult Minnesotans fail to eat enough fruits and vegetables to meet the daily recommendations for their age and gender.[81] Only 21% of 6th grade students and 17% of 12th grade students reported consuming five or more servings of fruits, fruit juices or vegetables the previous day.[82]

The ability to eat more nutritious, less calorie-dense foods can be limited by fresh food availability. Research shows that people who live near grocery stores are more likely to eat recommended amounts of fruits and vegetables and less likely to be obese or have a diagnosis of diabetes.[83] The negative effects can be compounded by a person's ability to access a private vehicle. Residents who do not live within walking distance to a grocery store and do not own or have access to a car are left with purchasing higher-calorie, lower-nutrient foods from neighborhood convenience stores and fast-food restaurants.[84] One study showed that residents who lived more than 1.75 miles from a supermarket had a body-mass index (BMI) almost 0.8 more than residents who lived 1.75 miles or less from a supermarket.[85] That is an additional 4.8 pounds for a person 5-feet and 5-inches tall. Additionally, rural and low-income Minnesotans have poorer access to fruits and vegetables than urban and wealthier Minnesotans.[86]

Providing access to healthy food sources is essential in promoting healthy diets and lifestyles. However, dispersing supermarkets/fruit and vegetable stores throughout the community may be challenging considering existing land use patterns and the market to support such stores.

Figure 9: Minneapolis Farmers' Market
Source: Image from the Metropolitan Design Center Image Bank
© Regents of the University of Minnesota. All rights reserved. Used with permission.

The health indicator looked at strategies or programs that addressed access to healthy foods, such as language that promoted transit access to grocery stores or proximity of a community farmers' market near residential development. Specific key-word searches included 'fruit,' 'vegetable,' '(healthy) food,' 'grocery store,' 'supermarket,' and 'farmers' market.'

COMPREHENSIVE PLAN REVIEW FINDINGS

Providing access to healthy foods is a positive approach for addressing the health issues outlined above. Unfortunately, community and regional food planning is not a common element found in the metro area's comprehensive plans, nor is it a required component. Eight of the 52 communities (15%) addressed the issue of healthy foods and/or the issue of accessibility of healthy foods. Five of the eight comp plans referenced the health indicator with little or no direction on achieving an outcome. Three of the eight comp plans, Minneapolis, Burnsville and Excelsior, included policy statements or actions for increasing access or promoting healthy foods in the community.

Eleven additional comprehensive plans mentioned the words 'food' or 'farmers' market' as either a sanitary concern or a part of a new or re-development projects. The issue was not in the context of access to healthy foods, therefore those comp plans were not counted. New Hope's comprehensive plan mentioned that the community had lost each of its four grocery stores since 1990, but did not address any support for providing access to remaining healthy food stores or attracting new grocery stores.

Excelsior provided an example of how to integrate healthy living, especially access to healthy food, into all planning initiatives. The following are two examples of policy statements that address access to healthy foods:

> *"The community must focus on improving accessibility, by a variety of transportation modes, to health care, food, education, employment, financial institutions, and social and recreational activities."*

> *"Integrate active and healthy lifestyle principles into all planning and public/private initiatives in the community. . . The City can also influence physical activity through park improvements, promote access to and expansion of transit opportunities, improve air and water quality, promote access to healthy food and improve safety of housing and environments. The City will examine all public and private projects in light of the impact to healthy lifestyles of Excelsior residents."*

The Excelsior comp plan also identified the need for community gardens at Excelsior Park Land, an administration goal for healthy lifestyles, and a series of food access policies and implementation strategies. See below.

Administration Goal 10: Promotion of active and healthy lifestyles shall be a priority for the community and shall be considered in all City projects as well as private redevelopment.

Food Access Policies:

A. Encourage and support the opening of a food market in Excelsior that provides healthy food options.

B. Encourage and support the farmers market and seasonal vegetable stands.

C. Work to provide access, especially for special populations such as the elderly or those with mobility issues, to transportation systems to ensure healthy food access.

D. Support and expand the community gardens.

FOOD ACCESS ACTIONS AND STRATEGIES

1. Encourage the opening of a food market in Excelsior that provides healthy food options.

2. Support the farmers market and examine options for expanded operations.

3. Revise zoning and licensing requirements to allow for seasonal vegetable stands.

4. Support and expand the community gardens.

RECOMMENDATIONS

There are two general approaches to increasing access to healthy foods: 1) bring healthy food retailers, farmers markets and community gardens to areas that lack sufficient access, or 2) link existing health food retailers to residents through transportation, especially public transit, and pedestrian and bicycle infrastructure. Cities can include policy statements in comprehensive plans supporting these efforts and make commitments through the development of programs or plans to implement these efforts. Another approach to supporting access to healthy food is reducing barriers to healthy food options such as farmers' markets and mobile vendors. These barriers may be addressed in the comprehensive plan, food licensing restrictions and zoning ordinances. Additionally, communities can promote programs such as farm-to-school initiatives that promote the economic viability of local farms and increase the consumption of nutritious produce in school children.

In 2007, the American Planning Association (APA) adopted a Community and Regional Food Planning Policy paper that outlines a number of strategies a community may use to incorporate healthy foods into their planning initiatives. The Policy Guide on community and regional food planning presents seven general policies, each divided into several specific policies. For each specific policy, a number of roles planners can play are suggested. The seven general policies are the following:

1. Support comprehensive food planning process at the community and regional levels;

2. Support strengthening the local and regional economy by promoting local and regional food systems;
3. Support food systems that improve the health of the region's residents;
4. Support food systems that are ecologically sustainable;
5. Support food systems that are equitable and just;
6. Support food systems that preserve and sustain diverse traditional food cultures of Native American and other ethnic minority communities;
7. Support the development of state and federal legislation to facilitate community and regional food planning discussed in general policies #1 through #6.

The Policy Guide can be found at http://www.planning.org/policy/guides/adopted/food.htm.

For more resources on addressing access to healthy foods, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

HEALTH INDICATOR #10: DOES THE PLAN DISCUSS LOCAL FOOD PRODUCTION?

HEALTH IMPORTANCE

Local food production provides access to healthy foods, and promotes additional health and social benefits to the gardeners and broader community. The act of gardening increases physical activity, especially for seniors.[87,88] Spending time in nature, including community gardens, can reduce stress, lower blood pressure and promote other mental health benefits.[89,90,91,92] For low-income communities, community gardens provide an affordable source of fresh foods. A study in Upstate New York found that "46% of the gardens were located in low-income urban areas. In approximately 30% of the gardens, the majority of gardeners were African American or other racial minority, or Hispanic."[93] Additionally, community gardens located in low-income neighborhoods were associated with resolving other issues in the neighborhood including crime, safety and vandalism.[94,95] Community gardens create a positive community influence and can strengthen communities by promoting neighborhood pride and creating social networks. Stronger communities generally have less neighborhood crime.[96,97]

Fast Facts: (copied from "The Planner's Role in the Urban Food System", The New Planner, Spring 2008, available online at http://planning.org/thenewplanner/2008/spr/urbanfoodsystem.htm)

- 56% of total U.S. farm production takes place in "urban-influenced" counties.[98] As such, preserving existing agricultural land within and surrounding urban areas is critical to maintaining production levels.

- 15-20% of the nation's workforce is employed in food system activities,[99] and therefore important for the strength of the U.S. economy.

- 80% of a city's sewage is contributed by food system activities,[100] which provides opportunities for innovation and design in waste management to improve environmental quality.

- 25% of fossil fuel use and air pollution is attributable to food production, processing, and transport.[101] Locally produced foods reduces travel and therefore fossil fuel emissions.

- Food travels an average distance of 1,500 miles between producer and a U.S. consumer[102]

- Local land for agricultural production is disappearing; only 0.4% of the land cover of the 53 developed communities reviewed remains 'cultivated crops'. See Figure 10: Map of 7-County Metro Area Land Cover
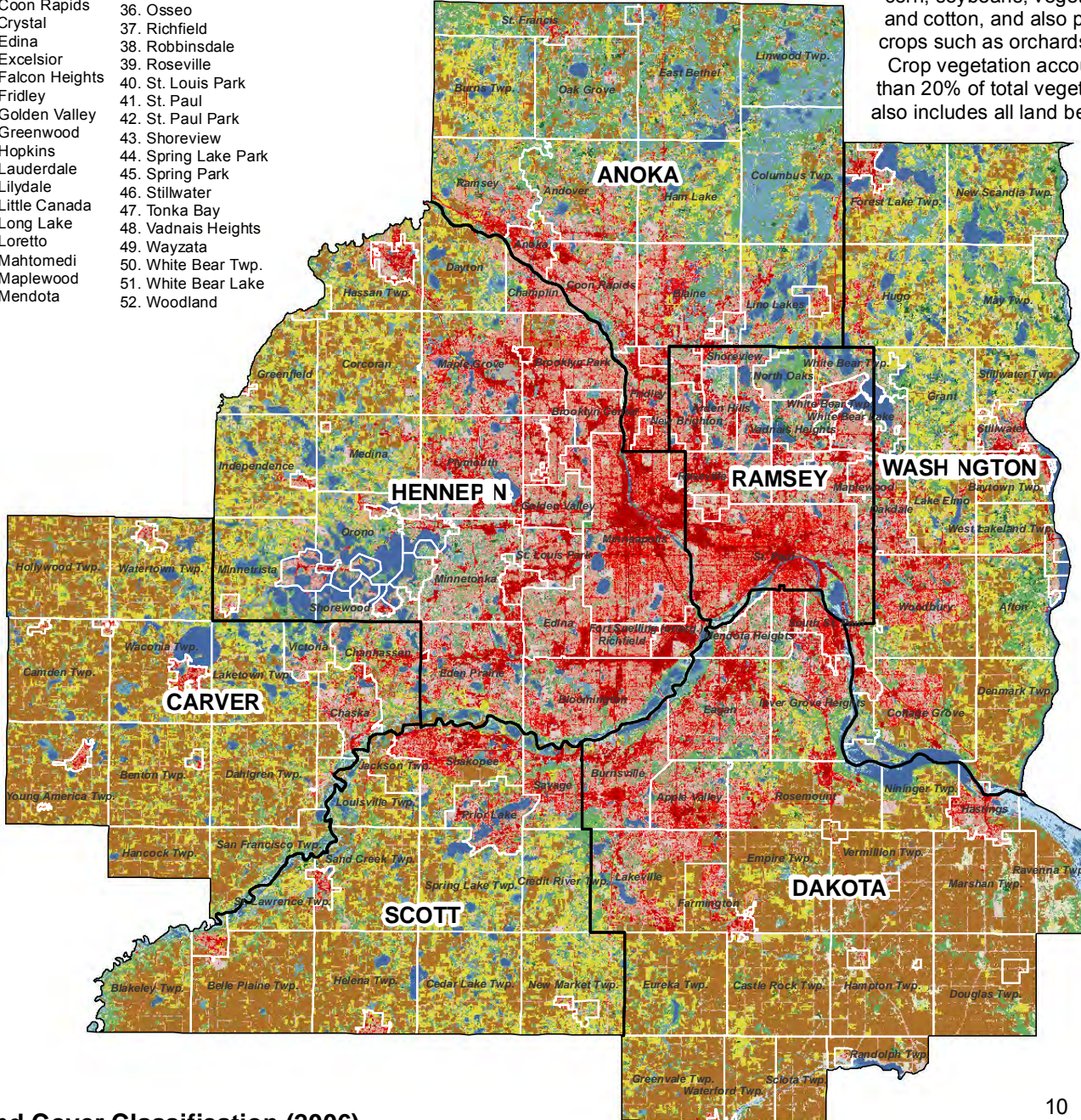
Figure 10: Seven-County Metro Area Land Cover

Only 0.4% of the land cover in the 53 Developed Communities reviewed remained 'cultivated crops'*

Compared to:
25.1% for the entire 7-County Metro
37.2% for the entire state

*Cultivated Crops – areas used for the production of annual crops, such as corn, soybeans, vegetables, tobacco, and cotton, and also perennial woody crops such as orchards and vineyards. Crop vegetation accounts for greater than 20% of total vegetation. This class also includes all land being actively tilled.

Developed Communities Included in the Review
1. Anoka
2. Apple Valley
3. Arden Hills
4. Bloomington
5. Brooklyn Center
6. Burnsville
7. Champlin
8. Circle Pines
9. Columbia Heights
10. Coon Rapids
11. Crystal
12. Edina
13. Excelsior
14. Falcon Heights
15. Fridley
16. Golden Valley
17. Greenwood
18. Hopkins
19. Lauderdale
20. Lilydale
21. Little Canada
22. Long Lake
23. Loretto
24. Mahtomedi
25. Maplewood
26. Mendota
27. Mendota Heights
28. Minneapolis
29. Minnetonka
30. Mound
31. Mounds View
32. New Brighton
33. New Hope
34. Newport
35. North St. Paul
36. Osseo
37. Richfield
38. Robbinsdale
39. Roseville
40. St. Louis Park
41. St. Paul
42. St. Paul Park
43. Shoreview
44. Spring Lake Park
45. Spring Park
46. Stillwater
47. Tonka Bay
48. Vadnais Heights
49. Wayzata
50. White Bear Twp.
51. White Bear Lake
52. Woodland

Land Cover Classification (2006)

- Unclassified
- Open Water
- Developed (Open Space)
- Developed (Low Intensity)
- Developed (Medium Intensity)
- Developed (High Intensity)
- Barren Land
- Deciduous Forest
- Evergreen Forest
- Mixed Forest
- Shrub/Scrub
- Herbaceous
- Hay/Pasture
- Cultivated Crops
- Woody Wetlands
- Emergent Herbaceous Wetlands

10 Miles

Source: National Land Cover Database, 2006

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Other benefits of community gardens and local agriculture:

- Local production increases the food security for our communities in a time of increasing climate instability and resource scarcity. Local and diversified food production will ensure that Minnesotans are not affected terribly by a drought in California or a hurricane in Florida.[103]

- Reduced driving means less traffic congestion, lower greenhouse gas emissions and improved air quality.
- Value-added products produced by urban commercial growers sold at top prices to up-scale restaurants, grocery stores, and farmers' markets are a source of jobs and local revenue generation. [104]
- At the same time, high-cost value-added products create a need for community gardens to provide lower cost healthy foods to neighborhoods.
- Increased pervious groundcover (e.g., replacing pavement with a garden plot) may save cities money on stormwater management and infrastructure; the money saved could be estimated and provided to gardeners as a tax rebate.[105]

DEFINING THE INDICATOR

This health indicator determined whether the comprehensive plans addressed local food production and/or supported local food production or policies. Specific key-word searches included 'food (production),' 'community gardens,' 'agricultural,' 'agriculture,' or 'farm.'

COMPREHENSIVE PLAN REVIEW FINDINGS

Seven of the 52 communities (13%) mentioned local food production in their comprehensive plans. Most of the plans referred to supporting new community gardens or expanding existing programs. White Bear Lake had a notable objective in the Land Use chapter, under the goal of "Reduced dependence upon fossil fuels, underground metals, and minerals." The objective states, "6. Support local food production and agriculture that reduces need for long-range transport of food."

The city of Minneapolis included a policy in the Public Health section of its Public Services and Facilities chapter which states, "Support the creation and improvement of community gardens and food markets which sell locally and regionally grown foods." After approval of the 2008 comprehensive plan, the city adopted its first Urban Agriculture Policy Plan (UAPP) in April 2011. The UAPP used the zoning code as

the primary mechanism for policy implementation. The zoning code recognized a few activities related to urban agriculture, primarily community gardens and farmers' markets. Specific details about the regulations are described in the Urban Agriculture Policy Plan Chapter 3, pages 26 through 29, including Minneapolis Park and Recreation Board and Hennepin County regulations relating to urban agriculture. The plan can be found online at
http://www.minneapolismn.gov/cped/planning/plans/cped_urban_ag_plan.

Details of note:
- Community gardens are not permitted as on-site retail, except as approved temporary use
- Farmers' markets of five or fewer vendors may not require a business license
- Developers of Planned Unit Developments (PUDs) may include provision of permanent growing space for residents
- There are no firm policies or regulations related to urban farms, roof top gardens, or temporary structures such as hoop houses

RECOMMENDATIONS

Each community is unique in the available opportunities to support local food production. Primarily in fully developed communities it would be unreasonable to recommend large plots of land be set aside for urban agriculture. However, most communities do have pockets of available land, or even rooftops, that could support small urban and community gardens. Land rights can be tricky in these circumstances and communities should create appropriate laws regarding tenancy and ownership, as well as water rights and fees, that support urban agriculture.

In most communities, it makes sense to incorporate community gardens into the overall park plan, because additional health advantages and safety are promoted if incorporated into parks and wildlife corridors.[106] Urban, suburban, and rural areas can adopt ordinances/permit processes for the raising of chickens and other farm animals. Communities that are not fully developed can support policies to preserve agricultural land such as zoning, transferable development rights, and conservation easements. Finally, it is important to support policies to remove regulatory barriers to the distribution, consumption and purchase of locally produced food that promote the successful economic system of local food production.

For more resources on supporting local food production and sales, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

HEALTH IMPORTANCE

Heat is a significant threat to public health in the United States. According to the National Oceanic and Atmospheric Administration (NOAA), heat has claimed more lives on average per year over the last ten years than any other severe weather event.[107] By the end of the 21st Century, heat-related deaths could more than triple in the U.S.[108] Extreme heat can be a serious health issue in northern climates like Minnesota where residents are more acclimated to bitter winter cold than blistering summer heat.

Between 1912 and 2011 Minnesota's annual average temperature increased by 0.23°F per decade, making it the ninth fastest warming state in the U.S.[109] However, from 1970 to 2011 Minnesota's annual average temperature increased 0.62°F per decade, making it the third fastest warming state in the U.S.[110] Between 1975 and 1995, Minneapolis had an historical average of 8 extreme heat event days per summer. Minnesota death records from 2000 to 2010 indicated that between the months of May and September, 35 deaths were attributable to extreme heat. [111] By the end of the century, it is predicted that Minneapolis will have 30 extreme heat event days per summer, causing 121 deaths per year.[112]

Minnesota recently broke several heat-related records. Many of the records were driven by high dew point temperatures. During the summer of 2011, there were five heat episodes in Minnesota that were worthy of issuing heat advisories or warnings. The worst heat event occurred during the heat wave of July 16-20, 2011. On July 19, a record state dew point temperature was set in Moorhead at 88°F.[113] The air temperature was 93°F, creating conditions that made it feel like 130°F. On that same day, the Twin Cities experienced an all-time high dew point of 82°F with an air temperature of 95°F. The combined air and dew point temperatures created a heat index of 119°F. Given increasing temperatures and dew point temperatures it is likely that Minnesota will see increased illnesses and deaths from extreme heat.

In addition to direct health impacts, extreme heat events can result in increased use of energy, power outages, damage to highways and roads, and an increase strain on the provision of available essential services like emergency hospital services, ambulance services and security.[114] The heat wave that hit Minnesota in July of 2011 left 750 Excel energy customers without power in the seven-county metropolitan area and killed livestock throughout the state. "The stress on farm animals caused a die-off worse than some growers have seen in nearly 30 years," said Byron Hogberg, Farm Services Administration Director in Renville County in southwestern Minnesota.[115]

DEFINING THE INDICATOR

Health indicator #11 assessed whether communities addressed extreme heat and/or the urban heat island effect. The urban heat island effect is characterized by an urban area that is significantly warmer than the surrounding rural areas where natural ground cover has been replaced with pavement, buildings, or other materials that tend to absorb and retain heat. The following urban heat island definition is provided by the U.S. Environmental Protraction Agency (EPA):

The term "heat island" describes built up areas that are hotter than nearby rural areas. The annual mean air temperature of a city with 1 million people or more can be 1.8–5.4°F (1–3°C) warmer than its surroundings. In the evening, the difference can be as high as 22°F (12°C). Heat islands can affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution and greenhouse gas emissions, heat-related illness and mortality, and water quality.

Specific key-word searches for this health indicator included 'extreme heat' and 'urban heat island.'

COMPREHENSIVE PLAN REVIEW FINDINGS

Five of the 52 comprehensive plans (10%) (Burnsville, Minneapolis, Osseo, Richfield and St. Louis Park) recognized urban heat island effects and zero mentioned extreme heat events. Osseo, St. Paul and Richfield recognized the benefits of rooftop gardens or green roofs as a mitigation measure for reducing heat. Burnsville included a comment about the degradation of the community's natural areas because of the urban heat island effect and climate change. Minneapolis provided the only policy statement directly linked to reducing heat island effects. See box below for the Minneapolis Urban Heat Island Policy Statement.

Minneapolis Urban Heat Island Policy Statement

Develop regulations to further reduce the heat island effect in the city by increasing green urban spaces for parks and open spaces, including shading of parking lots, sidewalks and other impervious surfaces, promoting installation and maintenance of green roofs and utilization of highly reflective roofing and paving materials.

RECOMMENDATIONS

Even small urban areas are affected by the urban heat island effect and all communities are at risk for extreme heat events. Comprehensive plans should include policies to increase urban green space city-wide and especially in areas identified with high concentrations of impervious surfaces. Policies may include promoting the shading of parking lots, sidewalks, buildings and other impervious surfaces. Comp plans can also promote goals that encourage green roofs and white roofs on private buildings and require them on public buildings. Communities also may support policies and/or design guidelines that encourage use of pervious pavers in parking lots, alley ways, and other areas to promote stormwater management and lower urban temperatures.

While frequently led by local emergency management department or public health, planners can help promote strategies to prevent illnesses and deaths from extreme heat events in comprehensive plans. Some strategies that could be used within comp plans include an inventory of cooling centers, community pools, splash pads or parks that could fall under the parks or community facilities chapter. Also, the comp plan can provide guidance on where

Figure 12: Target Center Green Roof in Minneapolis, MN

specific vulnerable populations are located in the community to support the efforts of the local health department.

For more resources on extreme heat events and the urban heat island effect, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

HEALTH INDICATOR #12: DOES THE PLAN PROVIDE STRATEGIES TO CONVERT COMMUNITY FACILITIES, FLEETS AND OPERATIONS TO A CARBON NEUTRAL ENVIRONMENT?

HEALTH IMPORTANCE

Carbon neutrality indicates having a net-zero carbon footprint. Carbon neutrality can be achieved by completely eliminating energy use except that which is produced by a renewable source that does not emit carbon (e.g. solar, wind or hydroelectric) or balancing carbon emissions with an equal amount of carbon sequestration (e.g., planting trees or buying carbon offsets).

Carbon neutral policies have economic, national security and public health co-benefits. Reducing carbon emissions through energy efficiency gains reduces the amount of energy purchased, which saves money for local governments once the energy efficiency investment is paid off. Reducing carbon emissions through increased renewable energy use can benefit local economies if the energy is sourced locally, and on a large scale improve national security if it reduces dependence of foreign energy sources. Reducing the sources of carbon emissions also will reduce the sources of air pollution, such as particulate matter and ozone, which can cause decreased lung function in healthy persons and can exacerbate existing respiratory (i.e., asthma and chronic obstructive pulmonary disease (COPD)) and cardiovascular conditions. [116,117]

Policies to influence private businesses and residences are more influential when cities demonstrate first-hand how carbon reductions can be made. In 2007, the city of Austin, Texas committed to going carbon-neutral by 2020. The "Go Neutral" Plan includes developing an online carbon footprint calculator to assess the impact of individuals and businesses; gathering a "menu" of strategies for individuals and businesses can undertake to reduce their footprint; promoting and recognizing achievements toward reducing carbon footprint; and marketing carbon offsets through businesses for travel and events.[118] The first goal of the Climate Protection Resolution is "Make all City of Austin facilities, fleets and operations totally carbon neutral by 2020." Specific measures include powering all city facilities with renewable energy by 2012 and making the entire city fleet of vehicles carbon neutral by 2020.[119]

Figure 13: Low-carbon vehicle

As a result of these efforts, Austin is currently a nationwide leader in sustainability and climate mitigation and their work is already showing promising results. The purchasing power of cities alone can influence the operations of manufacturers to make products and services more climate-friendly.

Additionally, some cities are their own energy suppliers and when they commit to providing a specific percent of the total power generated from renewables, policy is put into action.

DEFINING THE INDICATOR

The health indicator assessed whether the comprehensive plans mentioned reducing or eliminating carbon. The plans were counted if they included the specific key-word 'carbon' and had policies and strategies related to carbon-reduction.

COMPREHENSIVE PLAN REVIEW FINDINGS

Eight of the 52 comprehensive plans (15%) included specific language about reducing carbon. The eight cities, which included Arden Hills, Burnsville, Falcon Heights, Mahtomedi, Maplewood, Minneapolis, St. Paul and White Bear Lake, demonstrated an effort to reducing GHG emission by implementing policy statements or strategies in their comp plans.

Mahtomedi included a policy in the community facilities chapter which stated, "Conduct energy audits of all pertinent City facilities. Identify and implement strategies to reduce carbon emissions, increase energy efficiency, and provide the City with monetary savings."

Maplewood committed to establishing GHG reduction goals in all aspects of city operations "including such things as a "no idle" policy, increasing the fuel efficiency of City fleet vehicles, and the conversion of vehicles that operate with environmentally sustainable alternative fuels." Efforts also included measuring the carbon footprint of City operations and taking measures to reduce carbon emissions where feasible.

Minneapolis included a policy to support local businesses, goods and services to minimize the carbon footprint. The plan also included two objectives about carbon dioxide through reducing engine emissions and recognizing the benefits of tree canopy carbon sequestration.

The city of White Bear Lake included a commitment to measure the City's carbon footprint and establish reduction goals immediately and a policy statement in support of converting city vehicles to low-emission vehicles.

Edina's comp plan, not one of the eight that were counted, included a chapter on global warming and climate change. The chapter mentioned GHG emission reductions but not specifically carbon or citywide reductions for facilities, fleets and operations.

RECOMMENDATIONS

Reducing carbon emissions and committing to carbon neutrality may slow the impacts of climate change on communities world-wide. Strategies to reduce carbon emissions can have additional benefits to public health by reducing the adverse health effects of local air pollution. As the comprehensive plan examples above demonstrate, there are a number of ways communities can commit to reducing their

carbon footprint. A recommended first step is to measure the carbon footprint of the community facilities, fleets and operations. Next communities can support the creation of a local Climate Action Plan to reduce the carbon footprint.

Climate Action Plans include specific reduction targets by sector, strategies and a plan for monitoring and reporting progress. Strategies in the building sector include energy efficient appliances, weatherization and renewable energy purchases. Programs like EPA's Energy Star or USGBC's LEED mentioned in Health Indicator #1 are good resources. Strategies in the transportation sector include reducing congestion and VMT by promoting the use of public transit, biking and walking, and TDM strategies described in Health Indicator #4.

Several communities and institutions in Minnesota have adopted climate or energy action plans. Some examples include the following:

- University of Minnesota Climate Action Plan
  http://rs.acupcc.org/site_media/uploads/cap/812-cap_5.pdf
- Minneapolis Climate Action Plan
  http://www.minneapolismn.gov/sustainability/climate/index.htm
- Duluth, MN Energy Action Plan 2011
  http://www.duluthmn.gov/downloads/Duluth%20CITY%20OPERATION%20Energy%20Action%20Plan_FINAL_May%2010%202011.pdf
- Ely, MN Energy Action Plan 2010
  http://www.arrowheadplanning.org/documents/Ely%20Energy%20Action%20Plan/Ely%20Energy%20Action%20Plan_FINAL_November%202010.pdf

For more resources on reducing carbon emissions, see the MDH Healthy Planning Training and How-To Guide at www.health.state.mn.us/topics/places/plans.html.

SUMMARY

The 12 health indicators in this review are not required by state statute or regional policy to be included in the seven-county metro area comprehensive plans. As a result, large variation between communities in addressing the health indicators was expected. Notably, almost 75% of the comprehensive plans addressed three of the health indicators, i.e., energy efficient buildings, tree canopy, and separating incompatible uses. Over 50% of the comprehensive plans addressed three additional health indicators, i.e., travel demand management, vegetative buffers along water bodies, and views of greenery. Less than 15% of the comprehensive plans addressed the following four health indicators: access to healthy foods, local food production, extreme heat events/urban heat island, and carbon reductions/neutrality. Table 3 below provides a summary of the health indicator findings. Response 1 (Implemented) signifies the health indicator was achieved by an adopted plan or program. Response 2 (Direction) signifies that direction through goals and strategies were established to meet the health indicator's objective. Response 3 (Language) signifies that the comp plan referenced or discussed the health indicator but there was little or no direction provided for achieving the outcome.

Table 3: Summary of Local Health Indicator Findings

12 Local Health Indicators	NO	YES	Response 1	Response 2	Response 3
#1. Does the plan address energy-efficient buildings?	14	38	2	28	8
#2. Does the plan provide direction on brownfield cleanup?	31	21	3	9	9
#3. Does the plan provide guidance on separating incompatible land uses with residential areas and natural resources?	7	45	1	36	8
#4. Does the plan provide guidance on travel demand management (TDM) strategies?	23	29	7	15	7
#5. Does the plan address vegetated buffers along water bodies?	23	29	12	13	4
#6. Does the plan address the maintenance and preservation of the community's tree canopy?	12	40	19	15	6
#7. Does the plan address the views of greenery or vistas?	23	29	1	15	13
#8. Does the plan address crime prevention through environmental design (CPTED)?	43	9	1	5	3
#9. Does the plan address access to healthy food sources, such as grocery stores and farmers' markets?	44	8	0	3	5
#10. Does the plan discuss local food production?	45	7	0	6	1
#11. Does the plan address extreme heat events?	47	5	0	1	4
#12. Does the plan provide strategies to convert community facilities, fleets and operations to a carbon-neutral environment?	44	8	0	2	6

The recommendation section for each health indicator included examples of language, policies and programs that planners can include in their comprehensive plans and other regulatory tools to achieve healthy, vibrant communities. A summary of recommendations for each health indicator follows below.

Health Indicator 1: Does the plan address energy-efficient buildings?

Comprehensive plans can support the implementation of energy-efficient buildings through policy requirements and regulatory reform, such as LEED certification for public buildings, open space preservation and park dedication, water-saving landscaping, and the installation of cool roofs. Communities should encourage the state of Minnesota to adopt energy-efficient building codes and subsequently adopt the codes locally, as well as resolve existing conflicts in the codes, such as solar installations and historic preservation guidelines.

Health Indicator 2: Does the plan provide direction on brownfield cleanup?

Comprehensive plans should provide goals or policy statements to prioritize Brownfield cleanup and redevelopment prior to new greenfield development. Comp plans can support private sector redevelopment by identifying sites, providing a list of financial resources for the costs of investigation and clean-up, and removing barriers to development, such as undertaking public cleanup, allowing limited liability for potential contamination, or fostering public-private partnerships.

Health Indicator 3: Does the plan provide guidance on separating incompatible land uses with residential areas and natural resources?

Comprehensive plans can transition between incompatible land uses by using design standards, buffering techniques, zoning updates and redevelopment strategies. Zoning (use-based or performance-based) is an option to ensure appropriate land use transition. Buffering or screening can be accomplished using both natural buffers and intermediate land uses to step-up development intensity. Natural or vegetative buffers such as parks, boulevard trees, and other green spaces provide additional benefits, such as aesthetics, air quality improvements to both noise and pollution, and mental health benefits of views of greenery. (See indicator #7)

Health Indicator 4: Does the plan provide guidance on travel demand management (TDM) strategies?

Regional congestion and vehicle miles traveled (VMT) are a shared responsibility. All communities in the metro area should include goals or policy statements supporting the adoption of TDM strategies such as public transit, carpooling, flexible work-hours, telecommuting, bicycle parking, bicycle and pedestrian infrastructure, traffic calming techniques, and involvement in area-based TMOs. TDM strategies can provide innovative solutions to reducing the number of single-occupancy trips, overall VMT and regional traffic congestion.

Health Indicator 5: Does the plan address vegetated buffers along water bodies?

Comprehensive plans should include policy statements that support the establishment of vegetative buffer zones, shoreline ordinances, and preservation of native vegetation. Language should promote restricting development in critical areas, such as shorelines, natural drainage ways, steep slopes and erodible soils to support the reproduction of hydrologic conditions. More specifically, policies are needed that decrease impervious surface and that decrease pipes, sewers and ditching while providing infiltration and protecting natural systems.

Health Indicator 6: Does the plan address the maintenance and preservation of the community's tree canopy?

Comprehensive plans can support a healthy tree canopy through goals, objectives and policies that support the preservation and replanting of trees in places that increase shading and infiltration. Communities can support the creation and adoption of a municipal or community tree ordinance or urban forestry master plan to establish goals for tree canopy cover and rules for tree removal and planting. Urban shade trees and boulevard trees should be incorporated into municipal or community design standards. Additionally, communities that are not currently a member of the Tree City USA program may consider joining.

Health Indicator 7: Does the plan address the views of greenery or vistas?

Communities can support preservation of views of greenery through design standards that regulate height, bulk, scale, and view corridor (site distances). This can be difficult in a fully developed community and there may be conflicts between promoting views of greenery and strategies to promote other positive health outcomes (i.e., increase density to promote walkable communities). Focus on less prohibitive policies such as site design guidelines for development and redevelopment that ensure windows overlook trees and landscaping rather than parking lots or other intensive uses.

Health Indicator 8: Does the plan address crime prevention through environmental design (CPTED)?

Communities should include goals, objectives or policy statements to adopt CPTED in the land use, housing, parks and community facilities chapters of comprehensive plans. One method to do this is through the development review guidelines, as outlined by the Burnsville comprehensive plan. Cities may choose to follow the lead of the Richfield, St. Paul and Minneapolis comp plans which outline the use of CPTED in the development of public realm projects, specifically parks and recreation projects.

Health Indicator 9: Does the plan address access to healthy food sources, such as grocery stores and farmers' markets?

There are two general approaches to increasing access to healthy foods: 1) bring healthy food retailers, farmers markets and community gardens to areas that lack sufficient access, or 2) link existing health food retailers to residents through transportation, especially public transit, and pedestrian and bicycle infrastructure. Communities can support these efforts through policy statements and commitments to develop a program or implementation plan. Communities also should reduce barriers to healthy food options, such as farmers' markets and mobile vendors, in the comprehensive plan, food licensing

restrictions and zoning ordinances. Additionally, communities can promote programs such as farm-to-school initiatives that promote the economic viability of local farms and increase the consumption of nutritious produce in school children.

Health Indicator 10: Does the plan discuss local food production?

Fully developed communities with limited plots of land for urban agriculture should support small urban and community gardens on pockets of land, or even rooftops. Communities should help develop laws regarding tenancy and ownership, as well as water rights and fees, that support urban agriculture. All communities should incorporate community gardens into the parks or the community facilities plan and consider the adoption of ordinances/permit processes for the raising of chickens and other farm animals. Communities that are not fully developed can support policies to preserve agricultural land, such as zoning, transferable development rights, and conservation easements. Finally, communities should support policies to remove regulatory barriers to the distribution, purchase and consumption of locally produced food that promote the successful economic system of local food production.

Health Indicator 11: Does the plan address extreme heat events?

Comprehensive plans should include policies to increase urban green space city-wide and shading of parking lots, sidewalks, buildings and other impervious surfaces. Comp plans also can promote goals that encourage green roofs and white roofs and support policies and/or design guidelines that encourage use of pervious pavers in parking lots, alley ways, and other areas to promote stormwater management and lower urban temperatures.

Planners also may choose to coordinate with local public health on planning for extreme heat events. Assistance could include an inventory of cooling centers, community pools, splash pads or parks that could fall under the parks or community facilities chapter, as well as locating vulnerable populations in the community.

Health Indicator 12: Does the plan provide strategies to convert community facilities, fleets and operations to a carbon-neutral environment?

A first step for communities committed to reducing their carbon footprint is to measure the carbon footprint of the community facilities, fleets and operations. Next communities can support the creation of a local Climate Action Plan to reduce their carbon footprint. Climate Action Plans include specific reduction targets by sector, strategies and a plan for monitoring and reporting progress. Strategies in the building sector include energy efficient appliances, weatherization and renewable energy purchases. Programs like EPA's Energy Star or USGBC's LEED mentioned in Health Indicator #1 are good resources. Strategies in the transportation sector include reducing congestion and VMT by promoting the use of public transit, biking and walking, and TDM strategies described in Health Indicator #4.

The findings from this report are not intended for comparison across communities to determine which cities did or did not meet a health indicator's key-word search. The findings are intended to provide an idea of what health outcomes may be missing from consideration when planning the built environment. The recommendations are general, and communities interested in incorporating more health impacts into future planning processes should go to the MDH Healthy Places website at www.health.state.mn.us/topics/places/plans.html for the Healthy Planning Training and How-To Guide. The Training describes eight overarching health goals that planners can achieve by implementing a number of strategies. The How-To Guide provides a more in depth discussion of the strategies introduced in the Training. Planners and policy makers should be cognizant of the local context when addressing the health goals and focus on the health goals and strategies that are most appropriate for their community.

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