



MEMORANDUM

To: CMAP's Environment & Natural Resources Committee

From: CMAP Staff

Date: November 2, 2017

Re: ON TO 2050 Environment Indicator Refinement

Following an approach established in GO TO 2040, ON TO 2050 will include various topic-specific indicators, which are a set of performance measures to benchmark the region's progress on plan implementation. The final set of indicators should highlight and complement all of the major recommendations made in ON TO 2050. All indicators will have targets for both 2025 and 2050 to evaluate near- and long-term progress.

In identifying the set of indicators for ON TO 2050, staff first began by reviewing the existing GO TO 2040 indicators, as revised via the Plan Update process in 2014. Informed by several ON TO 2050 Strategy Papers and Snapshot Reports, staff considered whether the current set adequately addresses the core ON TO 2050 topics from both a technical (e.g. available data sources, methodologies) and policy (e.g. regulations, plan priority, accessibility, and level of effort) standpoint. This memo outlines recommendations for revisions or entirely new indicators in order to successfully benchmark the region's progress on implementing the plan.

Current GO TO 2040 Environmental Indicators

The GO TO 2040 Plan Update in October 2014 included an extensive review of the original GO TO 2040 indicators. There are nine main indicators that track progress on environmental recommendations (Table 1). In addition, there are four kindred indicators that complement three of the nine main indicators. Additional details about the indicator methodology can be found in the Indicator Methodology [appendix](#) from the Plan Update.¹

¹ CMAP. GO TO 2040 Plan Update, Indicator Methodology Appendix.
<http://www.cmap.illinois.gov/documents/10180/332742/Update+Indicator+Methodology+FINAL.pdf/720e4b90-0058-4d27-bdff-e898cdf3fb2b>

Table 1. GO TO 2040 Environmental Indicators

Indicator	Description	Targets in GO TO 2040	Recommendation
Acres of Impervious Area	Tracks the total acreage of impervious surface throughout the region as an indicator of impacts to natural resources especially surface water, as well as loss of natural and agricultural lands.	<ul style="list-style-type: none"> • 2020: 590,000 acres of impervious cover. • 2040: 640,000 acres of impervious cover. 	Keep
Greenhouse Gas Emissions	This indicator measures the total of greenhouse gas (GHG) emissions produced in the CMAP region.	<ul style="list-style-type: none"> • 2015: 119 MMTCO₂e 13.7 metric tons of CO₂ equivalent per capita • 2020: 105 MMTCO₂e 11.5 metric tons of CO₂ equivalent per capita • 2040: 47 MMTCO₂e 4.3 metric tons of CO₂ equivalent per capita 	Modify (updated data, targets, and baselines will be completed in April 2018)
Public Supply Water Demand	This indicator measures the total public water supply demand that is withdrawn, treated and delivered to all users. This indicator has two sets of targets -- one measuring total daily water demand and one measuring daily demand on a per capita basis.	<ul style="list-style-type: none"> • 2015: 1,042 million gallons of water used daily 123 gallons of water used daily per capita • 2020: 1,063 million gallons of water used daily 120 gallons of water used daily per capita • 2040: 1,156 million gallons of water used daily 109 gallons of water used daily per capita 	Keep
KINDRED: Lake Michigan Withdrawals	This kindred indicator tracks Lake Michigan withdrawals separately as there is a limit to the amount of water that can be diverted from Lake Michigan	Targets were not set for kindred indicators	Modify (see Table 4)
KINDRED: Deep Bedrock Aquifer Withdrawals	This kindred indicator tracks deep bedrock aquifer withdrawals separately as there is evidence that unsustainable withdrawals are occurring and leading to desaturation of this water resource.	Targets were not set for kindred indicators	Keep

Indicator	Description	Targets in GO TO 2040	Recommendation
Acres of Conservation Open Space	This indicator measures the total number of acres in the region used for conservation (i.e., preserves and natural areas). This measure does not include acres of parkland in the region, land used for golf courses, farm land, or land used for historic preservation.	<ul style="list-style-type: none"> • 2015: 275,000 acres • 2020: 300,000 acres • 2040: 400,000 acres 	Modify (see Table 5)
Regional Access to Parks per Person in Acres	This indicator tracks access to parks by subzone and is measured by two separate standards – four acres per 1,000 people and ten acres per 1,000 people.	<p>Four acres per 1,000 people</p> <ul style="list-style-type: none"> • 2020: 78 percent of the regional population • 2040: 100 percent <p>Ten acres per 1,000 people</p> <ul style="list-style-type: none"> • 2020: 57 percent of the regional population • 2040: 70 percent 	Keep
Trail Greenway Mileage	This indicator measures the number of miles of trail greenways in the Northeastern Illinois Regional Greenways and Trails Plan. Trail greenways are defined as off-street trails for walking or bicycling that connect parks or conservation areas; they exclude on-street trails	<ul style="list-style-type: none"> • 2015: 808 miles • 2020: 916 miles • 2040: 1,348 miles 	Eliminate (replace with existing Percentage of the Regional Trails Plan Completed kindred indicator)
KINDRED: Percentage of the Regional Trails Plan Completed	This indicator tracks the percentage of the Regional Trails Plan that has been completed.	Targets were not set for kindred indicators	Keep as core indicator (replacing Trail Greenway Mileage)
Acres of Land Harvesting Food for Human Consumption	This indicator lists the total number of acres in the region that support food for direct human consumption. Data for this indicator come from the U.S. Census of Agriculture. The U.S. Department of Agriculture defines “direct consumption” as the totals found in these categories: orchards, peanuts, potatoes, sweet potatoes, and vegetables. This data excludes community gardens and other entities not counted in the Census of Agriculture.	<ul style="list-style-type: none"> • 2020: 5,700 acres • 2040: 8,200 acres 	Keep

Indicator	Description	Targets in GO TO 2040	Recommendation
Value of Agricultural Products Sold Directly to Individuals for Human Consumption	This indicator measures the dollar value of agricultural products produced and sold directly to individuals for human consumption from establishments such as roadside stands, farmers' markets, and pick-your-own sites in the seven-county region. This measure is adjusted for inflation to show real (not nominal) value.	<ul style="list-style-type: none"> • 2020: The market value of agricultural products sold for human consumption will comprise 1.95 percent of the total value of agricultural products sold in the region. • 2040: The market value of agricultural products sold for human consumption will comprise 2.80 percent of the total value of agricultural products sold in the region. 	Eliminate
Percentage of Population Living in Food Deserts	This indicator measures the percentage of the population that lives in a Census tract where the median household income is below the weighted average median income level for the seven counties and that has a low accessibility to large supermarkets. For the study, supermarkets are defined as full-service chains, supercenters, and local chains or independents with at least five check-out lanes and a full line of groceries. Data collection and analysis were led by Daniel Block of the Fredrick Blum Neighborhood Assistance Center at Chicago State University.	<ul style="list-style-type: none"> • 2015: 7 percent • 2020: 6 percent • 2040: 0 percent 	Eliminate
KINDRED: Farmers' Markets in the Region	This kindred indicator tracks the number of farmers' markets operating in the region annually	Targets were not set for kindred indicators	Eliminate

Rationale for Updating ON TO 2050 Environmental Indicators

As part of the ON TO 2050 plan development process, CMAP explored key policy areas through the development of strategy papers on Climate Resilience, Integrating Green Infrastructure, Lands in Transition, Water Resources, and Stormwater and Flooding. In addition, CMAP has increased its understanding of current trends in natural resources and local food production through the development of a Natural Resources Snapshot and a Local Food Memo.

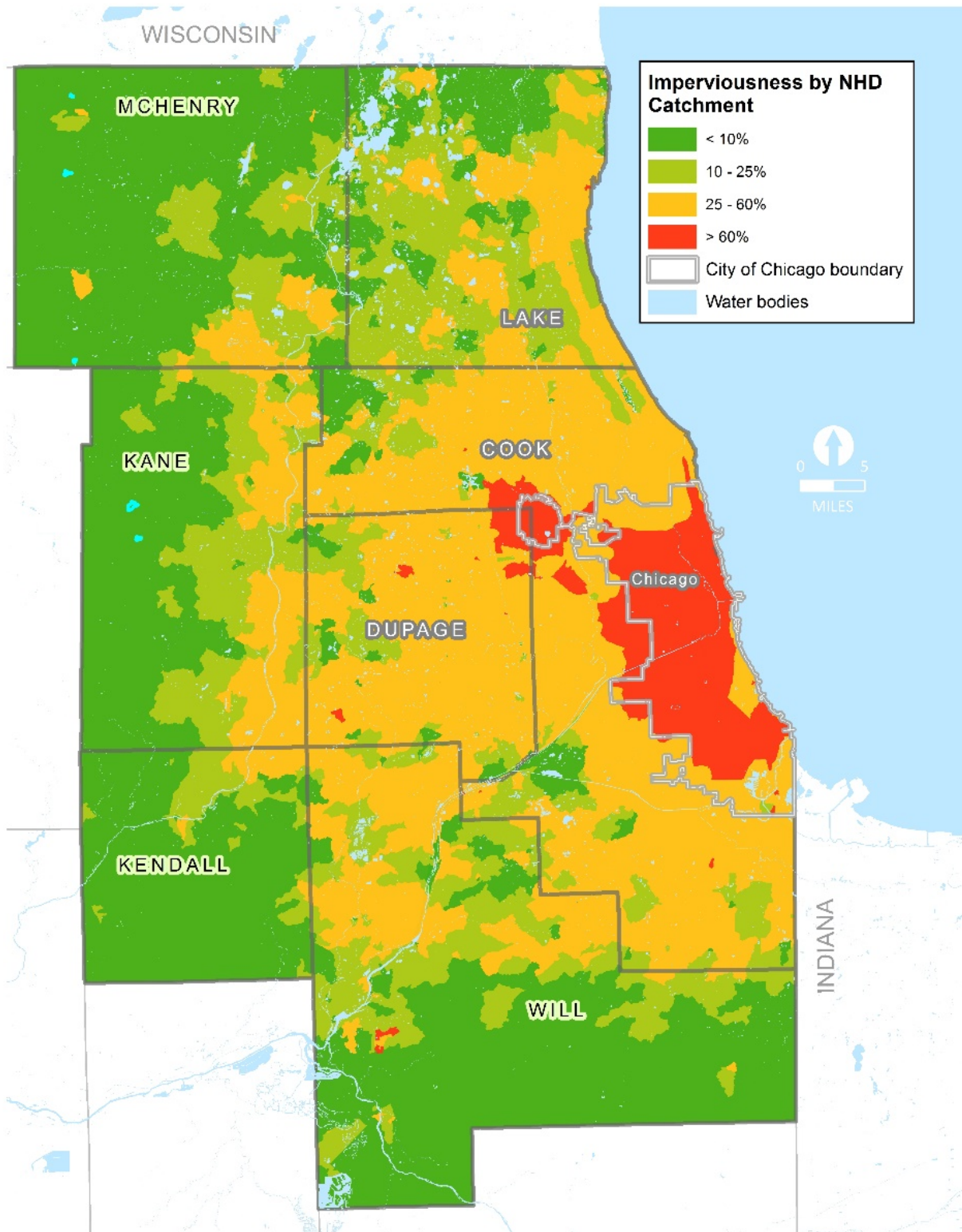
Key findings and policy recommendations have pinpointed the need to update some of the ON TO 2050 environmental indicators. What follows is a brief explanation of how research highlighted the need for additional indicator changes.

New Analysis on Water Resources

For ON TO 2050, CMAP reviewed several water quality assessments to gain a better understanding of watershed health in the Water Resources Strategy Paper. Many of the region's water resources are still not meeting all goals of the Clean Water Act, designated uses, water quality standards, or measures of biological quality. However, a significant number of waterbodies have not been assessed, due to the lack of adequate monitoring data to assess current conditions and track change over time. Less than 50 percent of streams and lakes have been assessed, and over 50 percent of assessed streams fall short of water quality goals. Given this lack of data, CMAP turned to other measurements to understand watershed health and water quality, namely the amount of impervious cover within a small watershed. At the watershed scale, impervious cover can lead to water pollution, erosion, and degraded stream health. Research has shown that subwatersheds with less than 10 percent impervious cover tend to maintain the health of streams.² Further increases of impervious cover (up to 25 percent) can lead to impacted streams that could be restored with intervention. **Figure 1** categorizes the region's small watershed catchments using four categories of impervious cover percentage indicative of watershed health. This analysis highlights priorities for planning and policy activities that advance the protection of higher quality water resources and the restoration of others.

² Thomas R. Schueler, Lisa Fraley-McNeal, Karen Cappiella, "Is Impervious Cover Still Important? Review of Recent Research," *Journal of Hydrologic Engineering* 14, no. 4, 2009.

Figure 1: NHD catchments by percent imperviousness



Sources: 2001-2011 National Land Cover Dataset, 2015 Northeastern Illinois Development Database, Illinois Department of Natural Resources, and CMAP analysis of National Hydrography Dataset.

CMAP's water resources strategy paper also reviewed water supply challenges in the region. As the region's infrastructure ages, loss of potable water is a growing area of concern, particularly in the portion of the Chicago region served with Lake Michigan water. Governed by a U.S. Supreme Court consent decree as well as the Great Lakes Compact, water loss works against water conservation and efficiency goals and also hinders utility management. In addition, high levels of water loss can indicate that a community water supplier is violating the conditions of their Lake Michigan permit. In 2013, CMAP and partners found that approximately 21 percent of 195 permittees lost water at a rate that exceeded the water-loss standard the Illinois Department of Natural Resources (IDNR) sets as a condition of permit.³

Updated Protocols for Greenhouse Gas Emissions Inventories

The 2010 Chicago Regional Greenhouse Gas Emissions Inventory was completed prior to the development of the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories (GPC), now considered the industry standard. To improve the accuracy of year-to-year comparisons, CMAP has undertaken steps to develop a GPC-compliant inventory for the year 2015 (to be completed in April 2018), and update the 2010 inventory to reflect GPC best practices. The targets currently included in the indicator reflect past GHG accounting practices, and will need to be updated. These changes will make the indicator more robust, and ensure the accuracy of year-to-year trends.

Land Preservation Trends and the Conservation Areas Layer

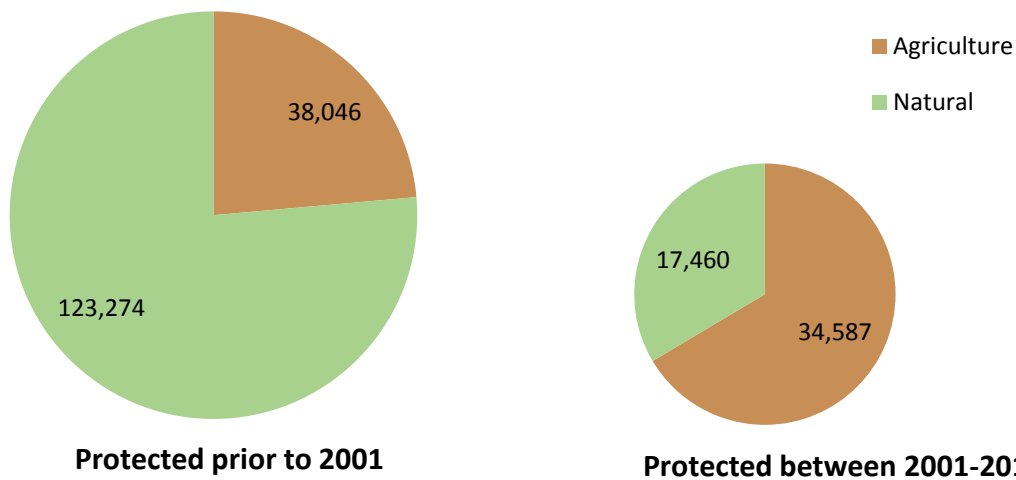
CMAP conducted a review of newly protected lands and found that from 2001 to 2015, an estimated 61,500 acres of conservation open space were permanently protected (approximately 9,500 of which were impervious land cover). A significant portion of newly protected lands include areas that are currently used for agricultural purposes, and some of these may have been preserved for future restoration to a natural condition. Overall the amount of agricultural land under protection doubled during this period (**Figure 2**). Farmland protection measures, such as limiting agricultural conversion and preventing conflicts with farming operations, aim to retain valuable farmlands in production given their significant economic and cultural contributions to our communities. At the same time, habitat fragmentation and the importance of larger habitat cores—combined with a decreasing amount of high-quality natural lands left to protect—have led conservationists to focus land acquisition strategies on preserving high-quality remnant natural areas, building larger core preserve areas, and maintaining or creating connections between existing natural areas. Land conservation indicators should reflect the increasing importance of agricultural land to achieve goals for land use policy, land preservation activity, and the restoration and connectivity of natural areas.

Regional mapping of natural resources and green infrastructure has evolved since the creation of GO TO 2040. GO TO 2040 identified the Green Infrastructure Vision (GIV), a spatial dataset representing the Chicago Wilderness Biodiversity Recovery Plan, as a way to prioritize open space acquisition and preservation, yet the data quality at the time of the original plan adoption did not support its use as an indicator. CMAP worked with Chicago Wilderness to create updated versions of the GIV for the region. At the subregional level, McHenry, Kane, and Lake

³ <http://www.cmap.illinois.gov/documents/10180/296743/FY14-0071+IDNR+WATER+LOSS+REPORT/bfda6186-8c79-42b5-80b8-9d97c7c2300d>

Counties created their own detailed green infrastructure plans and strategies, including detailed maps of natural resource areas. As part of the ON TO 2050 planning process, CMAP has drawn on the data and priorities expressed in these existing plans to develop a region-wide dataset titled the Conservation Areas layer. The Conservation Areas layer provides spatial data on natural resources that is easy to understand and use, supportive of ON TO 2050 policy goals, reflective of local priorities, and based on data that is region-wide and regularly updated. By combining analysis of general land, water, and ecological datasets with county plans, the layer includes both regionally significant resource areas and additional areas that county entities have identified as important based on local analysis. Because county plans allow for a more detailed analysis of a smaller area, they are able to assess natural resource areas that are significant but may not appear in a region-wide analysis. The classification allows the conservation areas layer to include these locally identified priority resources while distinguishing them from the regional conservation priorities. This layer will help stakeholders pursue policies and plans that advance regional goals for conserving natural resources and the ecosystem services they provide.

Figure 2. 2001 Land cover of previously protected and newly protected lands, in acres



Note: Portions of protected conservation open space were found to contain impervious surfaces and are not identified as agricultural or natural lands cover by the 2001 National Land Cover Dataset. Impervious acreage has been removed to more accurately track agricultural and natural lands.

Source: CMAP Land use Inventory, Illinois Department of Natural Resources, County Forest Preserves or Conservation Districts, Kendall County Forest Preserve District Master Plan, and I-View: Prairie State Conservation Coalition’s database of Illinois protected natural lands.

Recommended ON TO 2050 Indicators

This memorandum proposes to continue CMAP’s longstanding efforts to track indicators for natural resources to provide policy and planning recommendations for the region. The methodology of several indicators will stay the same⁴ and simply use updated data sources when they become available. Tables 2-6 describe proposed changes to a select number of ON TO 2050 Environmental Indicators in more detail. One indicator, tracking the amount of greenhouse gas emissions in the region, will need to be substantially revised based on CMAP’s upcoming work to develop a new inventory. The new inventory will be developed using current best practices established by the Global protocol for Community-Scale Greenhouse Gas Emissions Inventories (GPC). The inventory is anticipated to be complete in April 2018 and the revised indicator will be proposed to the working committees at that time.

Table 2. Proposed Percent of Region in Sensitive and Impacted Watersheds Indicator

Indicator	Tracks the change in impervious surface by watershed catchment throughout the region as an indicator of health and integrity of aquatic resources.
Methodology	<p>Research has shown that small watersheds with less than 10 percent impervious cover tend to be associated with healthy streams. Further increases of impervious cover (up to 25%) can impact streams that could be restored with intervention. This Indicator would track the total land area of the region in small watersheds in four impervious cover categories. This would highlight the policy recommendations of the plan to limit the creation and expansion of impervious surfaces into new agricultural and natural areas and is a metric of the health and integrity of aquatic resources .</p> <p>The source for this data is the National Land Cover Dataset (NLCD), a raster dataset with 16 land cover classifications that is published approximately every five years by the U.S. Geological Survey (USGS), as well as the National Hydrography Dataset Plus v2, which outlines the boundaries of small watershed catchments. The percent imperviousness of each watershed catchment would first be calculated and categorized into four groupings based on the impervious cover model:</p> <ul style="list-style-type: none"> - Sensitive: 0 – 10% - Impacted: 11 – 25% - Non-supporting: 26-60% - Urban drainage: 61-100% <p>Then the total land area in each of the four categories would be presented and reported as a percentage of the region. As of the 2011 NLCD, the region falls into the four categories as follows:</p>

⁴ “GO TO 2040 Update Appendix: Indicator Methodology,” Chicago Metropolitan Agency for Planning, 2014, www.cmap.illinois.gov/documents/10180/332742/Update+Indicator+Methodology+FINAL.pdf/720e4b90-0058-4d27-bdff-e898cdf3fb2b

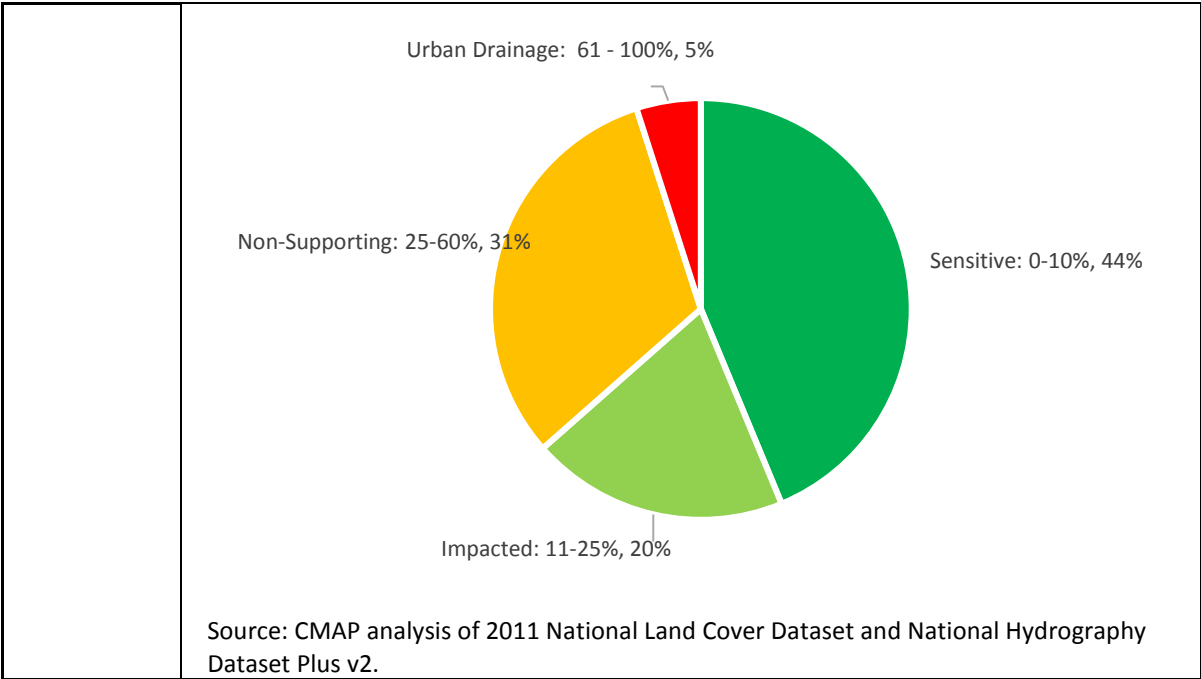


Table 4. Proposed Lake Michigan Withdrawals Kindred Indicator

Indicator	This kindred indicator tracks Lake Michigan withdrawals and levels of non-revenue water loss from community water suppliers. This is tracked separately as there is a limit to the amount of water that can be diverted from Lake Michigan.
Methodology	<p>In addition to overall water demand, the diversion of water from Lake Michigan is an area of interest for the CMAP region. By a U.S. Supreme Court consent decree, the State of Illinois is allowed to divert water from Lake Michigan at a rate of no more than 2,068 million gallons per day on average. The U.S. Army Corps of Engineers is responsible for the official accounting of water diverted from Lake Michigan. The State of Illinois Department of Natural Resources Office of Water also tracks the level of water loss, known as non-revenue water, from Lake Michigan Permittees on an annual basis. Levels of water loss above the state’s threshold (12% non-revenue water in 2015, decreasing to 10% by 2019) indicate water systems are not in compliance with the Rules and Regulations for the Allocations of Water from Lake Michigan (IL Admin. Code, Title 17, Part 3730).</p> <p>This indicator will track Lake Michigan withdrawals as reported by the U.S. Army Corps of Engineers, along with the subset of those withdrawals tracked by IDNR as non-revenue water. Each will appear in million gallons per day (mgd):</p>

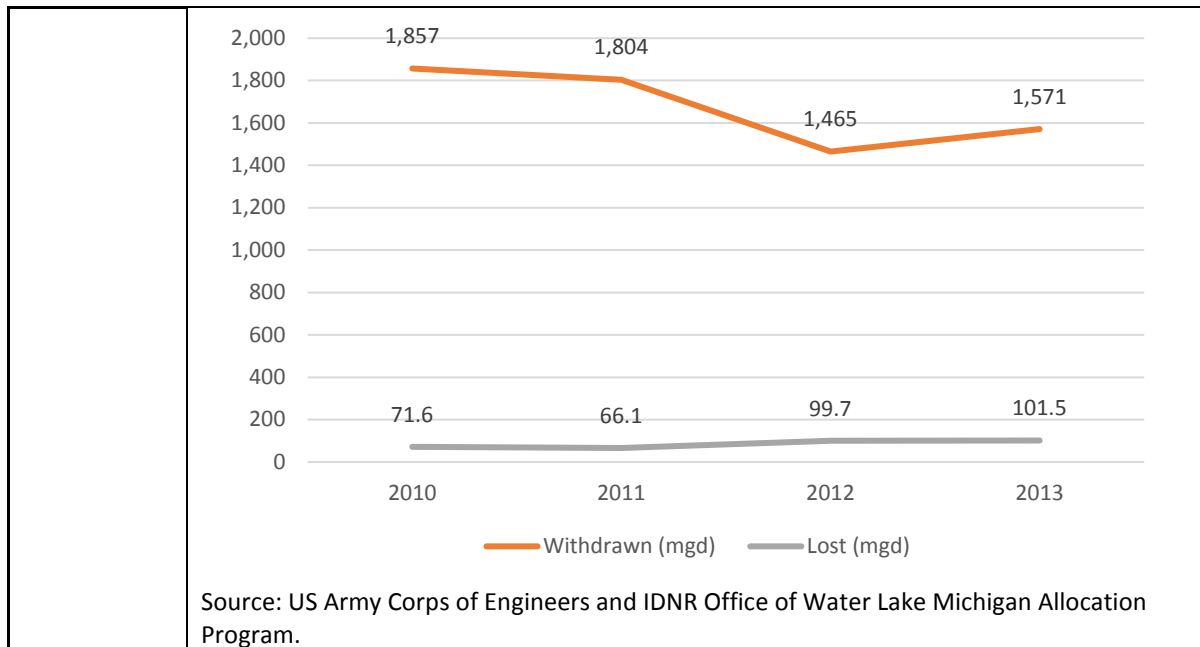


Table 5. Proposed Acres of Preserved Open Space Indicator

Indicator	This indicator measures the total number of acres in the region used for land and water preservation (i.e., preserves, natural areas, and conservation easements). This measure does not include acres of parkland in the region, land used for golf courses, unprotected farm land, or land used for historic preservation.
Methodology	The current CMAP Land Use inventory, finalized following the adoption of GO TO 2040, is a parcel-based database which is a marked departure from the previous version. As a result of this change, the base year conservation open space value was recalculated based on the updated Land Use Inventory structure in order to ensure that this indicator is measured in a consistent manner. To calculate the total acreage, CMAP will include easement data from the National Conservation Easement Database, a regularly updated geospatial dataset maintained by the Trust for Public Land and Ducks Unlimited.

Table 6. Proposed Percent of Preserved Open Space within CMAP Conservation Areas Layer Kindred Indicator

Indicator	This indicator measures what percentage of preserved open space within the region lies within the areas identified as conservation priorities in CMAP’s Conservation Area Layer.
Methodology	The Conservation Area Layer combines county-level green infrastructure plans with regional analysis of key land, water, and habitat resources to map conservation priorities across the region. It will be updated in the future as new data becomes available and counties create or update their green infrastructure plans.

A small group of GO TO 2040 indicators are recommended for demotion to kindred indicators or complete elimination due to data limitations and overlap between primary and kindred indicators:

- Value of Agricultural Products Sold Directly to Individuals for Human Consumption**
 - Because it only measures direct sales to consumers through farm stands and farmers markets, this indicator fails to capture sales of food crops to processors, grocers, restaurants, and other means of reaching local consumers. By excluding these points of sale, the indicator may not capture the importance of local food production to the

regional agricultural economy. For this reason, staff propose to stop tracking this kindred indicator for ON TO 2050.

- **Trail Greenway Mileage** – Changes to regional priorities in the trails planning process led CMAP to cease using the “greenway trail” designation in the 2016 update to the Regional Greenways and Trails Plan. Because the designation will not be maintained going forward, greenway mileage will no longer be an effective indicator. For ON TO 2050, it can be replaced by Percentage of the Regional Trails Plan Completed, which was previously a kindred indicator and better reflects current regional and CMAP priorities for trails planning.
- **Percentage of Population Living in Food Deserts** – This indicator relies on data that is not currently, nor expected to be regularly available. Staff propose to eliminate this indicator for ON TO 2050.
- **Farmers’ Markets in the Region** – This measurement is not a meaningful measure of food access. The primary indicators related to local food, when considered together, present a better assessment of local food. Staff propose to eliminate this indicator for ON TO 2050.

Next Steps

Following committee review and discussion of the above list of proposed indicators, staff will adjust the list as needed to incorporate feedback – by modifying or eliminating indicators, or by adding new ones if necessary. Once the list of ON TO 2050 indicators has been finalized, staff will begin setting near-term (2025) and long-term (2050) targets for each one. These targets will go through a subsequent round of committee review before being compiled into a final list of indicators and targets covering the full range of topics in ON TO 2050.