



# Water Affordability in Northeastern Illinois

ADDRESSING WATER EQUITY IN A  
TIME OF RISING COSTS



## Table of Contents

---

6	Executive Summary
10	Introduction
11	What is Water Burden?
12	The Increasing Cost of Water
18	Measuring Water Affordability
19	Methods and Results
20	Measuring Water Burden On Lowest Income Households By Census Tract
24	Hours of Work Needed to Pay the Water Bill
25	Cost Burden versus Income
28	Examining Racial Disparities
30	New Municipal Dashboard Tool
34	Strategies for Equitably Addressing Water Burden
38	Community Typologies and Corresponding Water Affordability Solutions
40	Important Considerations
44	Key Findings and Conclusion

## Acknowledgements

---

This work was done in partnership between the Metropolitan Planning Council, Elevate Energy and the Illinois Indiana Sea Grant.



### Project Leads

Danielle Gallet, Director of Water Resources,  
Metropolitan Planning Council

Caroline Pakenham, Water Program Manager, Elevate Energy

Margaret Schneemann, Water Resource Economist,  
Illinois Indiana Sea Grant

### Staff

Roya Alkafaji, Water Program Specialist, Elevate Energy

Dan Cooper, PhD, Director of Research, Metropolitan Planning Council

Alejandro Di Prizio, Research Assistant, Metropolitan Planning Council

Margaret Garascia, Senior Research Manager, Elevate Energy

Liz Granger, Content Strategy Manager, Metropolitan Planning Council

Adam Slade, Associate, Metropolitan Planning Council

Luis Tello, Research Intern, Illinois Indiana Sea Grant

Olivia Tse, Data Analyst, Elevate Energy

Shehara Waas, Research Manager, Metropolitan Planning Council



## **Communications Consultant**

Megy Karydes, Karydes Consulting

## **Graphic Design**

Sarah Sommers Design

## **This project was guided by a group of national advisors, for whom the team is grateful**

Nora Beck, Senior Planner, Chicago Metropolitan Agency for Planning

Ed Osann, Director, Natural Resources Defense Council

Zoë Roller, Program Manager, US Water Alliance

Eric P. Rothstein, Principal, Galardi Rothstein Group

Manuel P. Teodoro, PhD, Associate Professor, Texas A&M

## **MPC is grateful to our funding partners**

The Charles Stewart Mott Foundation, The Chicago Community Trust, Grand Victoria Foundation, The Joyce Foundation, MacArthur Foundation and McDougal Family Foundation all generously supported this project.

This report is part of a larger body of work including a literature review, a program and policy solutions paper, and an online, interactive tool, which can be found at: [metroplanning.org/WaterAffordability](https://metroplanning.org/WaterAffordability)

## Executive Summary

---

In northeastern Illinois, water affordability is a growing concern facing all municipalities. In our region, the average water rate grew almost 80% over the past decade (2008 – 2018), rising from an average of \$4.05 per 1000 gallons to \$7.21 per 1000 gallons, after adjusting for inflation. We see this trend mirrored nationally — from 2010 to 2019, the price of water service increased by 57% in 30 major U.S. cities.<sup>1</sup> Since water is a basic human need, when households have to make tradeoffs between paying their water bill and paying for other basic human needs (such as food, shelter and medical care), then a water burden exists.<sup>2</sup>

### **How did we get here? Why are rising water service rates challenging our communities?**

Part of the reason is that our water infrastructure, built over a century ago, has aged and urgently needs repair and replacement. This drives up the cost of water delivery and creates challenges around supplying safe and reliable water service at a low price as our water utilities play catch-up with years of deferred infrastructure investment. Additional cost drivers in the water industry include resource depletion, pollution, population growth/decline, rising input costs (e.g., energy, chemicals, labor), increasing regulatory burdens, and decreasing or no longer existing subsidies and grants from federal and state governments.<sup>3</sup> When combined with a historic deferral of needed investments, the result has been escalating water rates.<sup>4</sup>

As water costs have continued to rise, income growth has remained essentially stagnant — particularly working class wages.<sup>5</sup> The region's income inequality, rising household costs of living, and historic segregation all result in our most vulnerable households increasingly struggling to afford water. This is true even in municipalities where incomes are above average. Three-fourths (75%) of communities in the northeastern Illinois region have experienced water bill growth rates exceeding income growth rates over the past 10 years.

**This report reveals that current methods for analyzing and identifying water affordability challenges are currently evolving.**

Some of the older approaches can mask the impact of rising water rates and stagnant incomes experienced by our most vulnerable households. New analyses indicate just how widespread water burden is, as well as the relationship between water burden, segregation, and income inequality.

In fact, this report shows that half of the region's municipalities have at least one census tract where the lowest income earners are water burdened.

Workable solutions begin with recognizing the impact rising water service costs have on some households, and then implementing rate structures, policies and programs that alleviate the financial impacts of rising water bills on customers who are unable to pay. Because every community is unique, a one-size-fits-all water affordability solution does not exist. Moreover, communities cannot go it alone — effective solutions will require not only utility or municipal-level solutions, but also action and assistance from all levels of government (county, regional, state, federal) as well as non-governmental organizations.

The report also highlights important considerations, such as rate setting versus affordability programs and the current legal constraint in Illinois. It is grounded in the belief that addressing water affordability should begin with identifying populations that are burdened because of cost of service, and those that are burdened because of income.

This research is meant to begin analyzing and exploring the issue while outlining possible solutions for tackling water affordability in metropolitan Chicago communities. Understanding the underlying causes of increasing water burden is critical to designing an equitable water rate structure and effective water affordability programs.

While more research is needed to understand household-level trends, this report and accompanying package of resources represents an important first step in quantifying the extent of the problem in northeastern Illinois, and exploring strategies for tackling the growing affordability challenge.







# Water Affordability

While there is a need to generate revenue to maintain safe and sustainable water service, water affordability is a growing concern and a more equitable approach is required for measuring water burden.

## Introduction

---

Water service costs are on the rise. From 2010 to 2019, the price of water service increased by 57% in 30 major U.S. cities.<sup>6</sup> At the same time, household income has been essentially stagnant, particularly for working class wages.<sup>7</sup> A growing number of households will find their water bills unaffordable if water rates continue to rise at the expected pace.

We are in the replacement era for water systems. Much of our pipes, pumps and treatment plant infrastructure was installed in the early to mid-20th century.<sup>8</sup> The American Water Works Association estimates it will cost at least \$1 trillion over the next couple of decades to maintain current levels of drinking water service.<sup>9</sup> Likewise, the United States Environmental Protection Agency (U.S. EPA) estimates that \$271 billion is needed for wastewater infrastructure over the next 25 years.<sup>10</sup>

In addition to infrastructure investment needs, additional cost drivers in the water industry include resource depletion, pollution, population growth/decline, rising input costs (e.g., energy, chemicals, labor), increasing regulatory burdens, and decreasing or eliminated subsidies and grants from federal and state governments.<sup>11</sup> When combined with a historic deferral of needed rate increases, the result has been escalating water rates.<sup>12</sup>

**So we find ourselves faced with a conundrum: our old, crumbling infrastructure needs repair and replacement, water service costs are increasing, AND we have a growing number of households unable to afford these rising water service costs.**

Affordability challenges impact not only households unable to pay their water bills, but the financial integrity of the entire water system. While there is a need to generate revenue to maintain safe and sustainable water service in our communities, attention must be paid to identifying and protecting — through viable and equitable practices, policies, and programs — community members who face affordability challenges for drinking water.

This report was undertaken as a partnership between the Metropolitan Planning Council, Elevate Energy and the Illinois Indiana Sea Grant to explore the extent to which communities in the northeastern Illinois region are facing challenges to water affordability, and to identify opportunities to address these concerns. This report and accompanying package of resources, represents an important first step in quantifying the extent of the problem in northeastern Illinois, and begins to explore strategies for tackling the growing affordability challenge.

## What is Water Burden?

---

Water affordability — or water burden — relates to the ability of a customer to pay their water bill. For the purposes of this research, **we define water burden** as the percentage of a household's income that goes toward paying water bills.

Put simply, water service affordability is a function of the interaction between two factors:

1. Cost of service (what is the water rate and what does a customer's water bill cost?)
2. Income (what is the customers' ability to pay for the service?)

Cost of service is related to the rates set by a water utility to fund operation and maintenance of the drinking water system. Solutions to the cost-of-service issue reside in achieving cost efficiencies and adjusting how water rate structures and/or affordability programs are designed. Another important driver of water burden is related to low household income, income inequality or disinvestment. Large disparities in income exist, particularly for households of color. For example, the poverty rate for Black households is roughly five times that of white households. For Latinx households, it is nearly four times higher.<sup>13</sup> In this case, affordability problems — and the necessary solutions — represent a bigger issue than a water utility alone can address.

**A growing number of households will find their water bills unaffordable if water rates continue to rise at the expected pace.**

A more nuanced approach to measuring water burden recognizes that water affordability cannot be considered in isolation from the ability of a household to afford all essential costs of living.<sup>14</sup> Since water is a basic human need, when households have to make tradeoffs between paying their water bill and paying for other basic human needs (such as food, shelter and medical care), then a water burden exists.<sup>15</sup>

As water bills continue to increase at rates greater than income levels, this cost will become a larger percentage of household budgets and the number of households finding water bills unaffordable will rise. Industry experts predict water bills to increase for decades to come, due to cost drivers in the water industry.<sup>16</sup> Water costs primarily fall on ratepayers, as water rates provide the main source of revenue for drinking water service.<sup>17</sup> What's more, the regressive nature of water rates places the greatest burden on those who are least able to bear the cost.<sup>18</sup> Therefore, to continue to ensure equitable access to clean, safe water, policies and programs alleviating the water burden will become increasingly important.

## The Increasing Cost of Water

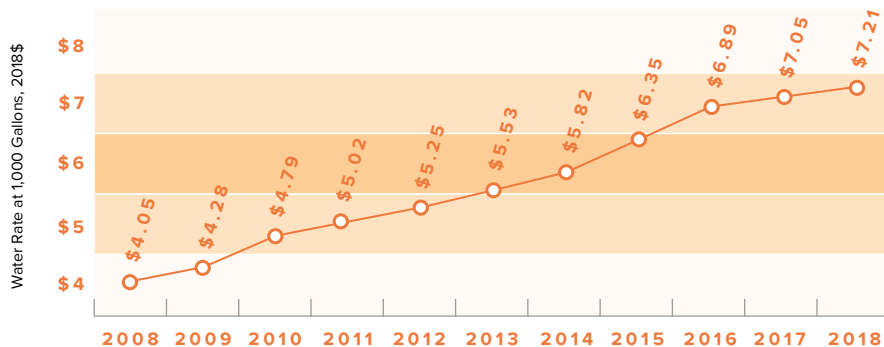
---

The concern over water service affordability has grown in recent years as water bills increase at a faster pace than income, as well as overall cost-of-living.<sup>19</sup> While the cost of water has been rising over the past decade, the ability of consumers to pay for water service has declined.<sup>20</sup> According to the Bipartisan Policy Center's Executive Council on Infrastructure Water Task Force, "though water systems have historically underpriced their services, recent trends suggest that utilities are, to some degree, self-correcting. Nationally, from 2000 to 2017, water service rates increased by 136%, with average annual increases of over 5%. The steep jump in water prices outpaced the increase of median household income, which went up just 35% over this time period."<sup>21</sup>

How do these trends play out in the northeastern Illinois region? From 2008 to 2018, the average residential water rate grew from about 4 dollars per 1000 gallons to over 7 dollars per 1000 gallons, after adjusting for inflation (Figure 1).<sup>22</sup> This is a 5.94% average annual real trend, over and above inflation, in the average regional water rate.



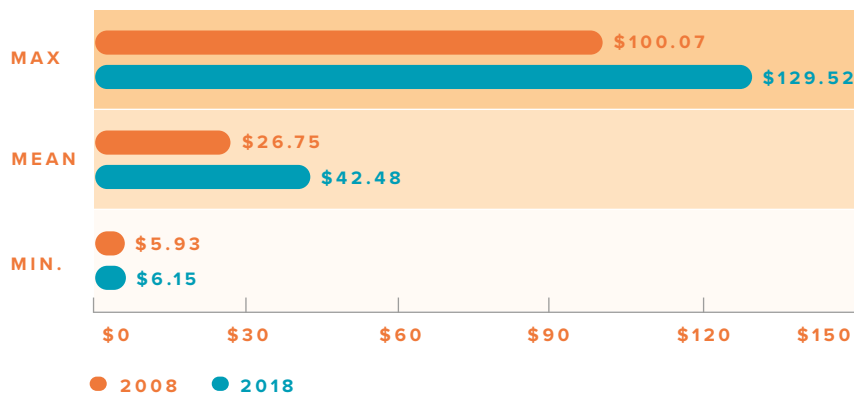
**Figure 1: Water Rates are Rising: Average Residential Water Rates by Volume in Northeastern Illinois (1,000 Gallons, 2008-18 (2018 dollars))<sup>22</sup>**



*(Figure 1)*  
 Source: Beck, N. and M. Schneemann. Water Demand Forecasting & Rates – Northeastern Illinois. Presentation to Illinois Water Con March 20, 2019.

As water rates (the price per unit of water, such as 1000 gallons) increase, so do water bills. Over the past decade, there has been on average an approximately 20% increase in the mean residential water bill in the northeastern Illinois region, or just over 4% real growth rate annually. The total water bill reflects both the water rate (charge per unit of water) discussed above, as well as additional charges per billing period (fixed charge).

**Figure 2: Water Bills are Increasing: Northeastern Illinois Monthly Residential Water Bills for 5,000 Gallons, 2008 – 2018 (2018 dollars)<sup>23</sup>**



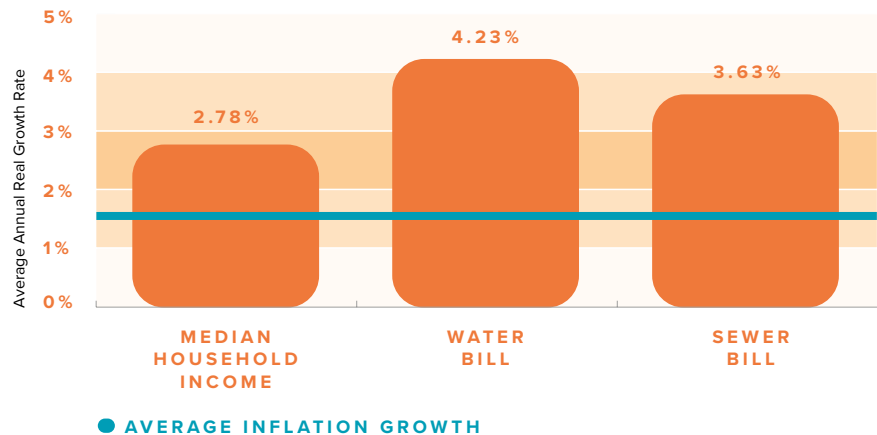
*(Figure 2)*  
 Source: Beck, N. and M. Schneemann. Water Demand Forecasting & Rates – Northeastern Illinois. Presentation to Illinois Water Con March 20, 2019.

There is, however, a great amount of variation in water bills across the region. As Figure 2 shows, the total typical monthly residential water bill ranges from below 10 dollars to

over 100 dollars from community to community. Some of the reasons for this variation in water bills across communities include different water sources, treatment costs, service population sizes, infrastructure age, miles and size of pipes, housing density, metering and billing technology and practices, wholesale contracts with other communities, and more.

The growth rate in both water and wastewater bills has outpaced both income growth and the overall cost of living (Figure 3).

**Figure 3: Bills are Outpacing Income: Water Bill Growth Compared to Median Household Income Growth in Northeastern Illinois, 2008-2018 (5000 Gallons, 2018 dollars)**



(Figure 3)  
 Source: Beck, N. and M. Schneemann. Water Demand Forecasting & Rates – Northeastern Illinois. Presentation to Illinois Water Con March 20, 2019.

As part of this research, a dashboard tool was created that includes an analysis of water rate trends in relation to income growth for every community in northeastern Illinois for which data was available. This tool compares how water rates have increased in the last 10 years compared to how household incomes in the region have changed over the last 10 years. Three-fourths (75%) of communities in the northeastern Illinois region have experienced water bill growth rates exceeding income growth rates over the past 10 years. Please use this URL to view the dashboard tool: [metroplanning.org/WaterAffordability](http://metroplanning.org/WaterAffordability)













# Measuring and Methods

Carefully analyzing water burden is critical to designing equitable water rates and effective affordability programs.

## Measuring Water Affordability

---

**There is not currently one generally accepted definition or measurement of water affordability.**<sup>24</sup> Rather, the definition and measurement of water affordability varies depending on the purpose of the water affordability assessment. Historic reasons for measuring water affordability include compliance with federal water regulations, eligibility for State Revolving Funds (SRF) and other grants, and customer assistance program (CAP) design.

At the federal level, measuring water affordability is used to assess the impact of complying with U.S. EPA Clean Water Act (CWA) and Safe Drinking Water Act (SDWA) standards. While there are a number of water affordability measurements used by the U.S. EPA, a common — and widely criticized — approach to measuring household water affordability is taking a community's average water and sewer bill as a percentage of that community's median household income (%MHI).

The threshold deemed affordable is 2.5% of a household's annual income to pay its water costs and 2.0% to pay sewer costs, for a total of 4.5%. This method was intended as a way of measuring a community's financial capability for negotiating regulatory compliance under the CWA and SDWA. The combined water and sewer threshold of 4.5% is considered arbitrary by water affordability experts.<sup>25</sup>

**It is important to note that this U.S. EPA method was not designed to assess what an individual household could actually afford.**

The U.S. EPA<sup>26</sup> notes that any number of justifiable variations of the household affordability ratio are possible, such as including both the water and wastewater charge, and using alternate income measures in the denominator (mean income, poverty level income), and looking at context of other community socio-economic measures (poverty rate, unemployment, etc.).<sup>27</sup> Again, the U.S. EPA affordability guidelines have been widely criticized since their publication.<sup>28</sup> Some key criticisms include: the use of median income, which does not address impacts on lower-income water users; an incomplete measure of costs; and the setting of an arbitrary or subjective threshold. A few of the recommended adjustments include:

- Consider measures other than median income to more accurately reflect impacts on disadvantaged or poor households (for example, income quintiles);
- Account for the housing cost burden;

- Express water burden in more intuitive terms (number of hours a low income household would need to work to pay the bill);<sup>29</sup>
- Analyze smaller geographic units (such as census block group);
- Include combined water costs (water and wastewater);
- Consider using a greater percentage threshold; and
- Use paired metrics (water burden and poverty).<sup>30</sup>

While the U.S. EPA measurement of water affordability has been widely criticized, it has nonetheless been widely used and accepted, in both its original form (water bills as a percentage of MHI) and with the adjustments noted above (such as using income quintiles, income by census tract, and disposable income instead of MHI). Affordability researchers generally agree that no one single metric can or should be used in measuring water affordability. Rather, a variety of quantitative and qualitative data should be considered.

## Methods and Results

---

The following section outlines three different approaches we employed to analyze residential-level water burden to better understand the scale and scope of water affordability challenges within the 7-County, northeastern Illinois region. We also provide some further exploration of racial disparities in water cost burdens, and highlight a new dashboard tool available to further explore community context and characteristics for each municipality within the region. Because water and wastewater are often billed, and therefore paid, together, **all of the following analysis combines water and wastewater costs.**

Additionally, we considered the following recommendations for improving the measurement of water affordability:

- Use of income quintiles;
- Use of smaller geographic units (census tracts);
- Express water burden in more intuitive terms (hours worked); and
- Comparison to other socio-economic indications.

## Research Assumptions

The following are additional, important assumptions about this research and analysis to keep in mind:

- This research does not address non-residential water affordability or issues pertaining to utility management, cost structure or financial capacity of utilities.
- This research does not address the impact of existing customer assistance programs.
- While this research is not able to provide specific water affordability indices for renters versus homeowners, we do provide homeownership rates by census tract (within our dashboard tool).
- This research is based on published water utility rates and an assumed consumption level of 5,000 gallons per capita per month.<sup>46</sup> Water bill data was not used for this analysis.
- Consideration of other essential costs of living such as housing and transportation were not directly factored into this analysis. However, our Dashboard tool provides further context for why all costs of living should be considered when measuring water burden.

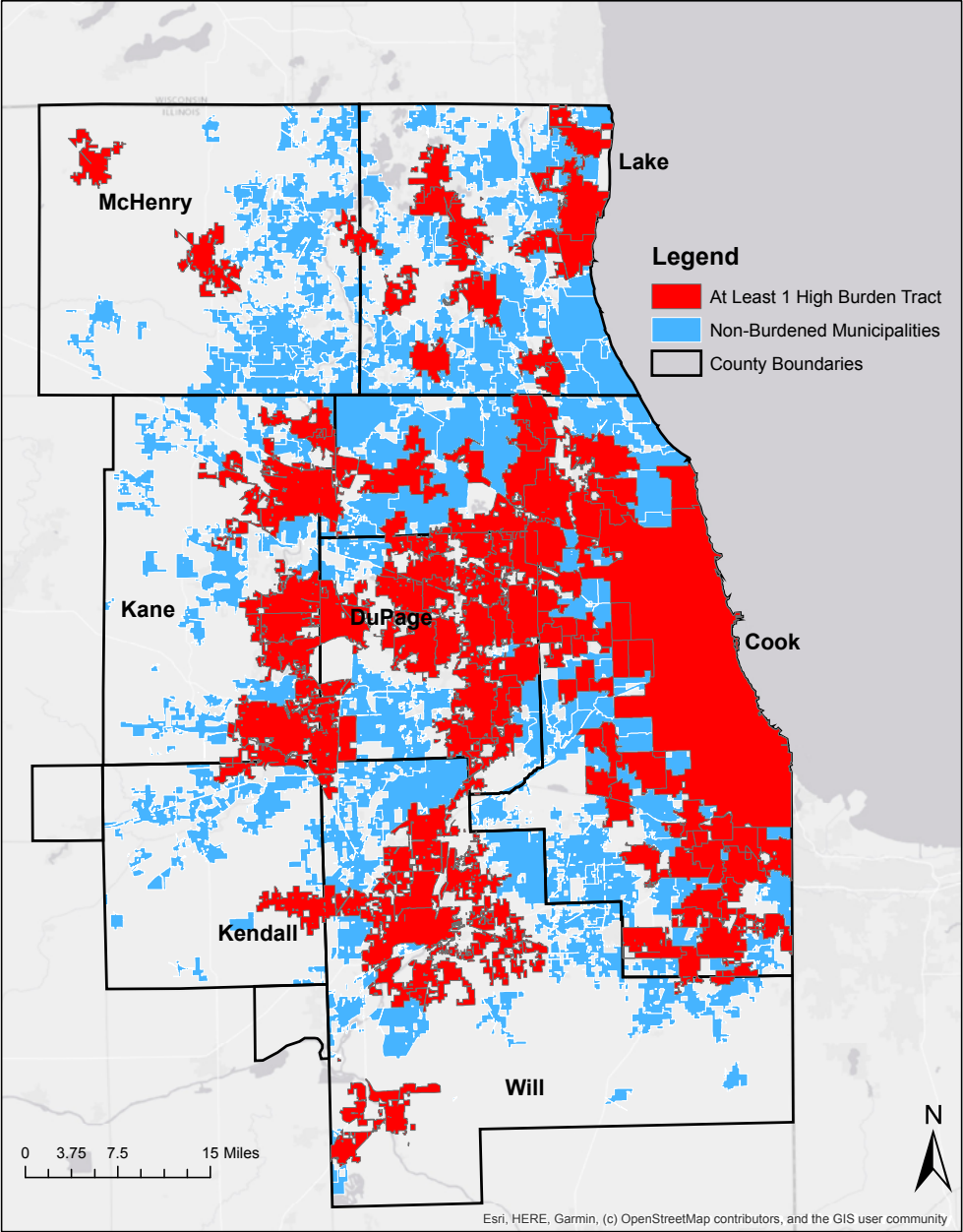
## 1. Measuring Water Burden On Lowest Income Households By Census Tract<sup>31</sup>

To provide a better understanding of water affordability, we used the EPA combined 4.5%<sup>32</sup> threshold of affordability for household water/sewer bills at the lowest income quintile by census tract, meaning the bottom 20% of income earners in that tract. While the 4.5% threshold is considered arbitrary, it is still useful for comparison purposes in this analysis. To do this, we divided the average water bill for each municipality in Northeastern Illinois, assuming a monthly, per capita usage of 5,000 gallons, by the mean annual household income **for the lowest income quintile in each census tract.**<sup>33</sup>

The results show that a third of all census tracts meet the 4.5% threshold for high water burden for the lowest earners. Over 50% of municipalities have at least one census tract in their jurisdiction with high water burden. As Figure 4 illustrates, 52% of municipalities with at least one high water burdened tract for lowest quintile earners are spread across the metropolitan region, and in every county.



Figure 4. A Widespread Issue: Municipalities with at Least One High Water Burden Tract for Lowest Income Earners



For comparison, we also ran an analysis for the region using the EPA 4.5% indicator of affordability for household water/sewer bills at the median household income (MHI). As Figure 5 illustrates, according to the MHI threshold, only 4 census tracts experience high water burden. This represents less than one percent of all tracts, meaning that less than one percent of municipalities (only four municipalities) have at least one tract that has a high water burden. The MHI threshold gives the appearance that combined water burden is not a pressing issue for the region, but rather an issue for a few municipalities.

**Figure 5. Masking the Issue: Municipalities with at Least One High Water Burden Tract Using 4.5% of Median Household Income**

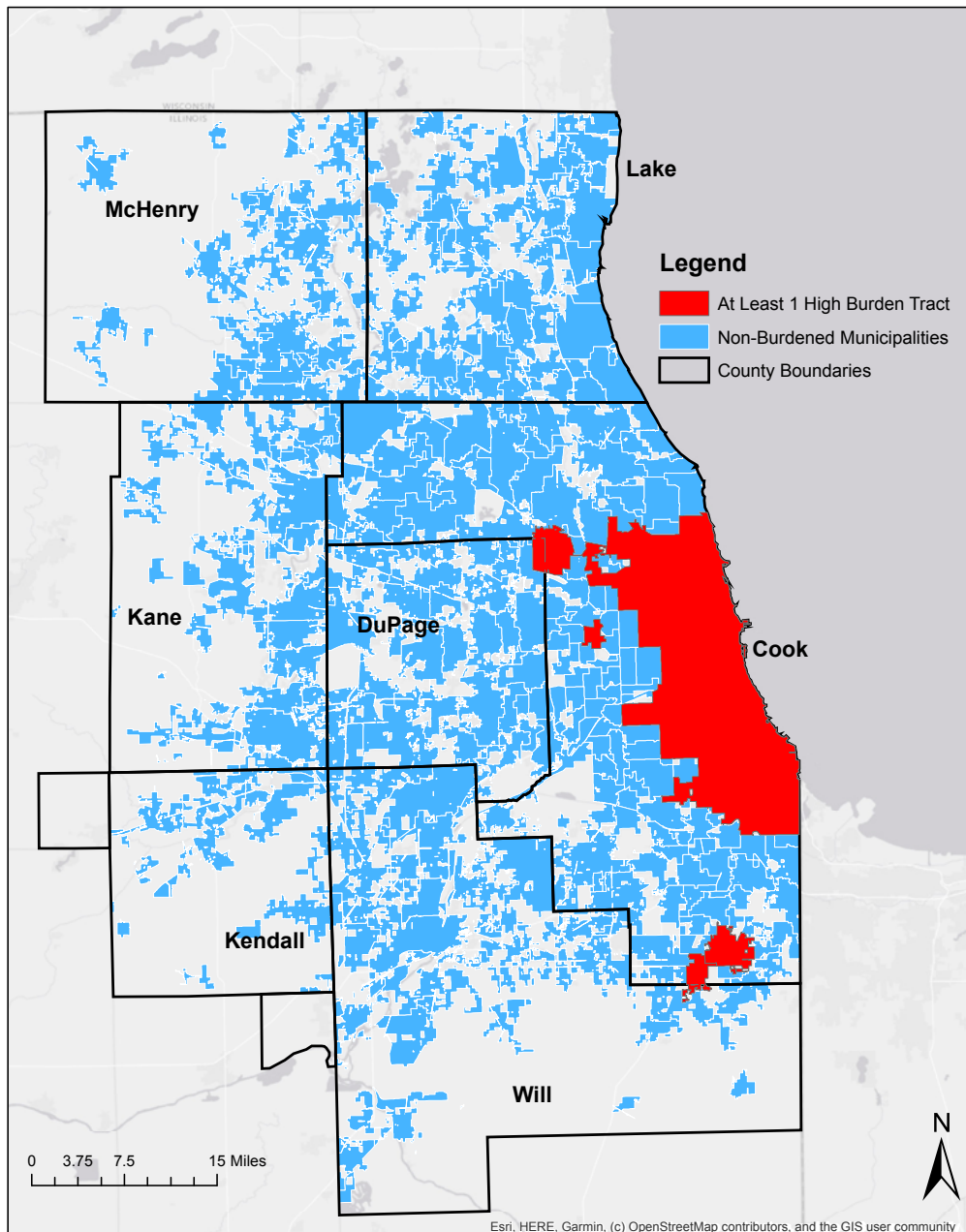


Figure 6 compares the results of using the lowest earning income quintile versus the median household income to identify water burden, and illustrates how using a MHI threshold greatly underestimates the extent of water burden for lower income households in the region.

**Figure 6. A Clearer Picture: Water Burden Comparison Between Lowest Income Quintile vs. MHI**

	<b>Lowest Income Quintile Threshold</b>	<b>MHI Threshold</b>
Mean Tract % Combined Expenditure	9.59%	1.06%
Median Tract % Combined Expenditure	3.60%	0.91%
Tract Burden Percent Range	0.58% - 100% <sup>35</sup>	0.16% - 5.52%
Number of High Burdened Tracts (over 4.5%)	682	4
% Tracts that are High Burdened	36.47%	< 1%
Number of Municipalities with at Least One High Burdened Tract	109	4
Percent of Municipalities with at Least One High Burdened Tract	51.66%	1.90%

As this research demonstrates, analyzing water burden as a percentage of the lowest earning income quintile provides a more focused picture of affordability for the most vulnerable community members — who may require attention and assistance. We argue this approach is a more appropriate and equitable way of measuring water burden.

Important to Note: while our research focused on the lowest earning income quintile, we still used a 4.5% indicator for measuring household affordability of combined water and sewer. Water affordability experts

have argued that this percent should be higher, more in the range of 7 – 10%.<sup>35</sup> We also used the average of the quintile, while some experts have argued that the top of the quintile should be used. It therefore remains to be seen if a 4.5% indicator and the average of the quintile are indeed the right metric from which to measure water burden — particularly when needing to consider other costs a household faces (e.g., housing, transportation, energy, telecomm, etc.).

## 2. Hours of Work Needed to Pay the Water Bill

Another way to express water affordability is to view it from the lens of how many hours of work — at a given wage — it takes to pay the average monthly water bill in a community. This method was introduced by Dr. Manuel P. Teodoro of Texas A&M University as a useful, illustrative measure for assessing affordability.<sup>36</sup> Because there is complexity in minimum wage laws in Illinois — allowing for state, county, and local variances in the minimum wage — rather than using minimum wage, we converted representative water bills into hours worked by converting mean annual income for the lowest quintile into hourly income.<sup>37</sup>

As Figure 7 demonstrates, using this measure of water affordability also illustrates just how much of a burden it is for low income earners to pay for water service. For example, in our research sample within northeastern Illinois, the number of hours a household in the lowest 20% of earners in their municipality would need to work to pay their combined water costs is 6.6 hours.<sup>38</sup> **That means that on average, the lowest quintile income earners in 72 municipalities work almost one day per month just to afford their combined water/sewer bill.**



**Figure 7. Working Full-Time Yet Falling Behind: Monthly Hours Worked to Afford the Water Bill for Lowest Income Earners Across Municipalities in Northeastern Illinois**

Mean Hours Worked for Lowest Quintile Income Earners	<b>17.5</b>
Median Hours Worked for Lowest Quintile Income Earners	<b>6.6</b>
Hours Worked Range for Lowest Quintile Income Earners	<b>&lt;1 – 160+<sup>39</sup></b>
Median Hours Worked for Median Income Earners	<b>1.7</b>
Hours Worked Range for Median Income Earners	<b>&lt;1 - 9</b>
Number of Municipalities Where Lowest Quintile Income Earners Work More than 8 Hours to Afford Water	<b>72</b>

### 3. Cost Burden versus Income

The data presented above illustrate that the issue of water burden can be attributed to a combination of the cost of water service and income. This report provides an additional breakout of cost versus income burden in order to help differentiate between these two distinct drivers of water affordability challenges.

The water affordability matrix illustrated in Figure 8 crosswalks two different metrics. The first metric is household expenditures on combined water and sewer bill as a percentage of household income. The second metric is the percent of households earning below 80% area median income.<sup>40</sup> This creates an affordability gradient which ranges from low burden to high burden.<sup>41</sup>

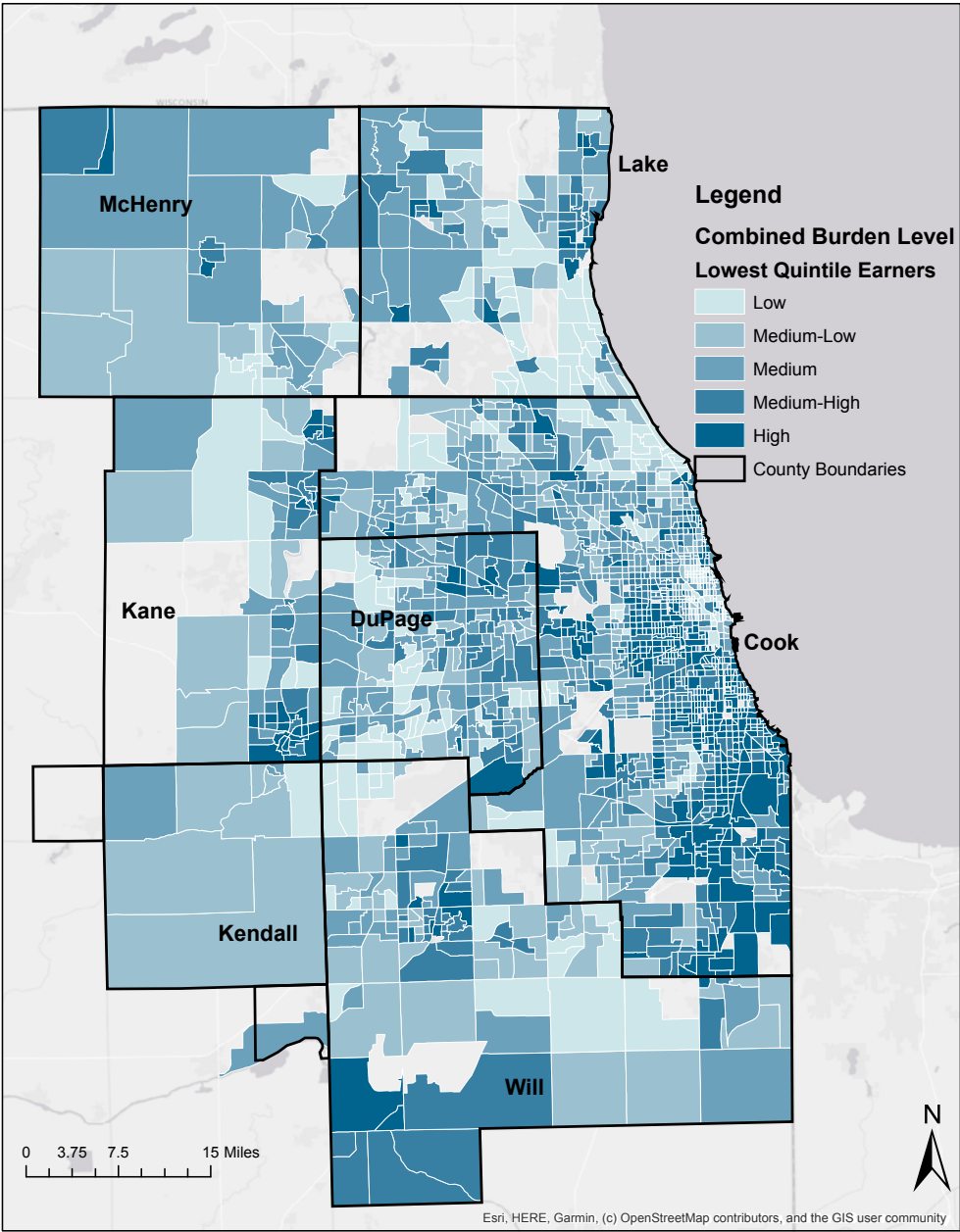
The result is an even more nuanced categorization of water affordability.<sup>42</sup> Census tracts were coded into one of five categories, based on the matrix illustrated in Figure 8. Data at the tract level were then aggregated to municipalities to determine how many municipalities had at least one tract rated as medium-high or high. Census tracts can be coded as “medium-high” due primarily to water prices or primarily due to area income. Taken together, this final method illustrates the full extent of the issue.<sup>43</sup>

**Figure 8. Water Affordability Matrix**

		Percent of households in area earning below 80% AMI			
		>=50%	25-49%	<25%	
		High	Medium	Low	
Percent household income for lowest quintile	Greater than 4.5%	High	High	Medium-High	Medium-High
	2.25-4.5%	Medium	Medium-High	Medium	Medium-Low
	Less than 2.25%	Low	Medium-High	Medium-Low	Low

The water affordability matrix provides the most nuanced analysis of the distribution of water affordability challenges across the region. The map on the following page in Figure 9 shows the degree to which bill and income burden present challenges for many municipalities in the Chicago metropolitan area. For example, 126 municipalities (44%) have at least one tract that is high water burdened, meaning the lowest income quintile of earners spend more than 4.5 percent of income on combined water bill, either due to high water costs or low income constraints. A total of 168 municipalities (59%) have at least one medium-high burdened tract, and 217 (76%) have at least one medium burdened census tract. Figure 8 and 9 provide an indication that many municipalities have low-income populations that experience challenges with affordability.

Figure 9. An Issue Across the Region: Map of Water Burden Levels by Census Tract



## Examining Racial Disparities

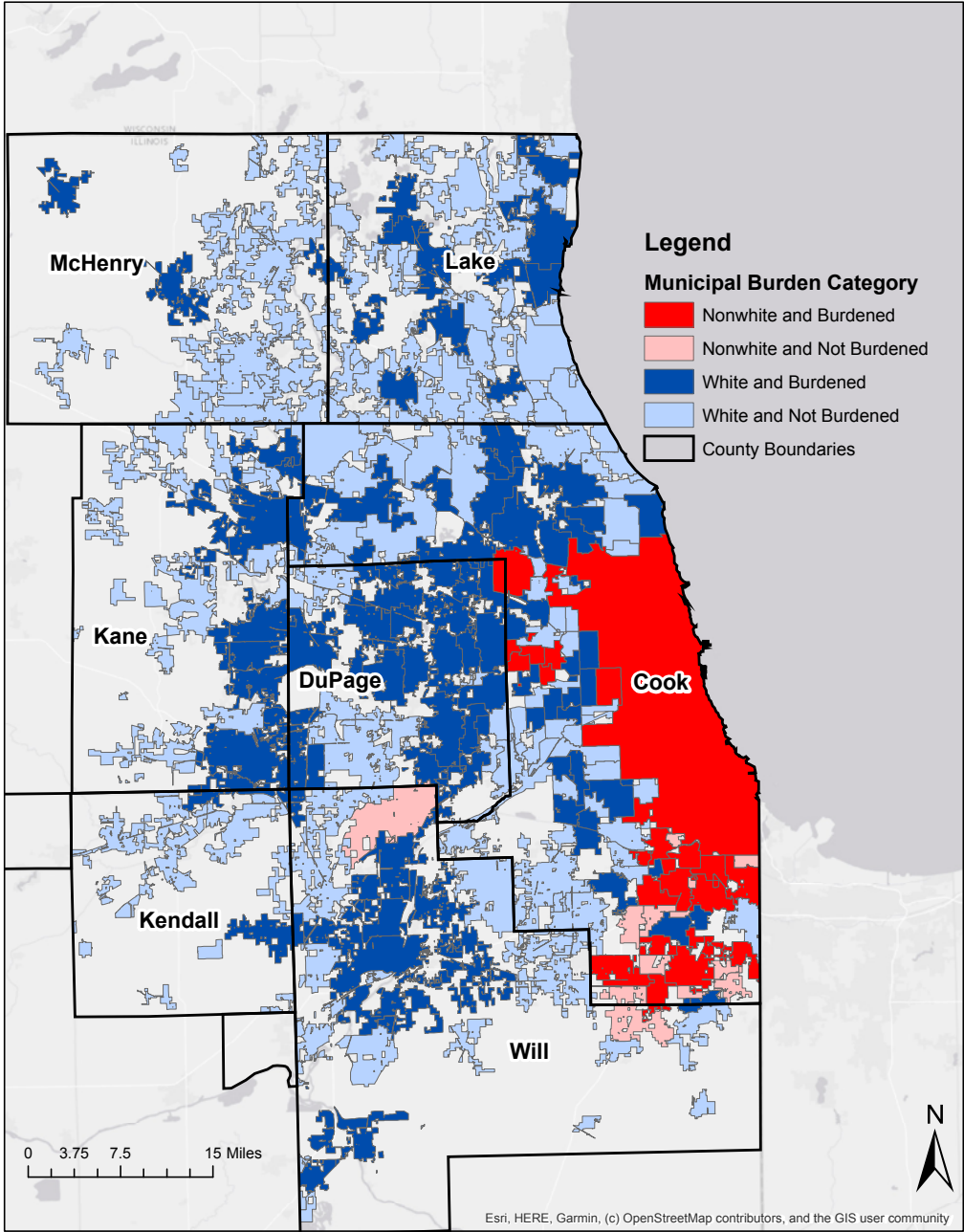
Many municipalities in the metropolitan Chicago region have low-income populations that are water burdened. Although household-level data are necessary to fully understand whether any disparities exist in water burden by race and ethnicity, analyses at the census tract and municipal levels highlight the degree to which racial segregation and income inequality may create further water burden challenges for low-income families of color. Using the arbitrary 4.5% threshold, Figure 10 maps the geographic distribution of water burden for majority white and non-white communities. **For majority white municipalities, 23% have a water burdened census tract, compared to 62% of majority non-white communities.**

Looking further into race and ethnicity, initial analyses reveal there is a relationship between combined water and sewer burden for the lowest 20% of earners, and the share of Black population at the census tract level — even when holding the percent of low income earners constant.<sup>44</sup> This does not necessarily mean that, within a given municipality, Black households are more burdened than white households. However, it illuminates the possibility that income disparities by race across the region may play a role in the degree to which water burden exists in communities of color.

At the municipal level, differences in water burden by racial composition have, in some respects, gotten worse over the past decade. The previous section made clear that combined water and sewer bills have grown faster than incomes in the northeastern Illinois region between 2008 and 2018, which was true for 78% of municipalities in the sample. This trend is exacerbated in municipalities with greater shares of Black and Latinx populations and less pronounced in places with higher percentages of white population.<sup>45</sup> Although this study did not examine the precise degree to which this is attributable to income disparities or water bill disparities, it is clear that water burden is a growing issue for many municipalities in the region, and special attention should be given to assessing potential racial disparities.



Figure 10. An Equity Issue: Map of Water Burden for Majority White and Majority Non-white Municipalities



## New Municipal Dashboard Tool

As part of this research initiative, the project partners also developed a **Dashboard tool** that allows one to view some of the findings in this report along with further community context and characteristics by each individual municipality within the region.

Additional community context provided by this tool includes:

- The tool includes general demographics including: number of households, owner versus renter, racial representation and median monthly income for each municipality.
- The average household costs of housing, transportation and water within a municipality are also aggregated. Further community-level analysis of water affordability should incorporate a holistic picture of all essential costs of living.
- We also provide findings comparing income to water bills over the last 10 year period. Again, the water industry is playing necessary catch-up with water rates covering full costs and whole dollar comparisons should be considered in addition to percentages.
- Our analysis of work hours required to pay an average water bill by municipality for households in the lowest earning income quintile versus households earning median income.

# Northeastern Illinois Water Affordability Dashboard

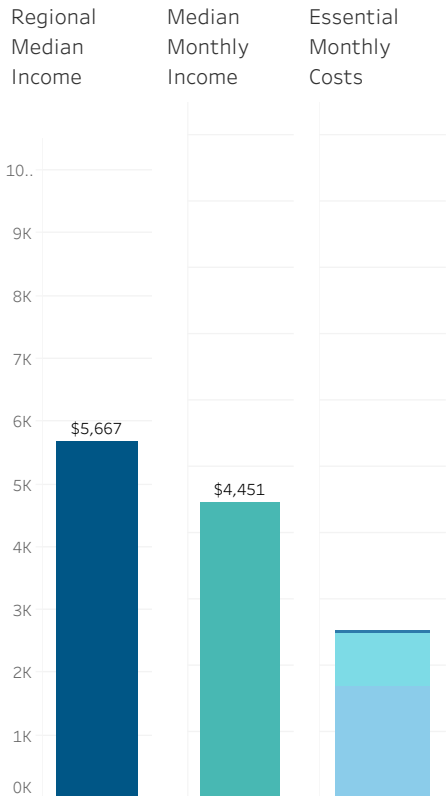
To view this interactive tool online, please use the following URL: [metroplanning.org/WaterAffordability](http://metroplanning.org/WaterAffordability)

- Explore average water bills and other related data for municipalities in Northeastern Illinois.
- Water bill growth is outpacing income growth in 78% of surveyed places.
- How many hours will a low-income household work to pay their water bill?

Welcome! This dashboard was created in partnership with Elevate Energy, Illinois-Indiana Sea Grant, and Metropolitan Planning Council. It serves as a visual aid to a [larger water affordability study](#). Select a city from the dropdown menu to explore its typical residential water costs and other characteristics.

## Choose a City

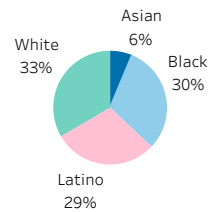
Chicago



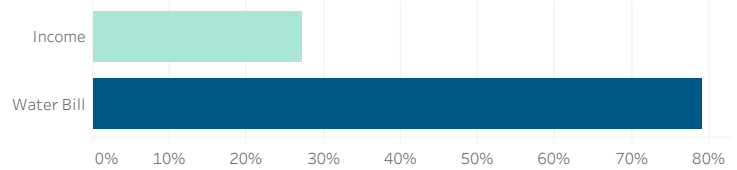
1,035,181 Households

Owner Occupied	Renter Occupied
44%	56%

## Racial Representation



## Percent Change Since 2008



## Work Hours Required to Pay the Water Bill

Households in the lowest earning quintile:	Households earning median income:
Hours	Hours
11.0	1.8

"Water bill" is the estimated combined water and sewer costs.

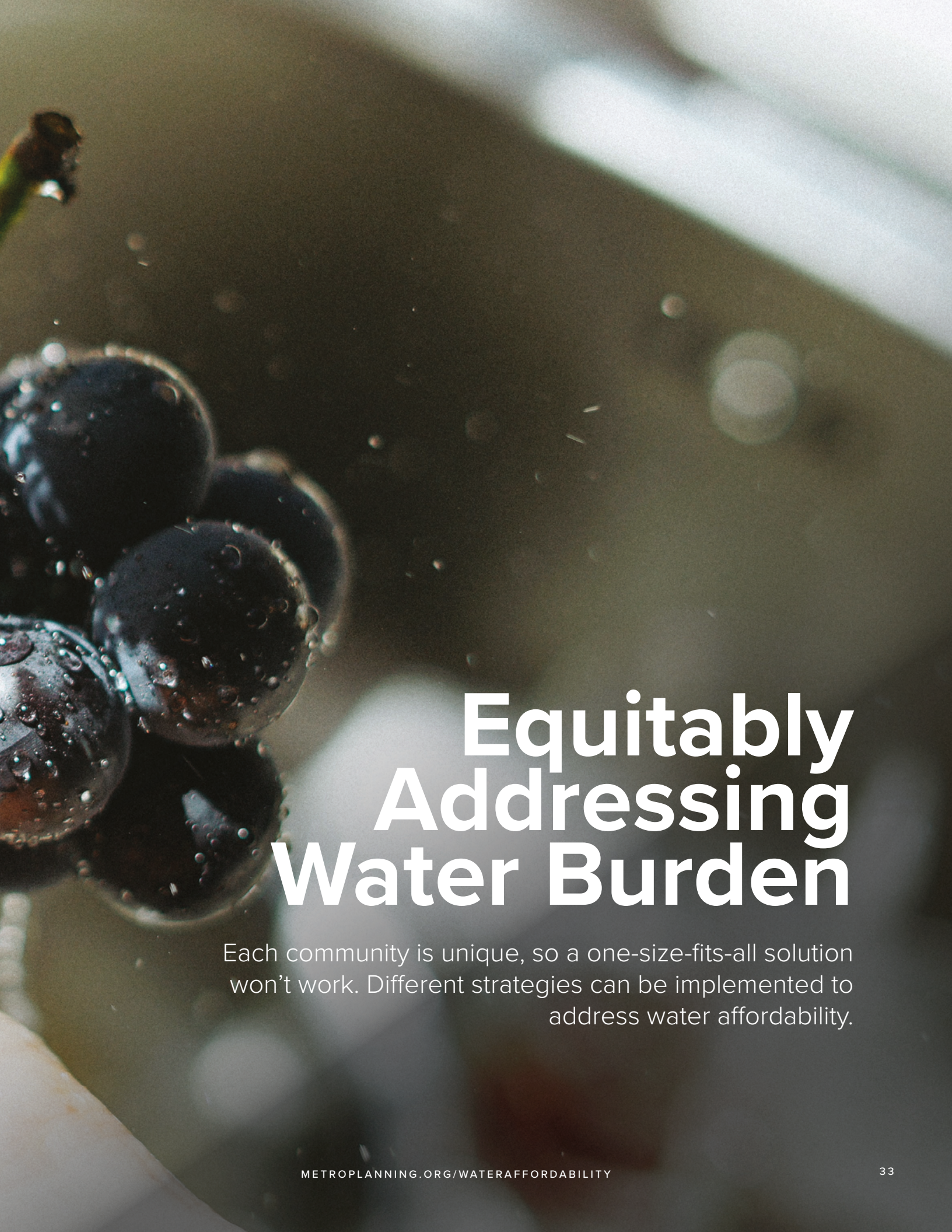
Racial groups are defined as White non-Hispanic, Black non-Hispanic, Asian non-Hispanic, and Hispanic. All dollar amounts were adjusted to 2018 dollars. Regional Low (80% AMI) Income Limit was determined by averaging 2- and 3-person household income limits for the Chicago-Joliet-Naperville region. Some communities have missing water bill data, and were therefore excluded from the analysis. Others were just missing 2008 bill data, for which estimates were imputed.

Sources: Illinois Indiana Sea Grant (2008 and 2018 water bill estimates), CMAP (2008 income estimates), ACS (2017 5-year income estimates, household counts, and racial representation), HUD (2018 Income Limits), and CNT's H+T Index (2015 monthly owner and transportation costs)









# Equitably Addressing Water Burden

Each community is unique, so a one-size-fits-all solution won't work. Different strategies can be implemented to address water affordability.





Strategies at the utility scale, such as addressing water service costs and minimizing water waste, are one way to help make water bills more affordable.

## Strategies for Equitably Addressing Water Burden

---

The following section outlines five broad categories of solutions for addressing water affordability. Because every community is unique, a one-size-fits-all water affordability solution does not exist. Some of the many variable local factors that impact affordability policies and programs include socio-demographic characteristics, community financial and management capacity, age of the water system, source water quality and quantity, customer base size, vulnerability to climate change, housing and land-use characteristics, and customer water-use patterns. For a more detailed understanding of these various strategies — including implementation considerations, case examples, and additional resources — please view the Water Affordability Programs and Policies paper released in tandem with this report.

### Strategy 1: Reduce Costs

Addressing escalating water service costs is one way to make water bills more affordable. Strategies to reduce water costs include (1) asset management, (2) increase federal or state funding and financing sources, and (3) regionalization. When cost reduction is done while protecting the level of service<sup>47</sup> all users of the water system potentially benefit.<sup>48</sup> Recommendations to reduce costs include:

- Prioritize investment based on capital improvement and asset management plans.
- Close the water financing gap by fully leveraging the Clean Water Act funding programs (such as the State Revolving Fund), and Water Infrastructure Finance and Innovation Act Program (WIFIA) and other state and federal programs supporting investment in water infrastructure.
- Consider partnerships, joint procurement opportunities, and regionalization to increase municipal capacity and capture cost efficiencies from better exploiting economies of scale.<sup>49</sup>

## Strategy 2: Promote Water Conservation

Water conservation at the utility scale is a foundational water affordability practice. Not only can conserving water decrease the water bill, but for water utilities at or near capacity, water conservation can also reduce costs by delaying or deferring the need for costly infrastructure expansion. Examples of water efficiency strategies are (1) leak detection and repair, (2) retrofits and rebates, (3) metering, (4) water conservation plan and ordinances, (5) water re-use, and (6) outreach and education campaigns. Water conservation benefits customers in older housing stock, customers with high discretionary water use, customers interested in practicing conservation, and potentially all water users when the system is at or near capacity.

Water conservation recommendations include:

- Adopt policies to prevent water loss,<sup>50</sup> standardize water-loss audits, and conduct an economic Level of Leakage analysis to determine which leakage control practices will benefit the system relative to the costs.
- Implement universal metering, ensure meters are accurate and efficient to avoid billing practices that would harm low-income customers, such as estimating bills and back billing. Sub-meter multi-unit buildings to provide a link between water use and water billing.
- Develop and adopt a community water-conservation plan and ordinances, integrating with other community plans (comprehensive, land-use, sustainability).
- Change plumbing codes to require the use of EPA WaterSense-labeled products and allow for water reuse.
- Target water conservation program assistance to residents with higher than average water use who are located in low-income areas, for example, retrofit-on-reconnect program to require plumbing fixture upgrades when a new water account is established.



Equitable water rate structures can address both affordability and revenue requirements at the same time.



Whether it's providing bill discounts or waiving connection fees for lower-income populations, strengthening customer assistance programs can help make water more affordable.

### Strategy 3: Design and Implement Equitable Rates

Rate structure design and implementation affordability strategies include (1) lifeline rates, (2) income-indexed rates, (3) conservation rates, (4) avoid rate shock, (5) water budgets, and (6) property-value-based charges to reflect the cost and value of fire protection. Note that, on top of rates themselves, additional fees can be charged, such as a connection fee, a security deposit, etc. Rate structures can be designed to help specific customer groups, though it is difficult to design a rate structure benefiting all customers who need assistance.

Water-rate design can be a targeted strategy that also promotes water conservation. Design and implementation of affordable water rate structures, however, can be difficult, and may involve making trade-offs with other utility objectives. For example, while the fixed charge (the portion of the water bill that is charged regardless of water use) can be detrimental to water affordability, it can provide revenue stability to the utility.

Rate design recommendations include:

- Set full-cost rates based on periodic cost-of-service rate studies informed by capital improvement and asset management plans.
- Consider reducing the fixed charge, minimum bill, and/or minimum use allowance.
- Provide a lifeline rate to customers and explore other rate strategies addressing affordability.<sup>51</sup>

### Strategy 4: Strengthen Customer Assistance Programs

Types of customer assistance programs include billing and collections policy, bill discounts, arrearage forgiveness, and crisis assistance. Budget billing practices help low-income customers who find it easier to pay smaller, more regular bills due to affordability or money-management issues. Collections policies can be designed to help customers already behind on payments or at risk of non-payment, estimated to be from 1 to 15 percent of customers

nationwide, and higher for communities with higher rates of low-income customers.<sup>52</sup> A variable bill discount helps large families who use more water, since higher-use customers are given a larger discount. Crisis assistance helps those having a one-time situation impacting their bill payment ability. Bill discounts help all customers who struggle to pay water bills.<sup>53</sup> Because lower income populations tend to move more often, waiving the connection fee and any required deposit can help customers stay current on bills.

Customer assistance program recommendations include:

- Use demographic and utility data and social science research to better understand the water affordability threshold and to design, deliver, and evaluate programs tailored to sub-groups.
- Put billing and collections policies into place that break the cycle of customers not paying, utilities investing in debt recovery, debt recovery practices and costs resulting in higher rates and fees, and higher rates and fees making customers less able to pay.<sup>54</sup>
- Piggy-back on other existing federal assistance programs for low-income to provide water efficiency assistance.

### Strategy 5: Target the Hard to Reach

Water affordability assistance programs typically target owner occupiers who receive a water bill, so these programs can be ineffective in targeting households that do not directly pay for water, such as renters.<sup>55</sup> An estimated 20 to 40 percent of customers are considered hard to reach (H2R).<sup>56</sup> They do not receive water bills (renters, multi-family units), but pay for water through rent and homeowner association fees. These customers experience water bill increases through higher rents or fees. Providing assistance



Approximately 20-40% of customers are considered hard to reach and may not receive water bills directly. Providing assistance to these customers requires a different set of strategies than for those who receive bills directly.

For a more detailed understanding of these various strategies — including implementation considerations, case examples, and additional resources — please view the Water Affordability Programs and Policies paper released in tandem with this report, which can be found at: [metroplanning.org/WaterAffordability](https://metroplanning.org/WaterAffordability)

to the H2R requires a different set of strategies than customers who receive bills directly, including:

- **Direct assistance** includes ways to provide vouchers, rebates, and discounts to landlords or tenants.
- **Indirect assistance** entails increasing knowledge of, and encouraging use of, existing public assistance programs.
- **Conservation programs** are an opportunity to provide water-efficiency improvements to multi-family buildings to lower water bills.

Targeting the hard-to-reach recommendations include:

- Characterize H2R customers to better design programs and develop effective outreach messaging — in multiple languages — by using existing data from U.S. Census, American Community Survey, PUMS data, the utility, and other sources. Communicate with landlords and building managers, who are intermediaries between the water utility and the H2R.
- Join and integrate with existing assistance programs (such as Low Income Home Energy Assistance Program / LIHEAP) that have established trust with H2R populations, when possible, to reduce the program administrative burden and avoid reinventing the wheel.
- Reduce the H2R population by sub-metering (metering tenant spaces separately).

## Community Typologies and Corresponding Water Affordability Solutions

---

The following outlines different types of challenges and corresponding solutions a community could implement with regards to water affordability.<sup>57</sup> These community typologies are designed to assist in understanding what solutions exist for tackling their community's particular affordability challenge(s). For more detailed information and case studies on the following solution strategies, please view the Water Affordability Programs and Policies paper released in tandem with this report.



## Foundational actions for all communities

- Water Rates — Full Cost Pricing<sup>58</sup>
- Reduce Costs — Asset Management
- Water Conservation — Leaks (water loss audit, leak control, metering)
- Customer Assistance — Tailored Programs
- Hard-to-Reach — Characterize
- Reduce Cost — Shared services, mergers, and regionalization

## Communities with high water costs/bill

- Reduce Costs — seek subsidies/funding from state and federal source
- Reduce Costs — explore regionalization solutions
- Water Conservation — if anticipated bill burden is from projected capacity expansion, water conservation plan
- Customer Assistance — adjust billing and collection policies

## Communities facing an overarching low income issue

- Water Conservation — older housing stock, retrofits & rebates, targeted assistance
- Water Rates — Lifeline rate, reduce fixed charge, use income-indexed rates
- Customer Assistance — Piggy-Back programs on existing federal assistance programs
- Hard-to-reach — Integrate programs

## Communities with large hard-to-reach populations

- Hard-to-reach — Characterize/Identify
- Hard-to-reach — Integrate Programs
- Hard-to-reach — Sub-metering

## Important Considerations

---

### **Need to use local water bill data to further understand community-level issues**

As noted previously, this research is not based on actual bill data. Instead, an average bill based on a utility's rates and an assumed consumption level of 5,000 gallons<sup>59</sup> was used. This analysis points toward a growing need for utilities to take a closer look at water burden in their service area. To do this, actual bill data at the local utility-scale will be necessary to further identify demographics of where water burden households in your community may be.

### **Rate setting versus affordability programs**

When addressing affordability challenges for residents, it is important to place a priority on providing the most helpful solutions that truly take residents into consideration. Because of this, beginning with an examination of how the water rate structure can address equity issues is critical. If an adjusted rate structure can help provide the needed relief for low-income residents, this can reduce the number of residents who may need to participate in an affordability program.

Additionally, affordability programs often rely on the resident to know programs exist, and to have the time and ability to apply and demonstrate eligibility. However, many low-income households are often not aware of these programs, have limited free time as they work more than one job and may have limited English language capacity. So beginning with a rate structure that can embed affordability for low-income households is a necessary first step.

### **Equity Issue — the Need for Federal, State and County Assistance**

While this research focused on household level affordability, **it is important to note that there are some communities in our region where none of these recommendations will work without assistance from the county, state and federal level.** This is because, for various reasons, the community may lack the financial capacity to generate sufficient revenue to adequately support the water system and/or create customer assistance programs. This is particularly true for smaller communities whose water systems lack necessary economies of scale, and a regionalized approach to water service may be appropriate. It is also true for communities with a large number of hard-to-reach and low-income residents.

At the federal level, there are water-related funding sources such as HUD Community Development Block Grants (CDBG) or the Public Works Program through the U.S. Economic Development

Administration (EDA). Communities also can utilize low-interest loans from the Clean Water Act and Safe Drinking Water Act State Revolving Funds (SRF), as well as the Water Infrastructure Finance and Innovation Act Program (WIFIA). Fiscally distressed communities who currently face barriers applying for this funding may 1) not know these programs exist, 2) not have the capacity to gather needed data, engineering reports and complete the application, or 3) not have the ability to raise rates to pay back loans given a lack of income growth in the community. The State and County could provide technical assistance to these communities to seek these funding and financing sources.

Given current fiscal challenges related to income growth and rising costs, more attention (and resources) at the national, state and county scale will be necessary to assist communities in ensuring safe and sustainable water service for communities now and into the future.

### **Current legal constraints in Illinois**

There is currently no regulatory requirement in Illinois for water systems to set affordable water rates, or to provide customer assistance programs. In Illinois, private (investor-owned) utility rates are overseen by the Illinois Commerce Commission (ICC), which is responsible for reviewing annual reports and approving customer rates and charges. Oversight of regulated utilities in Illinois is required by 220 ILCS 5/ Public Utilities Act, including not only water rates, but also such matters as customer's rights to receive notice of rate adjustments, enter into payment plans, and service termination procedures. Illinois law potentially provides a basis for a legal challenge to customer assistance programs funded with rate revenue for private investor-owned utilities.<sup>60</sup>

The overwhelming majority of water suppliers in northeastern Illinois, however, are government-owned, and therefore not subject to regulation at the state level. This gives our communities a great amount of flexibility in setting water rates, establishing billing policy and customer assistance programs. Public municipal utilities approve rates and other policies at the local level with board/council approval. Since rates in Illinois are set at the local level, regulations regarding water rates, billing policy, and customer assistance will largely consist of local ordinances. There is some legal precedent for government-owned utilities in Illinois to set rates that are neither unreasonable nor unreasonably discriminatory, and, for home-rule municipalities, additional regulatory oversight potentially limiting implementation of customer assistance programs may be contained in the home rule charter.<sup>61</sup>





# Key Findings & Conclusion

Water burden is more widespread than common data reveals. Solutions will vary based on a number of factors at the local level, but it's important to get started on solutions today.



Every community must take a closer look to identify customers facing water burden in their service area.

## Key Findings

---

### **Water burden exists across our region.**

The results of every analysis done as part of this research highlights how many communities in our region are impacted by the growing affordability issue in water service. Every community needs to take a closer look to identify customers that are facing water burden in their service areas.

### **Measuring water burden using Median Household Income masks affordability challenges.**

As this research demonstrates, analyzing water burden as a percentage of Median Household Income (MHI) provides an incomplete picture — particularly for those community members in the lower earning income quintiles. Indeed, measuring affordability at the average income level of a community does not indicate if the large majority of residents can afford the service.

### **Solutions vary based on a diversity of factors at the local level.**

Our analysis shows that affordability is a nuanced issue. Water burden emerges from the interaction of two factors:



1. Cost of service (what is the water rate and what does a customer's water bill cost?)
2. Income (what is the customers' ability to pay for the service?)

Because of this, **addressing water affordability begins with identifying populations that are burdened because of cost of service, and those that are burdened because of income.** Local solutions related to cost can be better tailored to meet the needs of specific households or communities. However, more robust, regional and state solutions are also necessary to help address affordability in communities that face both cost of service and income challenges that drive water burden.

### **Racial disparities exist for water burden in our region.**

Analyses at the census tract level in this report points toward a relationship between water burden and the share of non-white population at the census tract level. Further analyses are necessary to determine whether racial disparities exist at the household level, but at the very least, this calls attention to the larger problem of income disparities by race in the Chicago region. Ensuring equity in water affordability will require solutions that go beyond service pricing, and include policies and actors outside of water service.

Ensuring equity in water affordability will require solutions that go beyond water rate setting, and the involvement of decision makers outside the water service sector.



## Conclusion

---

While water industry cost escalations have been extensively documented, the diverse impacts of adjusting rates to reflect higher costs of water service has only recently begun to receive attention.<sup>62</sup> This research begins to explore the extent of the issue and outline possible solutions for tackling water affordability in our communities. Understanding the underlying causes of increasing water burden is critical to designing a water rate structure and effective water





affordability programs. In determining the extent of assistance, historically, the focus has been on revenue recovery, but a broader view looks to the larger public health mission of the water utility.<sup>63</sup> When designed correctly, affordability programs can increase access to water, reduce utility operation costs, increase financial sufficiency for low-income customers, and enhance acceptance of rate increases. This report is a starting point for taking action on our growing water affordability challenges to ensure everyone in our communities has access to safe and affordable water service.



## Endnotes

- 1 Circle of Blue: The Price of Water. (2019) Retrieved from: <https://www.circleofblue.org/waterpricing/>
- 2 Teodoro, M. (2018). *Measuring Household-level Water and Sewer Utility Affordability*. Prepared for the 2018 Utilities Management Conference American Water Works Association/Water Environment Federation 21-23 February 2018. San Antonio, Texas.
- 3 Baird, G. M. (2010). Water Affordability: Who's Going to Pick Up the Check? *Journal American Water Works Association*, 102(12), 16-23. doi:10.1002/j.1551-8833.2010.tb11358.x
- 4 "Though water systems have historically underpriced their services, recent trends suggest that utilities are, to some degree, self-correcting. From 2000 to 2017, water service rates increased by 136%, with average annual increases of over 5%. The steep jump in water prices outpaced the increase of median household income, which went up just 35% over this time period." Bartlett, S., Cisneros, H., Decker, P., Heartwell, G., Warnock, A., Nellenbach, M., ... Campanelli, B. (2017). *Safeguarding Water Affordability*. Retrieved from <https://www.mayorsinnovation.org/images/uploads/pdf/BPC-Infrastructure-Safeguarding-Water-Affordability.pdf>
- 5 U.S. Census Bureau. Historical Income Tables: Households. Retrieved from: <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html>.
- 6 Circle of Blue: The Price of Water. (2019) Retrieved from: <https://www.circleofblue.org/waterpricing/>
- 7 U.S. Census Bureau. Historical Income Tables: Households. Retrieved from: <https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-income-households.html>.
- 8 2017 Infrastructure Report Card: Drinking Water. (2017) Retrieved from <https://www.infrastructurereportcard.org/wp-content/uploads/2017/01/Drinking-Water-Final.pdf>
- 9 American Water Works Association. (2012). Buried no longer. 37. Retrieved from <http://www.awwa.org/Portals/0/files/legreg/documents/BuriedNoLonger.pdf>
- 10 EPA Survey Shows \$271 Billion Needed for Nation's Wastewater Infrastructure. (2016) Retrieved from: <https://archive.epa.gov/epa/newsreleases/epa-survey-shows-271-billion-needed-nations-wastewater-infrastructure.html>
- 11 Baird, G. M. (2010). Water Affordability: Who's Going to Pick Up the Check? *Journal American Water Works Association*, 102(12), 16-23. doi:10.1002/j.1551-8833.2010.tb11358.x
- 12 Bartlett, S., Cisneros, H., Decker, P., Heartwell, G., Warnock, A., Nellenbach, M., ... Campanelli, B. (2017). *Safeguarding Water Affordability*. Retrieved from <https://www.mayorsinnovation.org/images/uploads/pdf/BPC-Infrastructure-Safeguarding-Water-Affordability.pdf>
- 13 American Community Survey 2013-2017 U.S. Census Bureau (2018). Median Household Income, Poverty Rates and Computer and Internet Use, 2013-2017 American Community Survey 5-year estimates. Retrieved from <https://www.census.gov/newsroom/press-kits/2018/acs-5year.html>
- 14 Saunders, M. et al. 1998. *Water Affordability Programs*. AWWA Research Foundation, Denver.
- 15 Teodoro, M. (2018). *Measuring Household-level Water and Sewer Utility Affordability*. Prepared for the 2018 Utilities Management Conference American Water Works Association/Water Environment Federation 21-23 February 2018. San Antonio, Texas.
- 16 Baird, G. M. (2010). Water Affordability: Who's Going to Pick Up the Check? *Journal American Water Works Association*, 102(12), 16-23. doi:10.1002/j.1551-8833.2010.tb11358.x
- 17 National Consumer Law Center (2014). *Review and Recommendations for Implementing Water and Wastewater Affordability Programs in the United States*. Retrieved from: <https://www.nclc.org/images/pdf/pr-reports/report-water-affordability.pdf>
- 18 The regressive nature of water rates is due, in no small part, to the economies of scale present in the water industry that leaves smaller and more rural systems with a smaller customer base over which to spread costs. Since water systems are local monopolies, there is no substitute.
- 19 Beecher, J. (2016). Trends in Consumer Prices (CPI) for Utilities Through 2015. Retrieved from [http://ipu.msu.edu/wp-content/uploads/research/pdfs/IPU\\_Consumer\\_Price\\_Index\\_for\\_Utillities\\_2015\\_\(2016\).pdf](http://ipu.msu.edu/wp-content/uploads/research/pdfs/IPU_Consumer_Price_Index_for_Utillities_2015_(2016).pdf)

- 20 Ability-to-pay, or residential water affordability, refers to the capacity of customers to pay water rates that reflect the full costs of providing water service. See Hughes, J. et al. (2014). Defining a Resilient Business Model for Water Utilities. Water Research Foundation. Retrieved from: <https://www.waterrf.org/resource/defining-resilient-business-model-water-utilities>
- 21 Bartlett, S., Cisneros, H., Decker, P., Heartwell, G., Warnock, A., Nellenbach, M., ... Campanelli, B. (2017). Safeguarding Water Affordability. Retrieved from <https://www.mayorsinnovation.org/images/uploads/pdf/BPC-Infrastructure-Safeguarding-Water-Affordability.pdf>.
- 22 Beck, N. and M. Schneemann. Water Demand Forecasting & Rates – Northeastern Illinois. Presentation to Illinois Water Con March 20, 2019.
- 23 Meter Size Assumed 5/8 in. Monthly consumption 5000 gallons.
- 24 Schneemann, M. (2019). Water Affordability: Definition and Measurement Literature Review. Illinois-Indiana Sea Grant. IISG19-RCE-RLA-056. This review examines the definition and measurement of water affordability through a chronological search and presentation of the regulatory and research literature.
- 25 Teodoro, M. P. (2018). *Measuring household affordability for water and sewer utilities*. Journal - American Water Works Association, 110(1), 13–24. <https://doi.org/10.5942/jawwa.2018.110.0002>
- 26 U.S. Environmental Protection Agency. (1998). Information for States on Developing Affordability Criteria for Drinking Water. Retrieved from <https://nepis.epa.gov/Exe/ZyPDF.cgi/91022JSV.PDF?Dockkey=91022JSV.PDF>
- 27 An issue in using many of these measures is a potential mismatch between service area boundaries and political boundaries (census tract, counties).
- 28 Full discussion available in Schneemann, M. (2019) Water Affordability: Definition and Measurement Literature Review. Illinois-Indiana Sea Grant. IISG19-RCE-RLA-056. Rubin's criticisms include: 1) low correlation between median household income and measures of poverty. 2) water costs should not be considered in isolation, but rather, as part of an overall household bundle of goods and services. Rubin, S. National Rural Water Association. (2001). *Affordability of Water Service*. Duncan, OK: U.S.
- 29 Teodoro, M. P. (2018). *Measuring household affordability for water and sewer utilities*. Journal - American Water Works Association, 110(1), 13–24. <https://doi.org/10.5942/jawwa.2018.110.0002>
- 30 For a full discussion see Raucher, R., Clements, J., Rothstein, E., Mastracchio, J., & Green, Z. (2019). Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector. Retrieved from <https://www.awwa.org/Portals/0/AWWA/Government/DevelopingNewFrameworkForAffordabilityReport.pdf>
- 31 This method is attributable to Teodoro, M. P. (2018). Measuring household affordability for water and sewer utilities. Journal - American Water Works Association, 110(1), 13–24. <https://doi.org/10.5942/jawwa.2018.110.0002> We define lowest income households as the lowest quintile of income earners.
- 32 There currently does not exist an agreed upon threshold for measuring affordability.
- 33 The purpose of this analysis is not for regulatory compliance, but rather examining the water burden issue from an equity lens.
- 34 By this measure, the lowest quintile of earners in some of the most impoverished municipalities have incomes that are less than the average monthly water bill.
- 35 Raucher, R, J. Clements, E. Rothstein, J. Mastracchio, and Z. Green. (2019) Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector. Report prepared for the American Water Works Association, the National Association of Clean Water Agencies and the Water Environment Federation.
- 36 Teodoro, M. P. (2018). Measuring household affordability for water and sewer utilities. Journal — American Water Works Association, 110(1), 13–24. <https://doi.org/10.5942/jawwa.2018.110.0002> The hours worked at a minimum wage metric compliments the lowest income quintile metric.
- 37 For each census tract, the average household income at the bottom quintile (Q1), second quintile (Q2), and the median income were converted to hourly income by dividing by 52 weeks, and again by 40 hours per week. Then, the average combined water and sewer bill for the municipality was divided by that hourly wage, for each census tract, for each hourly wage.
- 38 The mean is highly skewed due to several municipalities having very low incomes at the

lowest quintile

- 39 Assuming a 40 hour work week, and 4 weeks per month, 160 hours equates to all of monthly hours work going to pay the water bill. In some communities, the income of the lowest quintile of earners is so low that, hypothetically, a low-income family would have to work more than full time to afford the average water bill.
- 40 Below 80% MHI is commonly used by agencies to designate disadvantaged communities/ assistance need. Cross-walking water burden, which expresses income levels relative to water bills, to %AMI captures income inequality as related to the growth rate of income. This analysis is based in part on the work of Raucher, R. et al. (2019), who suggest that a combination of measures be used to assess household affordability that represent both a measure of household-level burden and an indication of the level of burden in the surrounding area.
- 41 Raucher, R., Clements, J., Rothstein, E., Mastracchio, J., & Green, Z. (2019). Developing a New Framework for Household Affordability and Financial Capability Assessment in the Water Sector. Retrieved from <https://www.awwa.org/Portals/0/AWWA/Government/DevelopingNewFrameworkForAffordabilityReport.pdf>
- 42 The 5 Categories included in the matrix are: High (High + High), Medium-High (High + Medium), Medium (mid + Mid), Medium High (low + High), Medium–Low (Low + Medium), Low (low + Low)
- 43 This distinction is important in considering appropriate water affordability programs to implement.
- 44  $r=.107$ ,  $p<.001$ . There is a positive correlation between water burden and percent black population.
- 45  $r=-.235$ ,  $p<.01$ . There was a negative correlation between white population and combined water bill growth above income.
- 46 Our points of reference for using 5,000 gallons per capita per month figure are: (1) Environmental Financial Advisory Board (2007) comments on EPA document: combined sewer overflows - guidance for financial capability assessment and schedule development - recommend using average consumption level of 5,000 to 6,000 gallons (2) the Environmental Finance Center at the University of North Carolina uses 5,000 for assessing water affordability (3) using our average gpcd in the region and our average household size of 2.7, we get an average use of ~5000. Since we do not have access to billing data for the 240 plus utilities in our region, we are not able to use actual bills but have to use the average bill based on actual rates and the assumed consumption level of 5000 gallons.
- 47 That is, without compromising water quality, water pressure, customer service, etc.
- 48 Bartlett, S., Cisneros, H., Decker, P., Heartwell, G., Warnock, A., Nellenbach, M., ... Campanelli, B. (2017). Safeguarding Water Affordability. Retrieved from <https://www.mayorsinnovation.org/images/uploads/pdf/BPC-Infrastructure-Safeguarding-Water-Affordability.pdf>
- 49 Teodoro, M. P. (2018). Measuring household affordability for water and sewer utilities. *Journal - American Water Works Association*, 110(1), 13–24. <https://doi.org/10.5942/jawwa.2018.110.0002>
- 50 Bartlett, S., Cisneros, H., Decker, P., Heartwell, G., Warnock, A., Nellenbach, M., ... Campanelli, B. (2017). Safeguarding Water Affordability. Retrieved from <https://www.mayorsinnovation.org/images/uploads/pdf/BPC-Infrastructure-Safeguarding-Water-Affordability.pdf>.
- 51 Detroit Blue Ribbon Panel on Affordability. (2016). Final Report of Detroit Ribbon Panel on Affordability. <https://doi.org/10.1007/s13398-014-0173-7.2>
- 52 Water Research Foundation. (2010). *Best Practices in Customer Payment Assistance Programs* (Rep.). Retrieved from: <http://www.waterrf.org/PublicReportLibrary/4004.pdf>
- 53 United States Environmental Protection Agency (EPA) Drinking Water and Wastewater Utility Customer Assistance Programs (Rep.). (2016, April). Retrieved from: [https://www.epa.gov/sites/production/files/2016-04/documents/dw-ww\\_utilities\\_cap\\_combined\\_508.pdf](https://www.epa.gov/sites/production/files/2016-04/documents/dw-ww_utilities_cap_combined_508.pdf)
- 54 Aqua Publica Europa. (2016) *Water Affordability Public Operator's Views and Approaches on Tackling Water Poverty* (Rep.). (n.d.). Retrieved from: [https://www.aquapublica.eu/sites/default/files/document/file/ape\\_water\\_affordability\\_final\\_0.pdf](https://www.aquapublica.eu/sites/default/files/document/file/ape_water_affordability_final_0.pdf)



- 55 United States Environmental Protection Agency (EPA) Drinking Water and Wastewater Utility Customer Assistance Programs (Rep.). (2016, April). Retrieved from: [https://www.epa.gov/sites/production/files/2016-04/documents/dw-ww\\_utilities\\_cap\\_combined\\_508.pdf](https://www.epa.gov/sites/production/files/2016-04/documents/dw-ww_utilities_cap_combined_508.pdf)
- 56 Water Research Foundation (2017). Customer Assistance Programs for Multi-Family Residential and Other Hard-to-Reach Customers and Baird, G. M. (2010). Water Affordability: Who's Going to Pick Up the Check? *Journal — American Water Works Association*, 102(12), 16-23. doi:10.1002/j.1551-8833.2010.tb11358.x
- 57 A full discussion of these strategies is available in Schneemann, M. (2019) *Water Affordability: Programs and Policies A National Review*. Illinois-Indiana Sea Grant. IISG19-RCE-RLA-057. This publication was released in tandem with this research findings report.
- 58 Schneemann, M. (2012). Full-Cost Water Pricing Guidebook for Sustainable Community Water Systems. Chicago Metropolitan Agency for Planning, Illinois-Indiana Sea Grant. IISG-12-46 Retrieved from: <https://iiseagrant.org/wp-content/uploads/2019/02/WaterFullCostPricingManual-FINAL.pdf>
- 59 Our points of reference for using 5,000 gallons per capita per day figure are: (1) Environmental Financial Advisory Board (2007) comments on EPA document: combined sewer overflows - guidance for financial capability assessment and schedule development - recommend using average consumption level of 5,000 to 6,000 gallons (2) the Environmental Finance Center at the University of North Carolina uses 5,000 for assessing water affordability (3) using our average gpcd in the region and our average household size of 2.7, we get an average use of ~5000. Since we do not have access to billing data for the 240 plus utilities in our region, we are not able to use actual bills but have to use the average bill based on actual rates and the assumed consumption level of 5000 gallons.
- 60 Berahzer, S. I., Clements, J., Raucher, R., Advisor, S., Associates, A., Giangola, L., ... Colton, R. (2017). Navigating Legal Pathways to Rate-Funded Customer Assistance Programs: A Guide for Water and Wastewater Utilities. *UNC Environmental Finance Center*. Retrieved from: <https://efc.sog.unc.edu/sites/default/files/Pathways%20to%20Rate-Funded%20CAPs.pdf>
- 61 Berahzer, S. I., Clements, J., Raucher, R., Advisor, S., Associates, A., Giangola, L., ... Colton, R. (2017). Navigating Legal Pathways to Rate-Funded Customer Assistance Programs: A Guide for Water and Wastewater Utilities. *UNC Environmental Finance Center*. Retrieved from: <https://efc.sog.unc.edu/sites/default/files/Pathways%20to%20Rate-Funded%20CAPs.pdf>
- 62 See G. T. Mehan III, & Gansler, I. D. (2017). Addressing Affordability as a Necessary Element of Full-Cost Pricing. *American Water Works Association*, 109(10), 46-50. doi:10.5942/jawwa.2017.109.0132
- 63 Water Research Foundation. (2010). Best Practices in Customer Payment Assistance Programs (Rep.). Retrieved from: <http://www.waterrf.org/PublicReportLibrary/4004.pdf>. business standpoint, while a utility cannot spend more on a water affordability program than the lost revenue recovered



**ELEVATE ENERGY**  
Smarter energy use for all



For more than 85 years, the Metropolitan Planning Council (MPC) has made the Chicago region a better, bolder place to live and work by partnering with businesses, communities and governments to address the area's toughest planning and development challenges. MPC works to solve today's urgent problems while consistently thinking ahead to prepare the region for the needs of tomorrow.

140 South Dearborn Street, Suite 1400  
Chicago, Illinois 60603

312.922.5616  
metroplanning.org | @metroplanners  
metroplanning.org/WaterAffordability

#### Photo Credits

Cover by Johnny McClung; Page 6 & 7 by Samara Doole; Page 9 by Catt Liu; Page 15 by Anda Ambrosini; Page 16 & 17 by Jacek Dylag; Page 32 & 33 by Manki Kim; Page 34, top image by Lorri Lang; Page 34, bottom image by Talal Ahmad; Page 35 by CDC; Page 36, top image by Lisa Fotios; Page 36, bottom image by Ray Piedra; Page 37, top image by Ryan Jvr; Page 42 & 43 by Imani; Page 44, left image by Kirsten Marie Ebbesen; Page 44, right image by Jen Theodore; Page 45, left image by Jana Sabeth; Page 45, right image by The Creative Exchange; Page 46 & 47 by Paul Bulai