

WATER USE

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Columbus has a daily water use of 122 gallons per person, which is comparable to other Ohio cities such as Cleveland (158 gallons per person per day) and Cincinnati (120 gallons per person per day).^{1,2,3,4} (Note: The daily water used in Cleveland and Cincinnati are derived from the number of gallons supplied and the number of people served within each municipality.) However, there is room to improve our water use efficiency by implementing similar best management practices that have been shown to work in other major US cities. For example, Boston has reduced its daily water use by 43% from its peak in the 1980s and currently uses approximately 41 gallons per person per day.⁵ They have achieved this reduction through a number of different projects, including installation of low flush fixtures in existing properties, improved water metering, implementation of new rate structures, and working with manufacturers to improve operational efficiency.⁶ The city also benefited from state requirements to install efficient fixtures in new construction. Additionally, cities such as Las Vegas provide models of how to reduce water use, and while there are many factors that have led to their reductions that would not apply here, certain practices are reproducible in the Midwest.⁷

¹ "Water Facts." *The City of Columbus, Public Utilities: Water Protection*.

<https://www.columbus.gov/utilities/about/Water-Facts/>. Accessed Jan. 2018.

² Cleveland Water. "2014 Annual Report." <http://www.clevelandwater.com/2014-annual-report.pdf>. Accessed Jan. 2018.

³ "About Greater Cincinnati Water Works."

<https://www.cincinnati-oh.gov/water/about-greater-cincinnati-water-works/>. Accessed Jan. 2018.

⁴ "Greater Cincinnati Water Works Service Area Map." *City of Cincinnati, Greater Cincinnati Water Works*.

<https://www.cincinnati-oh.gov/water/linkservid/FA3AEC91-536F-48B2-84DBE12F70E03531/showMeta/0/>.

Accessed Jan. 2018.

⁵ "Map: Massachusetts water usage and cost, by town." *Boston.com*

http://archive.boston.com/yourtown/specials/water/massachusetts_water_usage_map/. Accessed Jan. 2018.

⁶ "Lessons From the Field - Boston Conservation." *National Geographic*.

<http://environment.nationalgeographic.com/environment/freshwater/lessons-boston-conservation/>. Accessed Jan. 2018.

⁷ Connor Shine. "What Nevada has done to conserve water may serve as example for California." *Las Vegas Sun*.

Apr. 27, 2015. <https://lasvegassun.com/news/2015/apr/27/tips-california-what-nevada-has-done-conserve-water/>. Accessed Jan. 2018.

In 2015, a team composed of the City of Columbus, DELCO Water Co., MORPC, USGS, and several others, collaborated to produce the [Sustaining Scioto](#) adaptive management plan.⁸ The goal was to ensure that future central Ohio residents would be able to enjoy the same high-quality water source that we have today by developing water utility strategies that account for population growth and climate change. Using local water usage per capita rates, as well as population projections, *Sustaining Scioto* projected that the water usage rates will increase by 4.3% by 2035 and by 105.2% by 2090. Though model consensus is that supply will likely meet demand, there are scenarios where this luxury is challenged. To ensure that the increasing water demand will be met, it is critical that we continue to evaluate the local water balance, improve our understanding of how future changes may affect our water supply, and promote water use efficiency throughout the city.

In addition to affecting the quality of Columbus' water, climate change could play a role in the amount of water available for public consumption. While increased precipitation (amount and intensity) will likely have the most impact on water quality, extreme heat events and droughts might result in increased water demand. To prepare for these potential challenges, many of the proposed action statements focus on water use efficiency, whether it is in the municipal, agricultural, or residential sector. By increasing our efficiency, we can reduce local water demand while also lowering water costs. There are a variety of ways that we can improve water use efficiency: utilize compact development, which requires shorter pipes and reduces water loss through leaks; implement conservation pricing, which allows utilities to charge increasing water rates based on higher levels of water use; and encourage water recycling for non-potable use. Actions, such as water recycling, have additional co-benefits, such as reducing stormwater runoff and lowering the amount of water used for landscaping. By creating greater awareness of the amount of water we each use daily, encouraging increased water efficiency, and improving our estimates of future water availability, the City of Columbus will be able to meet the water demands of the future.

N14. IMPLEMENT EDUCATIONAL CAMPAIGN TO REDUCE WATER USE

A water efficiency program, modeled after the successful energy efficiency programs conducted by electricity and natural gas providers around the state, which are funded by a surcharge on utility bills, could be introduced to help Columbus residents and businesses better understand how their water is used. Such a program could include more detailed consumption information in quarterly bills to ratepayers, greater promotion of efficient fixtures such as those certified as WaterSense, home water use audits with recommendations on specific actions that property owners could take to reduce their water consumption, and rebates on purchases of WaterSense and comparable fixtures.⁹ Some of these actions are already in progress, as Columbus is in the midst of implementing new meters and automatic metering systems that will provide increased water usage information to customers. These programs need to help ratepayers put their consumption in context by providing information on a property's water use relative to average comparable properties and ones that have utilized water efficiency programs. Likewise, consumers need to understand long-term costs associated with particular efficiency improvements, including their payback periods, to increase their likelihood of taking action. Nudges, in the way of small discounts or rebates for purchase of efficient fixtures, could be offered. There are

⁸ "Sustaining Scioto." *Mid-Ohio Regional Planning Commission*.

<http://www.morpc.org/tool-resource/sustaining-scioto/>. Accessed Jan. 2018.

⁹ "WaterSense." *U.S. Environmental Protection Agency*. <https://www.epa.gov/watersense>. Accessed Jan. 2018.

additional economic and environmental co-benefits of water efficiency including reduced natural gas and electricity consumption for generating hot water. In fact, energy audits conducted by electric and natural gas providers often include free distribution of sink aerators and low-flow showerheads due to their rapid payback periods in energy efficiency. Potentially, Columbus could collaborate with the utilities that are conducting the energy audits so that they include water efficiency audits and information regarding WaterSense technology.

Fee structures also play a role, with higher water rates promoting greater reductions in use. But, such structures should protect vulnerable populations by scaling unit costs with overall consumption and/or offering greater support for these households to make their residences efficient. Currently, low-income and senior citizen discount programs provide a 20% discount on water and sewer usage charges for the households that qualify.¹⁰ Lastly, financial instruments should be made available for individuals and businesses to distribute efficiency costs over a longer period of time, thus allowing improvement costs to be borne as savings are reaped. In Franklin County, the Columbus-Franklin County Finance Authority Energy Program offers ways for businesses, nonprofits and government agencies to finance improvement with payback periods of up to 30 years.¹¹ Similarly, the OOT has an energy efficiency program called ECO-Link that, due to the associated energy savings through reduced consumption of hot water, would allow homeowners to buy down their interest rate by as much as 3% on bank loans to pay for improvements.¹² Since cities in Ohio are superseded in building code requirements by the state, Columbus would need to look to incentives rather than regulation to promote new construction and renovation that exceeds efficiency standards in state codes. For example, incentives could include reduced fees or taxes for compliance with best practices. Both the Department of Building and Zoning Services and Department of Development should be involved in these conversations.

A11. DEVELOP EVENT-BASED WATER USE CRITERIA

Voluntary water conservation should be promoted and practiced at all times, but potential events, such as droughts and extended heat waves, could necessitate stricter water use criteria. A number of factors, including extended dry periods and droughts, rising temperatures, and longer growing seasons, may lead to increases in the water supply demand. As a result, river, lake, and reservoir levels could drop, groundwater recharge may be reduced, and our water supply would be strained to meet the needs of all users. Therefore, guidelines need to be developed for all users regarding different scenarios that might threaten the water supply. In the event of a water emergency, the Ohio EPA requires each community water system to have a contingency plan in place to ensure that necessary water needs are met.¹³ These plans provide the response and recovery actions to be taken during emergency situations, while the guidelines suggested here would be used for less critical events.

¹⁰ "Utility Discount Programs." *The City of Columbus, Public Utilities*.

<https://www.columbus.gov/utilities/customers/Utility-Discount-Programs/>. Accessed Jan. 2018.

¹¹ "Central Ohio Bond Fund." *Columbus-Franklin County Finance Authority*.

<https://columbusfinance.org/services/central-ohio-bond-fund/>. Accessed Jan. 2018.

¹² "Eco-Link." *The Office of the Ohio Treasurer*. <http://www.tos.ohio.gov/ECOLINK>. Accessed Jan. 2018.

¹³ Security and Emergency Preparedness. Attachment A: Ohio Administrative Code (OAC) rule 3745-85-01." *Ohio Environmental Protection Agency*.

http://epa.ohio.gov/portals/28/documents/rules/Final/3745-85-01_effective%2012-23-16.pdf. Accessed Jan. 2018.

These guidelines should detail the measures that will be taken in the event of heat waves, droughts, or even intense precipitation events, which could all affect both water availability and water quality (**N10**, **N11**, and **N13** detail events that affect water quality). At the onset of droughts and heat waves, the city and other involved stakeholders should increase efforts to closely monitor streamflow and reservoir/groundwater levels. This will ensure that enough time is allowed to take action to reduce water usage if necessary. Actions for small users, such as individual households, might include ramping up voluntary conservation; details on how to do so during dry periods could be included as part of the educational campaign detailed in **N14**. During major drought events, water rationing - limiting activities such as lawn irrigation - may need to be implemented in residential communities. For large users, such as agriculture and industrial users, water restrictions for certain activities already take effect under specific drought conditions. In exchange for volunteering to reduce water use during emergencies, certain large consumers of water receive discounted rates from the City of Columbus Division of Water. Currently, several utilities in the region already have limits on the amount of water they can extract from surface water supplies, based on set minimum stream flows that need to be maintained.¹⁴

CHAPTER INSET: As specified in the *State of Ohio Emergency Operations Plan*, Ohio Emergency Management Agency will establish a Drought Assessment Committee and Impact Task Force to appropriately match the state response to the severity of a drought.¹⁵ Under this plan “local jurisdictions may enact ordinances to assure equitable water distribution and may establish local drought emergency public information and education programs.” It is likely that emergency management activities during a regional drought emergency would be coordinated between FCEM&HS and leadership of the City of Columbus, including the Division of Water.

A12. UPDATE BUILDING CODE TO REQUIRE MORE EFFICIENT WATER USE

A13. IMPROVE IRRIGATION THROUGH CHANGES IN INFRASTRUCTURE AND PRACTICES THAT MORE EFFICIENTLY USE WATER

In the State of Ohio, state rather than local government sets building code standards. The current Ohio Building Code reflects the 2015 edition of the International Building Code. Revisions to standards improve energy and water efficiency, although construction costs can increase as well in some cases. These additional costs are often more than recovered over the life of the building and, in the case of water efficiency, the reduction in per person water use can result in savings to the entire community through lower demand for water treatment infrastructure. The City of Columbus should advocate for the state to follow the most current US building codes. Use of financial instruments, such as the OOT ECO-Link Program for homeowners and Columbus-Franklin County Finance Authority Energy Program for businesses, nonprofits and government agencies can help distribute the costs of energy efficiency over a longer period of time, allowing savings to accrue while infrastructure payment are being made. Without updated building codes, Columbus will need to continue to use incentives such as the Green Columbus Fund to promote efficient construction and renovation.¹⁶

¹⁴ “Upper Scioto River Watershed, Vulnerability Assessment Technical Memorandum”; Brown and Caldwell, 2014; http://www.morpc.org/wp-content/uploads/2017/12/2015-04-08-VulnerabilityAssessmentTM_Final.pdf

¹⁵ “State of Ohio Emergency Operations Plan - Drought Incident Response Annex.” 2016. http://ema.ohio.gov/Documents/Ohio_EOP/2016_Update_DROUGHT_INCIDENT_ANNEX.pdf. Accessed Jan. 2018.

¹⁶ “Tax Credits, Rebates, and Savings.” U.S. Department of Energy. <https://energy.gov/savings/city-columbus-green-columbus-fund>. Accessed Jan. 2018

Consistent with changes to practices of designing and renovating buildings are the outdoor spaces surrounding them. Action Statements **N15** and **A18** in the Ecosystems chapter of this document describes in detail how sustainable landscaping practices and alternate use of spaces can reduce water demands of landscaping. Selection of the right plants, such as natives and low-water varieties, can provide benefits such as sources of aesthetic beauty, spaces for outdoor leisure, food and habitats for wildlife, and reduced energy consumption through shading and wind barriers. Likewise, edible species can be planted that provide food for people. Thus, building landscapes, when well-designed, may provide greater value than lawns planted with monocultures of grass.

In cases where lawns are still necessary or desired, they should be appropriately sized and planted with varieties of grass that require the fewest inputs of water, fertilizer, and herbicide. When it is still necessary to provide irrigation for landscapes, systems such as drip irrigation that target watering to specific plants should be considered. Also, many modern irrigation systems may be integrated with weather stations and/or soil moisture sensors. Such systems allow users to deliver an appropriate volume of water at preferred intervals while taking into account natural rainfall and soil conditions. For organizations with large expanses of athletic turf, such as Columbus Recreation and Parks, such systems could provide significant resource savings. The value of fountains and ponds should be closely scrutinized if they require regular addition of water from the municipal water supply.

A14. IMPROVE EFFICIENCY OF WATER USE IN CITY FOUNTAINS, POOLS, SPLASH PADS, AND PONDS

As with many of the recommendations in this document, the City of Columbus can and should lead by example. This allows practices to be refined and showcased, offers informal educational opportunities for businesses and individuals, and helps establish a market for efficient products and services. Efficiency also allows the city to better steward its financial resources. An example of an action taken by Ohio State to reduce water consumption in Mirror Lake, which at one point required 50,000 gallons of water to be purchased from the city daily, is the installation of a well water supply.¹⁷

Columbus has renovated and constructed a number of buildings to LEED standards over the past decade. Similar standards for efficient use of water should be applied to fountains, pool, splash pads, and ponds. To achieve more efficient water use, some improvements have already been made to many of these public water bodies, while newly constructed ones included water-efficient designs. For example, the Scioto Mile Fountain at Bicentennial Park recirculates its water so that it does not need to be continually re-filled.¹⁸ Further actions, such as relining ponds and pools to prevent leakage, or utilizing excess water (i.e. greywater) for landscaping, should be considered. Additionally, signs and infographics regarding water recycling and water conservation should be displayed at the fountains, splash pads, pools, or ponds that have implemented those practices; this could be achieved through the educational campaign outlined in **N14**. To ensure a holistic analysis, any plans should include costs and energy consumption associated with pumps and filtration equipment.

¹⁷ Collin Binkley. "Ohio State to refill Mirror Lake with water from new well." *The Columbus Dispatch*. Aug. 12, 2014.

http://www.dispatch.com/content/stories/local/2014/08/12/Ohio_State_begins_re_filling_Mirror_Lake.html. Accessed Jan. 2018.

¹⁸ "Bicentennial Park." *The City of Columbus, Recreation and Parks Department*.

<https://www.columbus.gov/recreationandparks/parks/Bicentennial-Park/>. Accessed Jan. 2018.

