

**JOINT MEETING OF THE  
LAS VEGAS VALLEY WATER DISTRICT BOARD OF DIRECTORS  
COYOTE SPRINGS WATER RESOURCES DISTRICT BOARD OF TRUSTEES  
BIG BEND WATER DISTRICT BOARD OF TRUSTEES  
SPECIAL MEETING  
MAY 20, 2024  
MINUTES**

CALL TO ORDER 1:02 p.m., Commission Chambers,  
Clark County Government Center  
500 S. Grand Central Parkway, Las Vegas, Nevada

DIRECTORS PRESENT Jim Gibson, Vice President  
Justin Jones  
William McCurdy II  
Ross Miller (via phone)  
Michael Naft  
Tick Segerblom

DIRECTORS ABSENT Marilyn Kirkpatrick, President

STAFF PRESENT John Entsminger, Dave Johnson, Doa Ross, Greg Walch, Kevin Bethel

*Unless otherwise indicated, all members present voted in the affirmative.*

**COMMENTS BY THE GENERAL PUBLIC**

*For full public comment, visit [www.lvvwd.com/apps/agenda/lvvwd/index.cfm](http://www.lvvwd.com/apps/agenda/lvvwd/index.cfm)*

Louis Grandieri, 279 Broadcast Ave., submitted written comments in advance of the meeting and read those comments into record. His written comment is attached to these minutes.

Pete Foley, 4512 Fernbrook Rd., stated that the posted budget document includes a commitment that the Excessive Use Charge funds will not be used for the general fund, but will be used separately for conservation efforts. He stated that there is no way to distinguish those expensed funds from others, stating that while there is a financial commitment, there is no method to track those funds. He said that the District's operating expenses are decreasing, and revenues are increasing substantially due to the Excessive Use Charges. He added that Assembly Bill 220 remains concerning, citing that the SNWA has unprecedented power to cutoff water supply to residents. He stated that the public needs more information to understand the power that has been given to SNWA by Assembly Bill 220.

Laura McSwain, 2727 Ashby Ave., with the Water Fairness Coalition spoke about item #3, the adoption of the budget. She stated that the budget documents are not transparent enough for the public, and expressed frustration with how the capital projects and budgets are displayed. She stated that the District is operating outside of its charter to charge rates relative to the cost of water delivery. She questioned the transparency of the Springs Preserve's budget and expenses.

**ITEM NO.**

**1. Approval of Agenda & Minutes**

FINAL ACTION: A motion was made by Director Segerblom to approve the agenda and the minutes from the joint meeting of April 29, 2024. The motion was approved.

**2. Adopt the 2024B LVVWD SRF Request Resolution, authorizing the District to file an application for a loan from the Nevada Drinking Water State Revolving Fund to finance water infrastructure projects of the District and to secure the loan with revenue bonds secured by pledged revenues in the maximum aggregate principal amount of \$30,000,000.**

FINAL ACTION: A motion was made by Director Segerblom to adopt the resolution. The motion was approved.

**3. Conduct a Public Hearing on the Tentative Budgets for the Las Vegas Valley Water District, the Coyote Springs Water Resources District, and the Big Bend Water District and adopt final budgets for Fiscal Year 2024/25.**

John Entsminger, General Manager, addressed the Board of Directors, sitting as all three boards, and presented the District's Fiscal Year 2024-2025 tentative budgets. A copy of his presentation is attached to these minutes.

Mr. Entsminger began by providing highlights from the Las Vegas Valley Water District's 2023-2024 Fiscal Year which included launching new assistance programs for customers, reconfiguring assets to reduce average customer call wait times, constructing a new reservoir and pumping station on the west side of the valley, and updating customer's *My Account* settings to show water use. He gave an overview of 2024-2025 major capital expenditures, and an overview of the 2024-2025 budget. The LVVWD budget overview stated that the sources of funds reflect approved inflationary increases, that the Operating Budget is flat, that the Capital Budget is down by 30 percent, and that the Excessive Use Charge revenues do not fund general operating and remain committed for conservation-related initiatives. Mr. Entsminger also highlighted the total sources and uses of operating funds, gave a capital budget summary, and an outlook of the District's positive financial reserve balance.

Mr. Entsminger presented the Big Bend Water District's Fiscal Year 2024-2025 tentative budget. A copy of his presentation is attached to these minutes. He mentioned that the Big Bend Water District system is in a financial deficit and the organization will need to engage with the community to find solutions to help increase revenues, as the system's operating costs are not being met by the current rate structure.

Mr. Entsminger presented the Coyote Springs Water Resources District's Fiscal Year 2024-2025 tentative budget. A copy of his presentation is attached to these minutes.

Vice President Gibson opened the Public Hearing for the Tentative Budgets for the Las Vegas Valley Water District, the Coyote Springs Water Resources District, and the Big Bend Water District. Vice President Gibson asked for clarification for the public on how the revenue of the Excessive Use Charge is segregated. Mr. Entsminger stated that the District has strict controls on segregating that money and revenues received from those charges will be used on conservation measures, but added that not all future conservation programs have been deployed. Director Segerblom asked if this is additional conservation money, to which Mr. Entsminger affirmed. Director Segerblom asked if the District could make this information available to the public and perhaps included on the website. Kevin Bethel, Chief Financial Officer, stated that the budget documents currently include a separate line that says *EUC Deployment*. Vice President Gibson asked about clarification on the Spring Preserve's budget. Mr. Entsminger stated that the District contributes capital dollars to the Springs Preserve. He also added that it is more than an attraction, noting that the site includes important infrastructure of the overall water system and there are roughly 15 million gallons of storage, active production wells, and a pumping station on site. Vice President Gibson then opened the hearing to the public for comment.

Louis Grandieri stated that there has been no consideration for those who have pools. He stated that when a pool is drained into the sewer system, that water is returned to the lake, and there should be consideration for customers who then need to refill their pools, stating that receiving a fine to do so is unfair. He said it is not water waste because the drained water is returned to the system.

Laura McSwain asked if she could be directed to the meeting where the leak assistance program was approved. She is concerned with the Excessive Use Charges being deployed knowing the damage caused within the community. She stated that the District is only spending this revenue to legitimize it. She restated that the District is operating outside of its charter and should only charge rates based on a reasonable amount to deliver water.

Pete Foley stated that the District is supposed to charge customer rates based on the cost to deliver water. He asked why an excess of more than \$100 million is in the targeted reserves and stated that the District is skimming that money from the public. He asked for more transparency in the budget documents.

Andrew Reitz, 1912 Bluejay Circle, mentioned a past meeting where he spoke about his neighborhood being over pressurized and the District's responsibility to address the issue, but noted that no one in his neighborhood has been contacted. He stated that he has a neighbor with multiple people living in the home and said that they are doing what they can to reduce water use but are still receiving the Excessive Use Charge. He stated that he has checked the meter and no leak was found.

As there were no additional comments, Vice President Gibson closed the hearing.

Director Naft made a motion to adopt the final budgets for the Las Vegas Valley Water District, the Coyote Springs Water Resources District, and the Big Bend Water District for fiscal year 2024/25. The motion was approved.

**COMMENTS BY THE GENERAL PUBLIC**

Carol Reynolds, 2740 Mann St., stated that she would like to know what environmental research was conducted prior to implementing the Excessive Use Charge. She spoke about the wildlife that needs water and landscaping to survive.

Diane Henry, 7525 Coley Ave., stated that the real time water usage information that the District has highlighted in past meetings is always a few days behind real-time. She stated that the app is not user friendly, and that the data is not in real-time and not really useful.

Ross Newman, Las Vegas, stated that in 2014, the District participated in a hydrogel study at Fresno State to research lowering water usage for outdoor vegetation. He said that hydrogel technologies have advanced in the past 10 years and would like to know who to contact at the District about these studies.

Laura McSwain asked if a third-party organization is involved in the District's Water Quality Reporting. She recently researched installing a water filtration system into her home and stated that the water quality testing results performed by installer were scary. She stated that a third-party's involvement to monitor water quality is in order. She mentioned that the City of Henderson is removing grass and trees in one of its parks and asked why those trees are not being able to live out their natural lives and provide shade to the community.

Pete Foley estimates the District's marketing budget to be between \$5-\$10 million, but stated that it is hard to find that information. He stated that the nature of the marketing is highly confrontational and aggressive to the customer base. He talked about the approach of the District's social media and mentioned that he was recently responded to inappropriately by the District's social media team.

Louis Grandieri stated that he received a water waste notice in the mail and when he inquired about it, he was told that his usage on Sunday suggested that he was watering his lawn, which is against water restrictions. He stated that he was refilling his pool and that the District wrongly assumed what he was doing with his water use.

**Adjournment**

There being no further business to come before the board, the meeting adjourned at 1:47 p.m.

**Copies of all original agenda items and minutes, including all attachments, are on file in the General Manager's office at the Las Vegas Valley Water District, 1001 South Valley View Boulevard, Las Vegas, Nevada.**

# Public Comment received for the 5/20/24 LVVWD Board of Directors Meeting

**From:** [Lou Grandieri](#)  
**To:** [&PublicComment](#)  
**Cc:** [Water Fairness Coalition](#); [Louis Grandieri](#)  
**Subject:** {External} Public Comment For May 20, 2024 LVVWD BOD Meeting  
**Date:** Sunday, May 19, 2024 11:44:02 PM  
**Attachments:** [Using Trees and Vegetation to Reduce Heat Islands US EPA - Updated 10-31-2023.pdf](#)  
[Heat Island Impacts US EPA - Updated 08-28-2023.pdf](#)

Some people who received this message don't often get email from grandieri@gmail.com. [Learn why this is important](#)

Dear Sirs;

## **PUBLIC COMMENT** **LVVWD Board Mtg <[publiccomment@lvvwd.com](mailto:publiccomment@lvvwd.com)>**

With the implementation of water saving programs and restrictions on Las Vegas residents,  
I have many questions for the Las Vegas Valley Water District Board.

When you make changes to the greenscape of the Las Vegas Valley, there are other changes that factor into the impact.  
It's not a simple answer to save water by eliminating (or ignoring) what green landscape plays in the environment.

Did the LVVWD do an Environmental Impact Study prior to implementing the landscape removal program?  
If yes, what long-term impact did the study show would be a result of green lawns and landscape removal?

How much of an impact will the continued removal of grass, shrubs and trees have on the Las Vegas Valley residents?

### **EPA Study: "Using Trees and Vegetation to Reduce Heat Islands | US EPA"**

LAST UPDATED ON OCTOBER 31, 2023

"Research shows that urban forests have temperatures that are on average 2.9°F lower than unforested urban areas."

<https://www.epa.gov/heatislands/using-trees-and-vegetation-reduce-heat-islands>

### **EPA Study: 'Heat Island Impacts'**

LAST UPDATED ON AUGUST 28, 2023

Elevated temperatures from heat islands can affect a community's environment and quality of life in multiple ways.

<https://www.epa.gov/heatislands/heat-island-impacts>

What impact will the temperature increase be on the entire Las Vegas Valley, as you continue to remove landscapes to save water?

What is the impact on CO2 levels as you promote removal of the green areas in the LV Valley?

How much more electricity will be needed for Air Conditioning as a result of removing more green areas?

What is the impact on the electric supply and grid infrastructure as more cooling is needed by everyone?

What is the air quality impact on the valley after the removal of ornamental grass and shrubs under the current landscape reduction program? Has a study been conducted?

How much more money will be required for Flood Control water runoff, since there be more water runoff due to the removal of water absorbing green landscape?

I feel that little thought was given to the environmental impact on the valley when implementing the landscape removal program.

Also, the water restrictions implemented have an impact on maintaining green areas needed to reduce heat in the valley.


You can't continue to hard-scape the entire Las Vegas Valley and think it has no impact on residents' health.

There should be a moratorium on any further landscape conversions until an Environmental Impact Study is completed and reviewed.

Stop the insane thinking that water conservation has no impact on other factors that need consideration.

Don't turn Las Vegas into a dust bowl so you can build more hotels, casinos and stadiums.

Sincerely,  
Louis Grandieri, Jr.  
279 Broadcast Avenue  
Las Vegas, NV 89183-3527

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## Heat Islands

[CONTACT US](https://epa.gov/heatislands/forms/contact-us-about-heat-islands)

# Using Trees and Vegetation to Reduce Heat Islands

Trees and other plants help cool the environment, making vegetation a simple and effective way to reduce urban heat islands.

Trees and vegetation (e.g., bushes, shrubs, and tall grasses) lower surface and air temperatures by providing shade and cooling through evaporation and transpiration, also called evapotranspiration. Transpiration is a process in which trees and vegetation absorb water through their roots and cool surroundings by releasing water vapor into the air through their leaves. Trees and vegetation also provide cooling through evaporation of rainfall collecting on leaves and soil. Research shows that urban forests have temperatures that are on average 2.9°F lower than unforested urban areas.<sup>1</sup>

Trees and vegetation are most useful as a mitigation strategy when planted in strategic locations around buildings or to shade pavement in parking lots and on streets. Researchers have found that planting deciduous trees or vines to the west is typically most effective for cooling a building, especially if they shade windows and part of the building's roof.

### Trees and Vegetation Resources

- [Heat Island Compendium](https://epa.gov/heatislands/heat-island-compendium)
- [Related Webcasts](https://epa.gov/heatislands/heat-island-webinars)
- [What Communities are Doing](https://epa.gov/heatislands/what-communities-are-doing-reduce-heat-islands)

# Benefits and Costs

The use of trees and vegetation in the urban environment brings benefits beyond mitigating urban heat islands including:

- *Reduced energy use:* Trees and vegetation that directly shade buildings decrease demand for air conditioning.
- *Improved air quality and lower greenhouse gas emissions:* By reducing energy demand, trees and vegetation decrease the production of associated air pollution and greenhouse gas emissions. They also remove air pollutants and store and sequester carbon dioxide.
- *Enhanced stormwater management and water quality:* Vegetation reduces runoff and improves water quality by absorbing and filtering rainwater.
- *Reduced pavement maintenance:* Tree shade can slow deterioration of street pavement, decreasing the amount of maintenance needed.
- *Improved quality of life:* Trees and vegetation provide aesthetic value, habitat for many species, and can reduce noise.

The primary costs associated with planting and maintaining trees or other vegetation include purchasing materials, initial planting, and ongoing maintenance activities such as pruning, pest and disease control, and irrigation.

A study of urban forestry programs in five U.S. cities showed a range of expenditures: annual costs ranged from almost \$15 per tree in the Desert Southwest region to \$65 per tree in Berkeley, California. Pruning was often the greatest expenditure, accounting for roughly 25–40% of total annual costs (approximately \$4–\$20/tree). Administration and inspection costs were the next largest

- Related Links on Trees and Vegetation  
<<https://epa.gov/heat-islands/heat-island-related-links#trees>>



Shading in parking lot medians can provide extensive shading coverage. (Photo courtesy of E.G. McPherson)

expenditure, ranging from approximately 8–35% of annual expenditures (about \$4–\$6/tree). Tree planting, surprisingly, accounted for just 2–15% of total annual urban forestry expenditures (roughly \$0.50–\$4/tree) in these cities.<sup>2</sup>

Although the benefits of urban forestry can vary considerably by community and tree species, they are almost always higher than the costs. The five-city study discussed above found that, on a per-tree basis, the cities accrued benefits ranging from about \$1.50–\$3.00 for every dollar invested. These cities spent roughly \$15–\$65 annually per tree, with net annual benefits ranging from approximately \$30–\$90 per tree.<sup>2</sup>

## For More Information

More details are available in Chapter Two <<https://epa.gov/heatislands/heat-island-compendium>> of EPA's *Reducing Urban Heat Islands: Compendium of Strategies*, which covers the following topics:

- How trees and vegetation reduce temperatures
- The benefits and costs associated with trees and vegetation
- Other factors to consider when using trees and vegetation
- Urban forestry initiatives
- Tree and vegetation tools and resources

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## References

1. Knight, T., S. Price, D. Bowler, et al. 2021. How effective is 'greening' of urban areas in reducing human exposure to ground-level ozone concentrations, UV exposure and the 'urban heat island effect'? An updated systematic review [🔗](https://doi.org/10.1186/s13750-021-00226-y) <<https://doi.org/10.1186/s13750-021-00226-y>>. *Environmental Evidence* 10, 12.
2. McPherson, E.G., J. R. Simpson, P. J. Peper, S. E. Maco, and Q. Xiao. 2005. Municipal forest benefits and costs in five US cities (PDF) [🔗](https://www.fs.usda.gov/psw/publications/mcpherson/psw_2005_mcpherson003.pdf) <[https://www.fs.usda.gov/psw/publications/mcpherson/psw\\_2005\\_mcpherson003.pdf](https://www.fs.usda.gov/psw/publications/mcpherson/psw_2005_mcpherson003.pdf)> (6 pp, 267K). *Journal of Forestry* 103(8):411–416.



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[Heat Island Home <https://epa.gov/heatislands>](https://epa.gov/heatislands)

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[Learn About Heat Islands <https://epa.gov/heatislands/learn-about-heat-islands>](https://epa.gov/heatislands/learn-about-heat-islands)

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[What are the Impacts? <https://epa.gov/heatislands/heat-island-impacts>](https://epa.gov/heatislands/heat-island-impacts)

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[Climate Change and Heat Islands <https://epa.gov/heatislands/climate-change-and-heat-islands>](https://epa.gov/heatislands/climate-change-and-heat-islands)

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[Heat Islands and Equity <https://epa.gov/heatislands/heat-islands-and-equity>](https://epa.gov/heatislands/heat-islands-and-equity)

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[Heat Island Compendium <https://epa.gov/heatislands/heat-island-compendium>](https://epa.gov/heatislands/heat-island-compendium)

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[Measuring Heat Islands <https://epa.gov/heatislands/measuring-heat-islands>](https://epa.gov/heatislands/measuring-heat-islands)

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[Resources <https://epa.gov/heatislands/heat-island-resources>](https://epa.gov/heatislands/heat-island-resources)

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[Reduce the Risks <https://www.epa.gov/heatislands/reduce-heat-island-risks>](https://www.epa.gov/heatislands/reduce-heat-island-risks)

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[Cooling Strategies <https://www.epa.gov/heatislands/heat-island-cooling-strategies>](https://www.epa.gov/heatislands/heat-island-cooling-strategies)

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[What Communities are Doing <https://www.epa.gov/heatislands/what-communities-are-doing-reduce-heat-islands>](https://www.epa.gov/heatislands/what-communities-are-doing-reduce-heat-islands)

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[Community Actions Database <https://www.epa.gov/heatislands/heat-island-community-actions-database>](https://www.epa.gov/heatislands/heat-island-community-actions-database)

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[Local Heat Equity Examples <https://www.epa.gov/heatislands/local-heat-equity-examples>](https://www.epa.gov/heatislands/local-heat-equity-examples)

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[What EPA is Doing <https://www.epa.gov/heatislands/what-epa-doing-reduce-heat-islands>](https://www.epa.gov/heatislands/what-epa-doing-reduce-heat-islands)

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[What You Can Do <https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands>](https://www.epa.gov/heatislands/what-you-can-do-reduce-heat-islands)

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[Contact Us <https://epa.gov/heatislands/forms/contact-us-about-heat-islands>](https://epa.gov/heatislands/forms/contact-us-about-heat-islands) to ask a question, provide feedback, or report a problem.

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## Heat Islands

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# Heat Island Impacts

Elevated temperatures from heat islands [can affect a community's environment and quality of life in multiple ways.](https://epa.gov/heatislands/learn-about-heat-islands)

On this page:

- Increased Energy Consumption
- Elevated Emissions of Air Pollutants and Greenhouse Gases
- Compromised Human Health and Comfort
- Impaired Water Quality

## Increased Energy Consumption

Heat islands increase demand for air conditioning to cool buildings. In an assessment of case studies spanning locations in several countries, electricity demand for air conditioning increased approximately 1–9% for each 2°F increase in temperature. Countries where most buildings have air conditioning, such as the United States, had the highest increase in electricity demand.<sup>[1]</sup> This increase demand contributes to higher electricity expenses.

Heat islands increase both overall electricity demand, as well as peak energy demand. Peak demand generally occurs on hot summer weekday afternoons, when offices and homes are running air-conditioning systems, lights, and appliances. During extreme heat events, which are exacerbated by heat islands, the increased demand for air conditioning can overload systems and require a utility to institute controlled, rolling brownouts or blackouts to avoid power outages.<sup>[2],[3]</sup>

# Elevated Emissions of Air Pollutants and Greenhouse Gases

As described above, heat islands raise demand for electricity in summer. Companies that supply electricity typically rely on fossil fuel power plants <https://epa.gov/airmarkets> to meet much of this demand, which in turn leads to an increase in air pollutant and greenhouse gas <https://epa.gov/ghgemissions> emissions.

These pollutants are harmful to human health and also contribute to complex air quality problems such as the formation of ground-level ozone <https://epa.gov/ground-level-ozone-pollution> (smog), fine particulate matter <https://epa.gov/pm-pollution>, and acid rain <https://epa.gov/acidrain>. Increased use of fossil-fuel-powered plants also increases emissions of greenhouse gases, such as carbon dioxide, which contribute to global climate change <https://nca2018.globalchange.gov/>.

In addition to their impact on energy-related emissions, elevated temperatures can directly increase the rate of ground-level ozone formation. Ground-level ozone is formed when nitrogen oxides and volatile organic compounds <https://epa.gov/indoor-air-quality-iaq/technical-overview-volatile-organic-compounds> react in the presence of sunlight and hot weather. If all other variables are equal, such as the level of precursor emissions in the air and wind speed and direction, more ground-level ozone will form as the environment becomes sunnier and hotter.

## Compromised Human Health and Comfort

Heat islands contribute to higher daytime temperatures, reduced nighttime cooling, and higher air-pollution levels. These, in turn, contribute to heat-related deaths <https://epa.gov/climate-indicators/climate-change-indicators-heat-related-deaths> and heat-related illnesses <https://epa.gov/climate-indicators/heat-related-illnesses> such as general discomfort, respiratory difficulties, heat cramps, heat exhaustion, and non-fatal heat stroke.

Heat islands can also exacerbate the impact of naturally occurring heat waves, which are periods of abnormally hot, and often humid, weather. Sensitive populations are particularly at risk during these events.

- *Older adults* are among the most vulnerable to extreme heat events. Many physiological, psychological, and socioeconomic factors contribute to this danger. Older adults are more likely to be in poor health, to be less mobile and more isolated, to be more sensitive to high heat, and to live on reduced incomes.<sup>[4]</sup>
- *Young children* tend to be more susceptible to extreme heat due to their small size and other characteristics. Children's more rapid breathing rates relative to body size, time spent outdoors, and their developing respiratory systems raise their chances of aggravated asthma and other lung diseases caused by ozone air pollution and smog, which usually increases during heat waves.<sup>[5]</sup>
- *Populations with low-income* are at greater risk of heat-related illnesses due to poor housing conditions, including lack of air conditioning and small living spaces, and inadequate resources to find alternative shelter during a heat wave.<sup>[5]</sup>
- *People who spend their working hours outdoors* are more prone to conditions such as heat exhaustion and heat stroke. They have higher exposures to ozone air pollution and heat stress, especially if work tasks involve heavy exertion.
- *People in poor health*, including people with chronic conditions, disabilities, mobility constraints, and those taking certain medications, are vulnerable to extreme temperatures. People with diabetes, physical impairments, and cognitive deficits are especially at risk during heat waves.<sup>[5]</sup>

Excessive heat events, or abrupt and dramatic temperature increases, are particularly dangerous and can result in above-average rates of mortality. From 2004 to 2018 the Centers for Disease Control and Prevention recorded 10,527 heat-related deaths in the United States, an average of 702 per year. These numbers include deaths where heat was the underlying cause and deaths where heat was a contributing cause.<sup>[6]</sup>

## Impaired Water Quality

High temperatures of pavement and rooftop surfaces can heat up stormwater runoff, which drains into storm sewers and raises water temperatures as it is released into streams, rivers, ponds, and lakes. Water temperature affects all aspects of aquatic life, especially the metabolism and reproduction of many aquatic species. Rapid temperature changes in aquatic ecosystems resulting from warm stormwater runoff can be particularly stressful, and even fatal, to aquatic life.

One study found that urban streams are hotter on average than streams in forested areas, and that temperatures in urban streams rose over 7°F during small storms due to heated runoff from urban materials.<sup>[7]</sup>

Green infrastructure <https://epa.gov/green-infrastructure> is one option to cool stormwater runoff and improve water quality. It can include the use of downspout disconnections, rain gardens, planter boxes, bioswales, permeable pavements, green streets and alleys, green parking, and green roofs; as well as land conservation efforts.

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[1] Santamouris, M. 2020. Recent progress on urban overheating and heat island research. Integrated assessment of the energy, environmental, vulnerability and health impact. Synergies with the global climate change [↗](#)

<https://doi.org/10.1016/j.enbuild.2019.109482>. *Energy and Buildings* 207:109482.

[2] Maxwell, K., S. Julius, A. Grambsch, A. Kosmal, L. Larson, and N. Sonti. 2018. Built environment, urban systems, and cities [↗](#) <https://nca2018.globalchange.gov/chapter/11/>. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC. pp. 438–478.

[3] Zamuda, C., D.E. Bilello, G. Conzelmann, E. Mecray, A. Satsangi, V. Tidwell, and B.J. Walker. 2018. Energy supply, delivery, and demand [↗](#) <https://nca2018.globalchange.gov/chapter/4/>. In *Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II* [Reidmiller, D.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, K.L.M. Lewis, T.K. Maycock, and B.C. Stewart (eds.)]. U.S. Global Change Research Program, Washington, DC. pp. 174–201.

[4] Gamble, J.L., B. J. Hurley, P.A. Schultz, W.S. Jaglom, N. Krishnan, and M. Harris. 2013. Climate Change and Older Americans: State of the Science. [↗](#)

<https://doi.org/10.1289/ehp.1205223> *Environmental Health Perspectives* 121(1): 15-22.

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