

Media

Introduction

Pop quiz! True or False?

Environmental education is not required in most public schools in the United States.

Many schools do not have the funding for hands-on activities.

There are communities in the United States that don't have clean water.

Think about it for a second.

Well, if you said they're all true, you'd be correct!

Our vision is to educate the youth about good water conservation practices so that they implement these habits in their home. Looking at the bigger picture, we want to influence this new generation to be knowledgeable about water and combat climate change. We have orchestrated our own water fair at JJK Academy with students aged 8-10. We had 4 stations that focused on water conservation vocabulary, soil, water runoff, and water filtration. By participating in water fairs, children are exposed to water conservation exercises and will want to take pride in conserving their Earth.

This is important to the St. Louis area because it is located on a flood plain. Not only is this area on a flood plain, it also has a heavily industrial background. The pipes that are underground are deteriorating over time and are not sustainable during heavy rains. Areas in Illinois like Cahokia Heights (formerly Cahokia, Centreville, and Alorton) and East St. Louis face sewage flooding into their yards. The [Community-Oriented Digital Engagement Scholars \(CODES\)](#) at SIUE partnered with the [Jackie Joyner-Kersey Food, Agriculture, Nutrition, and Innovation Center](#) to look deeper into this issue. We are six students from this program that work with after-school kids at the [Jackie Joyner-Kersey \(JJK\) Academy](#) in East St. Louis.

We have conducted two years of research about this wicked water equity issue. We have interviewed local educators and organizations, surveyed nearly 200 educators regarding their part in water conservation education, and learned from SIUE's own STEM Center faculty about what it takes to develop lesson plans. Soaking in all this information and seeking a game plan, we visited the Illinois State Capitol where we spoke with legislators about our findings. We decided to tackle after school programming which has less regulations. Read further to learn about the steps we took to, ultimately, orchestrate our very own water fair!

Survey

Our first semester in CODES was spent defining our “wicked” problem. They call it a wicked problem because it is so deep and multifaceted. We asked ourselves questions like, “What are stakeholders and who are they in this situation?” and “What does this flooding issue look like along the Southern American Bottom?”. Not too long after our first introduction, we were itching to find out more.

During just our second semester in CODES, we immersed ourselves in research, gathering data, and overall familiarizing ourselves with our wicked problem. In doing this, we created a survey aimed toward educators. We titled this “Teachers’ Perspectives on Water Conservation Education”. We wanted to see what educators were or weren’t doing about this crisis, but also get a feel for their classroom environment. Our survey questions were mostly multiple choice, but ended with a few free responses. We received 196 total responses. The majority of our responses came from those who interacted with sixth through eighth grade students.

Across the board, educators agreed that hands-on labs and experiments work best for engaging students. However, when asked if they implement water conservation topics into their classes, the majority said no. If they responded no, the next question asked why not. The emerging themes were lack of awareness, lack of funding, and outstanding curriculum requirements, all preventing educators from implementing water conservation into their classrooms. This was eye-opening, and arguably the most important takeaways. We took this information and presented it at SIU System Day at the Illinois State Capitol. We spoke with legislators about the curriculum requirements as well as the sparse funding and will be following up with another visit in March 2026.

Zach Interview

On top of constructing a survey, we also interviewed a local educator, Zach, who also works with after school kiddos at the Jackie Joyner-Kersey Academy. [Here](#) you can find the full transcription of the interview.

We asked questions regarding how the kids at the academy learn and what changes are feasible to their after-school program. There were many themes that emerged, but a few outshone the others. For example, technological advancement was one recurring theme. Zach said on multiple occasions that he'd like to utilize technology and potentially drones to help kids visualize these water conservation issues, "Drones! That's what I'm trying to get right now. We have a good drone program, it's probably one of my favorite ones. And I've been trying, begging and begging for a thermal imaging drone. And just no luck, no funding... I think stuff like that, that's easy for kids to understand, where they can automatically pull up a chart, I think is great."

Another theme is activity characteristics for the after-school program. He wants these activities to be hands-on and science-forward. Zach said, "I think water conservation hits a lot, and science. They're not the focus kind of test scores. It's really math and reading, right?" which explains his frustration with the lack of science education requirements in the state. The last theme is what is important to these kids and what they take away when they go home. He wants to influence these kids to tie what they learn in his space to their homes, hoping they make a difference in their community.

Dr. Dexheimer Lessons

One of our last steps in our research semester was visiting SIUE's STEM Center. We met with the head of the center, Andrea Dexheimer, who is a research biologist at SIUE. She talked to us about all the things that go into finding and/or creating lesson plans such as Bloom's Taxonomy. This was especially helpful for both those who constructed water fair activities as well as plans for the water fair toolkit.

Water Fair Overview

After a year of researching and brainstorming, we decided to host a water fair at the Jackie Joyner-Kersey Academy. There were 4 stations: “The Magic of Water Filtration”, “The Dirt Detective”, “Runoff with Water Knowledge”, and “Water Word Wonders”.

The Magic of Water Filtration - JR

This project was created by Justin Richerson, and he created “The Magic of Water Filtration.” It started when he wanted to make a simple inexpensive project that portrayed an aspect of Water Filtration, when the idea was floated that I should make it about water filtration, after confirming this as a good idea with his peers and the community partners, he had set the research into motion and found several sources detailing the process, using materials such as a soda bottle, sand, pebbles of varying sizes, and cottonballs, it was also preferable that all these items were very inexpensive and easy to find/be supplied with. After the construction of the Simple water filter, it was ready for presentation.

His part of the Water Fair was essentially about water filtration and its effects on the environment. It had been constructed using a simple model of the water filter, using a bottle and some other relatively inexpensive materials. Then, he decided to make an activity out of it using a large notepad and drew an example of the water filter, and had the kids describe each layer of the simple water filter. It was meant for the students to comprehend what they had previously taught and bring their own ideas into it.

While there were some hiccups, Zach and Kurly loved the idea and the execution of it, so I would deem this project a rousing success.

Even during some trials and tribulations, including when the actual bottle fell over, and I had been worried about my project, Zach had reassured me that these kinds of mishaps happen, especially when lesson planning, even more especially given I had only two prior teaching simulations with the children of JJK, who I am now realizing were likely fresh out of a school day and had been letting off loose energy and that is likely why they weren't listening as well.

This had comforted me because I had originally been worried myself till I was sick if something would have gone wrong, but the way

The Dirt Detective - MR

My station at the water fair was the Dirt detective. During this station students were tasked with identifying different types of soils and writing down descriptors of these soils. This lesson was made after a culmination of different lesson plans that were interactive and kept kids engaged. The purpose of this was to educate kids on basic water knowledge and promote more involvement in gardens. Specifically, the garden around my students at JJK because they have a greenhouse. With more soil knowledge kids will be more inclined to grow their own food or understand how the plants around them are grown. This lesson also serves as an interactive lesson plan that could be replicated at different schools and after school programs.

Runoff with Water Knowledge - SS

My name is Sonia Sheryr and I created my lesson plan called Runoff with Water Knowledge. I plan on researching secondary sources regarding rain gardens, pollutants and other obstructions, and runoff water. I will include more evidence in my lesson plan and tailor it efficiently for my specific target audience to help convey the importance of runoff water in water conservation. It is also important to put into perspective how this one lesson plan can help picture the water cycle and runoff while understanding its functions and roles.

Water Word Wonders - AG

Water Words Wonders is a game that I, Alexandra created inspired by a fun and interactive approach to learning terms related to water conservation. When I started my research on water conservation education for young kids, I couldn't find many fun activities to teach them about water sustainability, taking care of water, and key terms related to this topic. So, the idea of making a game that was both fun and low-cost came to mind. After looking into different possible games, I decided on a matching game where kids match a definition to a card that includes a word and a picture. The picture helps kids better understand the words. Another thing I considered is that the game can be easily modified for older or younger kids, but for my version, it was made specifically for 5 to 12 year olds.

Water Fair Toolkit - PP

After our water fair concluded, we were able to dissect what went well and what areas could use improvement. One of our group members, Payton Plummer, constructed a water fair toolkit. This is a guide for other communities to implement similar events. She wanted to analyze the CODES water fair on a bigger scale.

She began by brainstorming topics that would encompass our goals but also that would be age appropriate and easily digestible. She created a google doc with different tabs, starting with a “Read Me” file– consisting of an overview and instructions for navigation. Another tab is labeled “Logistics” which covers the planning details it takes to create a water fair. The next tab is “CODES Water Fair” where there is a detailed description of all things that went into constructing the water fair that inspired it all. The remaining tabs are the topics covered: Water Equity, Water Conservation, Water Filtration, Community Gardens, and Flooding. Within each topic, there are four more tabs: Overview, Photos, Instructions, and Materials. Each topic has hands-on activities that would have a lasting impact on the participants and lead them to think more about water.

We have been working alongside the Jackie Joyner-Kersey Food, Agriculture, Nutrition, and Innovation Center in East St. Louis, especially with local educators, Zach and Kurly. Zach and Kurly were able to attend our water fair and give us good feedback, which was incorporated into the toolkit also. Payton hopes that this toolkit can be distributed to other communities to raise a new generation of students to make good decisions regarding water.

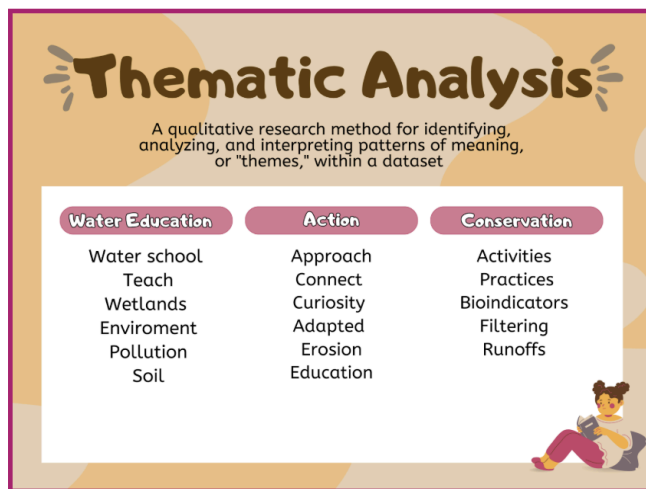
Water Fair Tips and Tricks

<https://eportfolio.siu.edu/marques-rutlin/617-2/>

This presentation will be used as a resource for teachers that would like to implement our water fair into their school curriculum or after school program. This presentation will help guide teachers in using each lesson plan to the best of its ability for students. Our ultimate goal is to implement more water infrastructure education for youth in East St. Louis, influencing a new generation to become further aware of issues regarding all-around water infrastructure. The purpose of this presentation will be to go over each lesson in the water fair tool kit and explain what went well, and things we can work on to make the lesson plan better.

Org Interviews - TD

Our 2025 Water Fair project was an event cultivated to expose K-8 students with water conservation practices. The goal was to ensure that students could go home with an idea on how to perform these practices. More specifically, my part in this research was to investigate the methods that organizations use to inform the public about water conservation. This process took about approximately a month to interview and decode them. With that being said, I was able to interview 3 staff members in the education department about the methods that they use. They began to explain their relationship between local school districts as it regards teaching science curriculum. Furthermore, staff members shared that they supply teachers with materials such as soil to help immerse students into the learning experience. Through this process, I was able to create a thematic analysis based off the words that were repeated the most.



More specifically, the thematic analysis can be outlined by three categories which include water education, action and conservation. All three of these categories demonstrate the process of dividing the most used words into the group that closely relates. This allowed for us to understand the importance of the National Great River Center, we were able to apply these same

engaging techniques to our 2025 Water Fair. Along with this, I created a local organization poster that worked to shed spotlight on the National Great River Center. The purpose of the poster is

We had four stations where students were able to take different things from. Ultimately, the experience allowed for students to take away positive water conservation practices that can

LOCAL ORGANIZATION
NATIONAL GREAT RIVER
CENTER

BACKGROUND

The organization's mission is to study large rivers and their watersheds (especially the Mississippi, Illinois, Missouri rivers), and to study how those rivers interact with the natural environment and with surrounding human communities

IMPACT

- Improved river and water-quality research → healthier drinking water, safer recreation, and better floodplain management
- Educational outreach → children and neighbors can learn about watershed stewardship, ecology, and conservation
- Community-science programs → opportunities for local citizens to get involved in environmental care

WANT TO GET INVOLVED?

- Join Community Science Programs
- Attend or Volunteer at the Annual Water Festival
- Join Local River Cleanups
- Become a Watershed Ambassador

be applied to daily life.

Conclusion

All in all, us six sophomores are feeling bittersweet wrapping up our final CODES Project. We have all played an important role in this research and implementation, but we couldn't do it without our research team professor, Dr. Adriana Martinez. She has been an incredible mentor, guiding us every step of the way. We are beyond grateful to have had her support, guidance, and all-willingness to collaborate with us, starting when we were six baby freshmen away from their homes for the first time.

Our next step for this water education is to distribute our work to other communities. We are still working with Kurly, the Strategic Partnership Manager at JJK, who is interested in continuing this education. We want to reach other communities in different areas who are experiencing the same wicked problem we are.

Defining Wicked

Define wicked

A “wicked problem” is defined as a problem that spans many different areas; therefore, it doesn’t have an exact solution because one change can affect another part of the overall problem, leaving it unsolved. Through our investigation into water conservation concentrated in young education, K-8th, we came across the wicked problem in our research it was the lack of research and information on why schools don’t teach water conservation or why it is not part of their curriculum Either. As we connect problems related to this wicked problem, we face the challenges that are stopping or preventing water conservation in schools are lack of lessons, funding, and support. Most of the research was done throughout our different CODEs classes the past two years with our partners JJKFAN Academy in east st louis, where we visited a few times, giving us a deeper understanding of what the academy after school program is like and what they were looking for us to add to it. Our project aims to address the “wicked” problem of the lack of water conservation education taught in K-8 schools. By using our research and building knowledge in water conservation with an educational focus, we created a water fair with four fun, interactive lessons, helping children develop an understanding of what water conservation is and the different areas that relate to it. Another member of our group, Payton, focuses on creating a toolkit with more information that educators can use in the classroom to teach water conservation. And the last member looked into the interview surroundings, places that could potentially help or offer programs and activities in water conservation education. That will show as an example to the public that there is a lack of education and activities surrounding water conservation. We hope that our research and water fair demonstrate that there are fun and interactive ways to approach teaching, and that water conservation is so important to our lives. Understanding why it needs to be taught from a young age can benefit our future and current water resources if change happens.

A “wicked problem” is defined as a problem that spans many different areas; therefore, it doesn’t have an exact solution because one change can affect another part of the overall problem, leaving it unsolved. Based on our investigation into the surrounding lack of education in water conservation in schools, our project responds to the wicked problem of water conservation not being taught in school by using research; based to create and implement lessons that were fun and interactive for kids k-8th in a water fair. Giving us the opportunity to try out the lessons with kids and have a better understanding of how educators would teach this topic and how kids will interact and learn. Overall, we hope to inspire other schools to see the importance of teaching water conservation to young kids, as it can make a difference in our future water resources.

Final

Link to my eportfolio!! <https://eportfolio.siu.edu/payton-plummer/emplance-contribution-1/>

Empowering Change Through Water Education

Pop quiz! True or False?

Over the past 40 years the world's population has doubled. Our use of water has quadrupled. Yet the amount of water on Earth has stayed the same.

30% of pipes in systems that deliver water to more than 100,000 people are between 40 and 80 years old.

Out of 118 water samples taken in Cahokia Heights, eight were contaminated with E.coli.

Think about it for a second.

Well, if you said they're all true, you'd be correct!

Meet our crew!



Alexandra Guerrero

Public Health

“Water Word Wonders”



Justin Richerson

Biology

“The Magic of Water Filtration”



Marques Rutlin

Music Education

“The Dirt Detective”



Payton Plummer

Business Administration

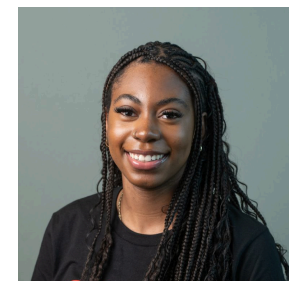
Water Fair Toolkit



Sonia Sheryr

Biology

“Runoff with Water Knowledge”



Tamiria Dixon

Social Work

Local Organization Interviews

Introduction

We are six students from the [Community-Oriented Digital Engagement Scholars \(CODES\)](#) at [Southern Illinois University Edwardsville \(SIUE\)](#) working to educate the youth about good water conservation practices in hopes that they implement these same water habits in their home. Looking at the bigger picture, we want to influence this new generation to be knowledgeable about water and combat climate change. We have orchestrated our own water fair at [Jackie Joyner-Kersee Academy \(JK Academy\)](#) with students aged 8-10. We had 4 stations that focused on water conservation vocabulary, soil, water runoff, and water filtration. By participating in water fairs, children are exposed to water conservation exercises and will want to take pride in conserving their Earth.

This is important to the St. Louis area because it is located on a flood plain. Not only is this area on a flood plain, it also has a heavily industrial background. The pipes that are underground are deteriorating over time and are not sustainable during heavy rains. Areas in Illinois like Cahokia Heights (formerly Cahokia, Centreville, and Alorton) and East St. Louis face sewage flooding into their yards.

What is a “Wicked Problem”?

A “wicked problem” is defined as a problem that spans many different areas; therefore, it doesn’t have an exact solution because one change can affect another part of the overall problem, leaving it unsolved. Based on our investigation into the surrounding lack of education in water conservation in schools, our project responds to the wicked problem of water conservation not being taught in school by using research; based to create and implement lessons that were fun and interactive for kids k-8th in a water fair. Giving us the opportunity to try out the lessons with kids and have a better understanding of how educators would teach this topic and how kids will interact and learn. Overall, we hope to inspire other schools to see the importance of teaching water conservation to young kids, as it can make a difference in our future water resources.



Project Summary

We have conducted two years of research about this wicked water equity issue. We asked ourselves, “How can the new generation become advocates for their community?” and “How can we shed light on areas like Cahokia Heights that face water inequity?” These questions kickstarted our research about water equity and youth education.

Community Partner

We partnered with the [Jackie Joyner-Kersey Food, Agriculture, and Nutrition Innovation Center \(JJK FAN\)](#) to help us tackle our wicked problem. They are a developing community focused on giving back to the community and making an impact on children in the area. We have been closely working with Zachary Stafford, Danforth STEAM+Ag Educator, and Kurly Taylor Jr., MPA, Strategic Partnership Manager. Zach and Kurly have been guiding us through dissecting our wicked problem. We first asked them what they needed from us, as JJK is now expanding. They expressed concern about hands-on activities with kids and getting them involved in their community.

Research Methods

We have interviewed local educators and organizations, surveyed nearly 200 educators regarding their part in water conservation education, and learned from SIUE’s own STEM Center faculty about what it takes to develop lesson plans. These methods were crucial in tackling our wicked problem because we were able to soak in all this information and seek a game plan. We decided to tackle after school programming which, we learned, has less regulations. Read further to learn about the steps we took to, ultimately, orchestrate our very own water fair!

During just our second semester in CODES, we immersed ourselves in research, gathering data, and overall familiarizing ourselves with our wicked problem. In doing this, we created a survey aimed toward educators. We titled this “Teachers’ Perspectives on Water Conservation Education”. We wanted to see what educators were or weren’t doing about this crisis, but also get a feel for their classroom environment. Our survey questions were mostly multiple choice, but ended with a few free responses. We received 196 complete responses. The

majority of our responses came from those who interacted with sixth through eighth grade students.

Across the board, educators agreed that hands-on labs and experiments work best for engaging students. However, when asked if they implement water conservation topics into their classes, the majority said no. If they responded no, the next question asked why not. The emerging themes were lack of awareness, lack of funding, and outstanding curriculum requirements, all preventing educators from implementing water conservation into their classrooms. What does this look like? In some cases teachers aren't prepared or equipped to give students hand-ons learning when it comes to water conservation education. Along with that, school districts might face budget obstacles or curriculum requirements. Click [here](#) to learn more about our survey results and findings

This was eye-opening, and arguably the most important takeaways. We took this information and presented it at SIU System Day at the Illinois State Capitol. We spoke with legislators about the curriculum requirements as well as the sparse funding and will be following up with another visit in March 2026.



Findings & Themes

On top of constructing a survey, we also interviewed Zach Stafford, who also works with after school kiddos at the Jackie Joyner-Kersey Academy. We asked questions regarding how the

kids at the academy learn and what changes are feasible to their after-school program. There were many themes that emerged, but a few outshone the others. For example, technological advancement was one recurring theme. Zach said on multiple occasions that he'd like to utilize technology and potentially drones to help kids visualize these water conservation issues, "Drones! That's what I'm trying to get right now. We have a good drone program, it's probably one of my favorite ones. And I've been trying, begging and begging for a thermal imaging drone. And just no luck, no funding... I think stuff like that, that's easy for kids to understand, where they can automatically pull up a chart, I think is great."

Another theme is activity characteristics for the after-school program. He wants these activities to be hands-on and science-forward. Zach said, "I think water conservation hits a lot, and science. They're not the focus kind of test scores. It's really math and reading, right?" which explains his frustration with the lack of science education requirements in the state.

The last theme is what is important to these kids and what they take away when they go home. He wants to influence these kids to tie what they learn in his space to their homes, hoping they make a difference in their community.

[Here](#) you can find the full transcription of our interview with Zach.

One of our last steps in our research semester was visiting SIUE's STEM Center. We met with the head of the center, Dr. Andrea Dexheimer, who was then a research biologist at SIUE. She talked to us about all the things that go into finding and/or creating lesson plans such as [Bloom's Taxonomy](#), which outlines the characteristics of learning outcomes. This was especially helpful for both those who constructed water fair activities as well as plans for the water fair toolkit.

CODES Water Fair

After a year of researching and brainstorming, we decided to host a water fair at the Jackie Joyner-Kersey Academy in October 2025. There were 4 stations, each outlined and facilitated by one of us CODE Scholars: "The Magic of Water Filtration" by Justin Richerson, "The Dirt Detective" by Marques Rutlin, "Runoff with Water Knowledge" by Sonia Sheryr, and

“Water Word Wonders” by Alexandra Guerrero. These stations were created to engage students hands-on while teaching them about water and good water practices.

Click [here](#) to read more about our water fair.

This water fair could be used as a resource for teachers that would like to implement our water fair into their school curriculum or after school program, but it was also helpful to one of our group members, Payton, as she constructed a Water Fair Toolkit for this same reason. This presentation will help guide teachers in using each lesson plan to the best of its ability for students. This presentation outlines each lesson in the water fair tool kit and explains what went well, and things we can work on to make the lesson plan better.



Water Fair Toolkit - Payton Plummer

After our water fair concluded, we were able to dissect what went well and what areas could use improvement. One of our group members, Payton Plummer, constructed a water fair toolkit. This is a guide for other communities to implement similar events. She wanted to analyze the CODES water fair on a bigger scale.

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Local Organizations Interviews - Tamiria Dixon

Tamiria’s focus in this research was to investigate the methods that organizations use to inform the public about water conservation. This process took about approximately a month to interview and decode. With that being said, she was able to interview 3 staff members in the education department about the methods that they use. They began to explain their relationship between local school districts as it regards teaching science curriculum.

Furthermore, staff members shared that they supply teachers with materials such as soil to help immerse students into the learning experience. Through this process, she was able to create a thematic analysis based on the words that were repeated the most. This allowed for her to understand the importance, just like the [National Great Rivers Research and Education Center](#), we were able to apply these same engaging techniques to our 2025 Water Fair. Ultimately, the experience allowed for students to take away positive water conservation practice that can be applied to daily life.



Conclusion

All in all, us six sophomores are feeling bittersweet wrapping up our final CODES Project. We have all played an important role in this research and implementation, but we couldn't do it without our research team professor, Dr. Adriana Martinez, Environmental Sciences professor and department chair at SIUE. She has been an incredible mentor, guiding us every step of the way. We are beyond grateful to have had her support, guidance, and all-willingness to collaborate with us, starting when we were six baby freshmen away from their homes for the first time.

Our next step for this water education is to distribute our work to other communities. We are still working with Kurly Taylor, who is interested in continuing this education. We want to reach other communities in different areas who are experiencing the same wicked problem we are.

Appendix

[Community-Oriented Digital Engagement Scholars \(CODES\)](#)

[Jackie Joyner-Kersee Academy \(JK Academy\)](#)

[Jackie Joyner-Kersee Food, Agriculture, Nutrition, and Innovation Center \(JJK FAN\)](#)

[National Great Rivers Research and Education Center](#)

[Read more about the CODES Water Fair](#)

[Southern Illinois University Edwardsville \(SIUE\)](#)

[Teachers' Perspectives on Water Conservation survey results](#)

Water Fair Toolkit (In progress)

[Zach Stafford interview transcription](#)

References

[This Black Town Has E. Coli in Its Drinking Water, but Feds Just Cut Support](#)

[Experts: U.S. water infrastructure in trouble - CNN.com](#)

[Water supplies in crisis - BBC News](#)