

Economics of Water in Delaware

Feb 1, 2022

Climate Bonds: Wave of the Future?

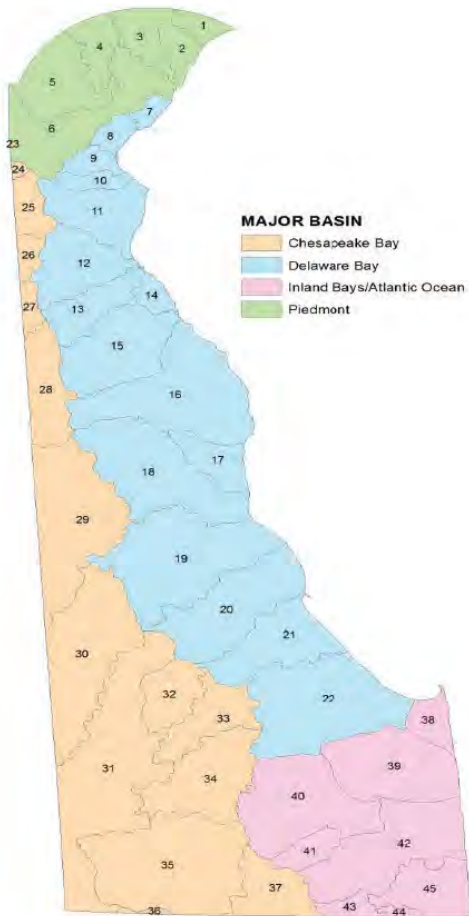


Gerald Kauffman
University of Delaware
Water Resources Center
Newark, Del



Delaware, a Water State

Delaware Watersheds



Piedmont Watershed

1. Naamans Creek
2. Shellpot Creek
3. Brandywine Creek
4. Red Clay Creek
5. White Clay Creek
6. Christina River

Delaware Bay Watershed

7. Delaware River
8. Army Creek
9. Red Lion Creek
10. Dragon Run Creek
11. C & D Canal East
12. Appoquinimink River
13. Blackbird Creek
14. Delaware Bay
15. Smyrna River
16. Lelapsic River
17. Little Creek
18. St. Jones River
19. Murderkill River
20. Mispillion River
21. Cedar Creek
22. Broadkill River

Chesapeake Bay Watershed

23. Elk Creek
24. Perch Creek
25. C & D Canal West
26. Bohemia Creek
27. Sassafras River
28. Chester River
29. Choptank River
30. Marshyhope Creek
31. Nanticoke River
32. Gum Branch
33. Gravelly Branch
34. Deep Creek
35. Broad Creek
36. Wicomico
37. Pocomoke River

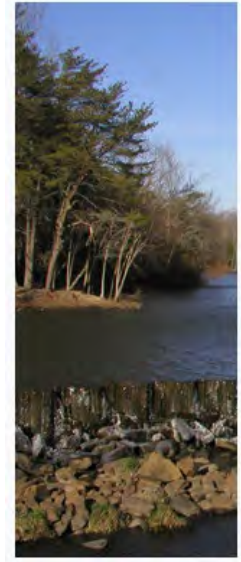
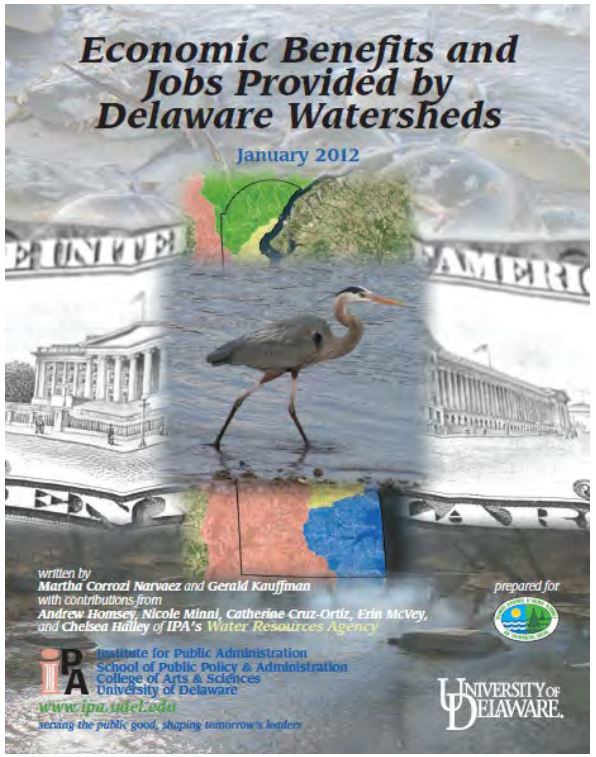
Inland Bays Watershed

38. Lewes-Rehoboth Canal
39. Rehoboth Bay
40. Indian River
41. Iron Branch
42. Indian River Bay
43. Buntlings Branch
44. Assawoman
45. Little Assawoman

- Lowest state at mean 60 ft msl
- No. 1 cleanest ocean beaches
- 300 mgd of water supplies
- 5 water intakes, 700 public wells
- 4 basins: Piedmont, Delaware Bay, Inland Bays, Chesapeake Bay
- 46 watersheds
- 25 miles of ocean coastline
- 841 square miles of bay
- 2,509 miles of rivers and streams
- 2,934 acres of lakes and ponds
- 1/3 of DE covered by wetlands
- 2/5 of DE in 500-yr floodplain
- 86% streams, 44% ponds impaired swimming
- 100 mi waters w/ fish consumption advisories

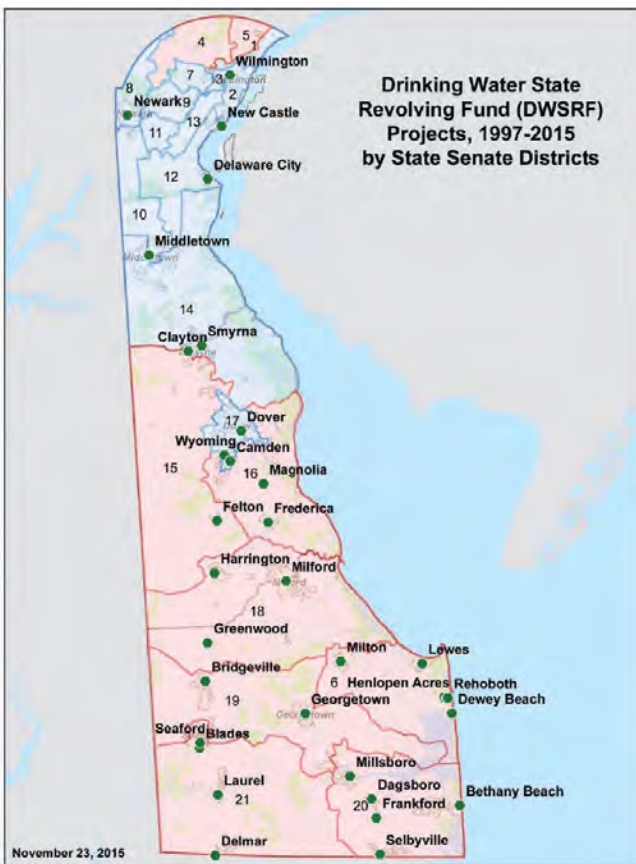
Delaware watersheds support:

- 1. Over **\$6 billion** in annual economic activity from water quality, flood control, water supply, fishing, hunting, wildlife viewing, recreation/tourism, agriculture, ports, forests, and parks benefits.
- 2. Ecosystem goods and services of **\$6.7 billion** per year (2010 dollars) with a present value (NPV) of **\$216.6 billion**.
- 3. Over **70,000 jobs** with **over \$2 billion** in wages.



Water \$ by Numbers

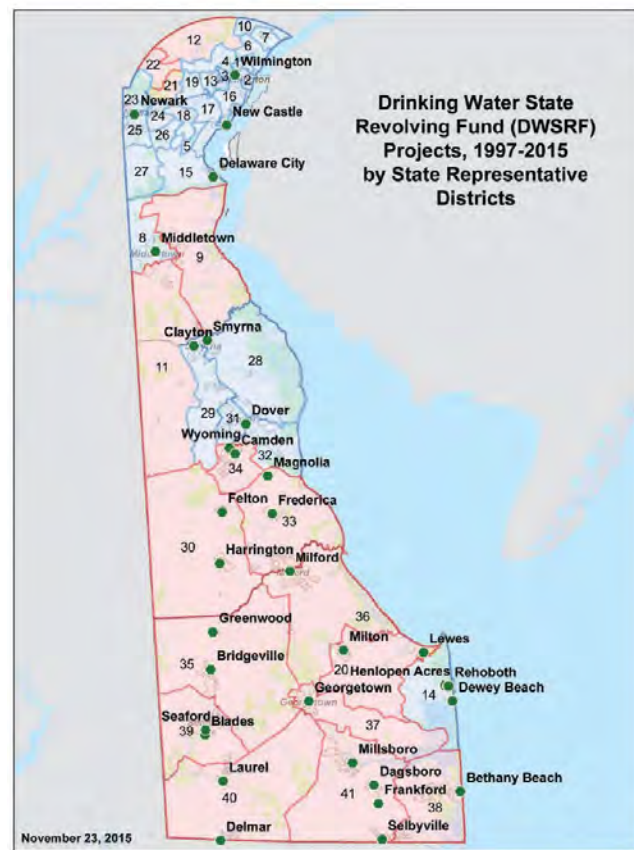
DE Watershed Value	\$6 billion 70,000 jobs
Bipartisan Infrastructure Law Water	\$62 billion
Resilience	\$48 billion
EPA Revolving Fund (DE)	\$63 million
DE HB 200 Clean Water Trust	\$50 million
DE Water Needs (2016-19)	\$411 million



Clean Water Task Force Report Page 58

LAST UPDATE: MAY 2016

INFRASTRUCTURE RELATED NEEDS 2016 THROUGH 2019



Clean Water Task Force Report Page 59

Data Source: Updated Statewide Wastewater Assessment Study, Clean Water State Revolving Fund (CWSRF) Project Notices-of-Intent (NOIs); and Municipal Capital Improvement Plans. CWSRF NOIs are solicited twice per year; therefore, estimated project needs change from year to year.

"Wastewater" project needs primarily include repair, upgrade, and replacement of existing facilities, except for Sussex County which include new sewer districts and expansion of existing sewer districts.

"Stormwater" project needs include new infrastructure to address flooding and drainage concerns.

"Other" includes needed studies, ancillary equipment needs, and green infrastructure such as pervious walking path replacement, and pervious parking lots.

Municipality	Project	Year				Total	Wastewater	Stormwater	Other	Legislative Districts	
		2016	2017	2018	2019					House	Senate
Town of Laurel	Miscellaneous Sewer Rehabilitation	\$250,000				\$250,000	X			40	21
	Miscellaneous Sewer Extensions	\$8,800,000				\$8,800,000	X			40	21
Town of Laurel - Subtotal		\$9,050,000	\$0	\$0	\$0	\$9,050,000					
Town of Millsboro	Pump Station Rehabilitation	\$250,000				\$250,000	X			41	20
	Stormwater Line Replacement	\$300,000				\$300,000	X			41	20
	18" Stormwater Line Replacement	\$600,000				\$600,000	X			41	20
	Sewer Line and MH Replacement	\$600,000				\$600,000	X			41	20
Town of Millsboro - Subtotal		\$840,000	\$150,000	\$0	\$0	\$990,000					
Town of Milton	WWTP Replacement	\$6,400,000				\$6,400,000	X			20	6
Town of Milton - Subtotal		\$6,400,000	\$0	\$0	\$0	\$6,400,000					

DE Water Needs \$411 million

New Castle County	\$67,153,900	\$57,330,000	\$16,900,000	\$17,575,000	\$158,958,900
Kent County	27,893,500	21,080,667	15,402,667	15,164,667	79,241,500
Sussex County	101,974,242	21,565,216	24,185,000	25,431,000	173,155,458
State of Delaware	\$196,721,642	\$99,975,883	\$56,487,667	\$58,170,667	\$411,355,858
	Collection & Conveyance	Treatment	Disposal	Totals	
New Castle County	\$125,483,900	\$33,255,000	\$220,000	\$158,958,900	
Kent County	26,777,500	50,064,000	2,400,000	79,241,500	
Sussex County	72,279,438	44,776,020	56,100,000	173,155,458	
State of Delaware	\$224,540,838	\$128,095,020	\$58,720,000	\$411,355,858	

Low Interest Climate Bonds - A Reservoir Case Study

FW = PW(1 + i)ⁿ Annual Cost (A) = PW(A/P) + O&M A/P = capital recovery factor
 Reservoir construction = \$10,000,000 with annual O&M cost = \$100,000

Ex. 1. How much would city borrow for 30 years at interest rate of 3% and 5%?

10,000,000(1+0.03)³⁰ = **\$24,273,000**
 10,000,000(1+0.05)³⁰ = **\$43,220,000**

Ex. 2. Annual reservoir cost, capital + O&M costs, n = 30 yr, i = 3% and 5%, find A/P.

i= 3%, A/P = 0.0521, \$10,000,000(0.0521) = \$521,500. AC = \$521,500+\$100,000 = **\$621,500**
 i= 5%, A/P = 0.0651, \$10,000,000(0.0651) = \$651,000. AC = \$651,000+\$100,000 = **\$751,000**





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Eagles know
 changes coming in
 offseason



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WATER QUALITY IN DELAWARE

'WE DON'T USE IT'

Why many rural residents are facing water infrastructure woes

Kristian Jaline Salisbury Daily Times | USA TODAY NETWORK - DELAWARE

For Delaware residents like Virginia Shockley, turning on the faucet is more than a necessity. It is a gamble with her belongings and her health due to potentially dangerous rural water infrastructure.

For many like her within the Ellendale Water District on New Hope Road, and in rural areas across the state, the story is the same: Rusty or deteriorating water pipes, poor water quality and possible issues with wastewater are a sign of years of possible infrastructure neglect.

"The water has ruined much of our clothes because it's rusty and stinks like rotten eggs," Shockley said. "We don't use it to cook and, if you do, the food has a bad taste to it. There is a company that comes in and drops off these large gallons of water, but we have to go to the store to fill them up."

With much of the affected population living in manufactured home communities, these issues have persisted since they moved to these rural addresses. In some cases, that has been nearly three years.

According to the Ellendale Water District, connecting to county water sources that are routinely tested is the obvious answer.

The question now for some long-suffer-



Delaware state agencies moved to connect the Donovan Smith community in Lewes to municipal water and sewer in December.
 LAUREN ROBERTS/SALISBURY DAILY TIMES

How Crisis Standards will change patient care

Meredith Newman
 Delaware News Journal
 USA TODAY NETWORK

Delaware hospitals are in crisis. ChristianaCare, Bayhealth, Tidell Health Nantuxco and Saint Francis announced in a joint statement last week that for the first time in about 130 years, they all will be implementing Crisis Standards of Care. This means that the hospitals will, among other things, begin to prioritize care among patients and change how resources are distributed.

For weeks, they have exceeded maximum capacity as Delaware seen an unprecedented number of hospitalizations during the latest surge in COVID-19 infections.

Under Crisis Standard of Care, the focus shifts to saving the most amount of lives over the needs of individual patients.

"Delawareans who need emergency care might not be able to get it," Gov. John Carney said earlier this week. "That's just a fact. It's time for everyone to pitch in and do what works."

Health officials continue to urge Delawareans to get vaccinated, wear masks and avoid large gatherings.

How did Delaware get here?

For nearly two weeks, the state watched hospitalizations climb, reaching new highs almost every day. Last week it crossed the 700 threshold.

At the time last year, when there was limited access to vaccines, hospitalizations hovered around 430.

The state is experiencing its toughest fight against the virus as the rate of weekly cases and the percent of positive tests are at their highest points.

The omicron variant appears more transmissible than any previous strain. During the week of Christmas health officials said, about 78% of lab tested samples were of the omicron variant.

Over the past month, Gov. John

See PATIENT CARE, Page 4A

Water

Continued from Page 1A

ing residents is how to afford it. Shockley is not the only resident who is either older or already suffering from other preexisting health conditions with high price tags on medication or treatments. So while the prospect of connecting to a safer and more regulated water supply is ideal, the reality of living on a fixed income precludes doing so.

Even for owners of ruraly located mobile home parks, the majority of the cost of dealing with these necessary improvements to begin allowing residents to move in falls on them.

"The water system is obviously very old, with an estimated age of 60, and it's black polymer pipe," said Thomas Troublefield, a resident of Frankford and owner of Stage Village Mobile Home Park in Delmar. "It will get cracks and water main breaks, and you don't know where it is until it gets to the ground. Getting the water system modernized and getting water from the town of Delmar will be huge for the tenants."

According to Troublefield, the water is safe and regularly tested. But with pipes in use long after their intended lifespan, it is a crumbling infrastructure.

The cost of upgrading an entire water system by himself, Troublefield explained, is nothing short of prohibitive. For that reason, organizations across the state have picked up the slack with financial assistance to do so.

It is these organizations that open the door to possible financial options and even provide 5-gallon containers of water for residents unable to use their own.

"Providing upgraded water systems for rural locations is a problem nationwide, and financially it's hard to do," Troublefield said. "The utmost importance is the safety of the drinking water. When you partner with organizations that have access to all these federal programs to assist, that is a huge resource."

Since taking ownership of the park 16 years ago, Troublefield has availed himself of the funds. Yet he represents a fraction of owners to get such aid.

Addressing the shortfall

Vikki Prettyman, Delaware and Maryland state manager for the Southeast Rural Community Assistance Project, certified by the Community Development Financial Institution, provides loans to local governments, public service authorities, homeowner associations, nonprofit organizations and other community entities for the development and construction of large-scale community projects.

Delaware communities, along with those in six other states, can borrow up to \$250,000 at an interest rate ranging between 3% and 7% for development projects like building a new water or wastewater treatment facility, installing water or wastewater laterals for a low-income development or neighborhood, repairing or replacing a water storage tank, or any other valuable community development project.

Due to COVID-19, we saw families staying at home and using their septic systems more, which means needing to pump the tank more frequently. That could mean over \$250 a pump for some



The Howard H. Seymour Water Reclamation Plant, Dec. 28, 2021, in Lewes.
 LAUREN ROBERTS/SALISBURY DAILY TIMES

"Nothing is more inherently important to someone's health than having clean water to drink and a safe sewer system."

Molly Magarik
 Secretary of the Department of Health and Social Services

comes to nitrates, believe that if it smells, tastes and looks good, there's not issues," Prettyman said. "But nitrates can't be seen, smelled or tasted. So you have to test your wells regularly."

Factors like proximity to certain traps or livestock could present a huge drinking water risk. On the Delmarva Peninsula, shallow wells are particularly at risk.

Affording public drinking water

The Southeast Rural Community Assistance Project's Loan Fund Program, certified by the Community Development Financial Institution, provides loans to local governments, public service authorities, homeowner associations, nonprofit organizations and other community entities for the development and construction of large-scale community projects.

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families in financial hardship," Prettyman said.

Rick Duncan, executive director of the Delaware Rural Water Association, has spent 31 years assisting park owners like Troublefield to offset the costs of updating water infrastructure.

"A crucial part of our mission at the rural water association is to travel directly to all small and rural communities and assist them with operating, governing, financing, upgrading and maintaining their water and wastewater infrastructure," Duncan said.

That includes issues like compliance with the federal Clean Water and Safe Drinking Water Act regulations, as well as all the training needed to keep local officials and operators certified and educated on the latest regulations. "We have 382 public water systems, of which 207 are community water systems. Only three of these water systems serve populations of more than 10,000 people, and only 34 serve a population between 3,300 and 10,000 people. That means 448 of the total 482 public water systems serve fewer than 3,300 people."

"Small and rural communities have more difficulty affording public drinking water and wastewater service due to lack of population density and lack of economies of scale," Duncan said. "This challenge is compounded by the fact that rural communities have lower average median household incomes and often have higher rates of poverty. We have a much more challenging time complying with our federal laws."

According to Duncan, that's due to the lack of technical resources in small communities.

Duncan also echoed the sentiment that the main concern in many of Delaware's small and disadvantaged communities is aging water infrastructure. This deterioration is exacerbated by dramatic increases in the cost of materials like pipe, hydrants, meters, fixtures and treatment chemicals.

Finally, Duncan explained the lack of water operators in the workforce remains one of the most troubling trends in Delaware, with experienced operators retiring and few new operators

coming into the field.

"The Delaware Division of Public Health, through our Health Systems Protection Section, regulates drinking water and administrators the Delaware Drinking Water State Revolving Fund," said Cassandra Codes-Johnson, associate deputy director of the Delaware Division of Public Health.

Each year the fund uses federal water grants which have been supplemented with state bond bill funds over the last several years, to support drinking water system improvements in Delaware. Water system infrastructure improvements have already been funded in locations like Georgetown, Laurel, Milton and Seaford.

"I would also just like to note that in Delaware, we have used our strong municipal partnerships to thoroughly streamline federalism, we have 100% compliance with those regulations," Codes-Johnson said.

Reversing the trend

Among the communities assisted by the fund was the Donovan Smith Mobile Home Park in Lewes.

On Dec. 27, Delaware state agencies moved to connect the Donovan Smith community in Lewes to municipal water and sewer, which is the pilot project of the Clean Water Initiative for Under-served Communities established by Gov. John Carney.

A signed memorandum of understanding by the secretaries of the Delaware Department of Natural Resources and Environmental Control, and the Department of Health and Social Services authorized a \$2.74 million loan to the Lewes Board of Public Works for connecting the Donovan Smith manufactured home community into Lewes' municipal water system, and a \$2.87 million grant for public works for connecting the Donovan Smith community to the Lewes municipal water system.

"Nothing is more inherently important to someone's health than having clean water to drink and a safe sewer system," Molly Magarik, secretary of the Department of Health and Social Services, said, thanking the entities involved in the Lewes initiative.

Construction on the sewer connection project is expected to begin in the first half of 2022 and will include:

- Approximately 5,000 feet of sewer main connected into the existing Lewes sewer collection system on Donovan Road.

- 23 manholes.
- Approximately 1,500 feet of house sewer services, with cleanouts, sewer main and service trench restoration, for 88 existing mobile home units within the Donovan Smith community.

- 1,000 feet of 12-inch main to connect to an existing main.
- 4,500 feet of internal main within the park.

- Meters, service lines, valves and fire hydrants inside the Donovan Smith community.

Other benefits to the community resulting from this pilot project stipulate under the terms of the transaction, for a period of 20 years, only the community owner will bear all of the community's water and sewer utility costs.