Resources from Lynn Henning Regarding Water Testing and CAFOs

NEPA Assist Tool
https://www.epa.gov/nepa/nepassist
Click Launch the NEPAssist Tool on Right
Type in Address on left at top
Go to the right there are numerous + boxes.
To make an impaired map
Click on Water Features
Then Click Impaired Streams
Click Impaired Waterbodies
Print or save map
You can also click each + to make maps of all the information listed.

Enviromapper
https://enviro.epa.gov/enviro/em4ef.home
Enter a location such as address, zip, city, county, waterbody,
park name, etc. (e.g., 22207, Arlington, VA or Difficult Run).
Click on More Data at top
Click Additional Data Layers
Click Water Features
Click Impaired Streams
Click Impaired Waterbodies
If you click on the red impairment line
You will get a box
Click on the MORE INFO at the Feature Details
This will give you the CAUSE of Impairment
Print or save

Here is the pathogen list from USEPA, Go to page 200 for Pathogens

https://www.epa.gov/sites/production/files/2015-07/documents/ag_101_agriculture_us_epa_0.pdf

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Michigan's E. coli Pollution and Solution Mapper
https://www.arcgis.com/apps/MapSeries/index.html?appid=2a060da30e2545129220861632b2c99

Test Strips/Parameters Highlighted, DNA Testing Information

Part Number	Description	Parameter	Range	USD Price	
2745050 Compare	Free & Total Chlorine Test Strips, 0-10 mg/L	Chlorine, low range - as free & total Cl_2	0 - 10 Cl_2 mg/L	$19.55	Add to Quote
2755250 Compare	5 in 1 Water Quality Test Strips	Multiparameter	Various	$19.79	Add to Cart Add to Quote
2744940 Compare	Chloride QuanTab® Test Strips, 30-600 mg/L	Chloride - as Cl^-	30 - 600 Cl^- mg/L	$54.95	Add to Quote
2745425 Compare	Nitrate and Nitrite Test Strips	Nitrate and Nitrite	Nitrate 0 - 50 mg/L NO_3-N mg/L	$23.99	Add to Cart Add to Quote
2745250	Total Hardness Test Strips, 0-425 mg/L	Hardness, Total - as $CaCO_3$	0 - 425 ppm	$13.65	Add to Quote

Compare					
2755325 Compare	Ammonia (Nitrogen) Test Strips, 0-6.0 mg/L	Ammonia, Nitrogen, low range - As NH_3-N, For freshwater	0 - 6 ppm	$25.75	Add to Cart Add to Quote
2601300 Compare	pH Paper, 0 - 14 pH Range, 100/pk	pH	0 - 14 pH units	$26.65	Add to Quote
2751340 Compare	Chloride QuanTab® Test Strips, 300-6000 mg/L	Chloride - as Cl^-	300 - 6000 ppm Cl^-	$53.75	Add to Cart Add to Quote
2890200 Compare	Free Chlorine Test Strips, 0-600 mg/L, 100 tests	Free Chlorine, High Range	0 - 600 mg/L Cl_2	$26.25	Add to Quote
2744850 Compare	Total Alkalinity Test Strips, 0-240 mg/L, pk/50	Alkalinity - Phenolphthalein	0 - 240 mg/L	$13.75	Add to Cart Add to Quote

2745650 Compare	pH Test Strips, 4-9 pH units	pH, mid range	4 - 9 pH units	$13.55	Add to Quote
2745325 Compare	Iron Test Strips (Total Dissolved Iron), 0-5 mg/L	Iron, medium range - As Fe**	0 - 5 ppm Fe	$26.25	Add to Cart Add to Quote
2757150 Compare	Phosphorus, Orthophosphate (reactive) Test Strips, 0-50 mg/L	Phosphorus, Orthophosphate (reactive) - as PO_4	0 - 50 ppm PO_4	$26.55	Add to Cart Add to Quote
2745125 Compare	Copper Test Strips, 0-3 mg/L	Copper	0 - 3 ppm Cu	$26.25	Add to Cart Add to Quote
2793944 Compare	Free & Total Chlorine Test Strips, 0-10 mg/L, Individually Wrapped, 250/pk	Chlorine, low range - as free & total Cl_2	0 - 10 mg/L Cl_2	$209.00	Add to Quote
39133	pH Paper, 1.0 - 11.0 pH Range		1.0 - 11.0 pH units	$13.29	Add to Cart Add to Quote

Compare					
37633 Compare	pH Paper, 4.5 - 7.5 pH Range		3.5 - 7.5 pH units	$16.80	Add to Quote
2793844 Compare	Total Hardness Test Strips, 0-425 mg/L, 250 tests, Individually Wrapped	Hardness, Total - as $CaCO_3$	0 - 425 ppm	$107.00	Add to Cart Add to Quote
2751000 Compare	pH Test Strip, 7.5-14 pH units, 100 tests	pH	7.5 - 14 pH units	$32.39	Add to Quote
2793828 Compare	Total Hardness Test Strips 0-425 mg/L, 1000 tests, Individually Wrapped	Hardness, Total - as $CaCO_3$	0 - 425 ppm	$324.00	Add to Cart Add to Quote
37933 Compare	pH Paper, 6.0 - 8.0 pH Range		6.0 - 8.0 pH units	$12.89	Add to Quote

37333	pH Paper, 3.0 - 5.5 pH Range		3.0 - 5.5 pH units	$12.89	Add to Cart
Compare					Add to Quote
38533	pH Paper, 9.0 - 12.0 pH Range		9.0 - 12.0 pH units	$12.89	
Compare					Add to Quote

https://www.hach.com/test-strips/test-strips/family?pageSize=50&sortBy=sequence&productCategoryId=35547009709&secondPageNumber=1&hideObsolete=true&pimContext=USen&erpSystem=ORACLE&focusResults=true

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DNA TESTING
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SARS-CoV-19 virus Responsible for the COVID-19 pandemic, can remain infectious for days -- or even longer -- in sewage and drinking water
https://www.sciencedaily.com/releases/2020/04/200403132347.htm

Scientists know that coronaviruses, including the SARS-CoV-19 virus responsible for the COVID-19 pandemic, can remain infectious for days -- or even longer -- in sewage and drinking water.

Two researchers, Haizhou Liu, an associate professor of chemical and environmental engineering at the University of California, Riverside; and Professor Vincenzo Naddeo, director of the Sanitary Environmental Engineering Division at the University of Salerno, have called for more testing to determine whether water treatment methods are effective in killing SARS-CoV-19 and coronaviruses in general.

The virus can be transported in microscopic water droplets, or aerosols, which enter the air through evaporation or spray, the researchers wrote in an editorial for *Environmental Science: Water*

Research & Technology, a leading environmental journal of the Royal Society of Chemistry in the United Kingdom.

"The ongoing COVID-19 pandemic highlights the urgent need for a careful evaluation of the fate and control of this contagious virus in the environment," Liu said. "Environmental engineers like us are well positioned to apply our expertise to address these needs with international collaborations to protect public health."

During a 2003 SARS outbreak in Hong Kong, a sewage leak caused a cluster of cases through aerosolization. Though no known cases of COVID-19 have been caused by sewage leaks, the novel coronavirus is closely related to the one that causes SARS, and infection via this route could be possible.
The novel coronavirus could also colonize biofilms that line drinking water systems, making showerheads a possible source of aerosolized transmission. This transmission pathway is thought to be a major source of exposure to the bacteria that causes Legionnaire's disease, for example.

Fortunately, most water treatment routines are thought to kill or remove coronaviruses effectively in both drinking and wastewater. Oxidation with hypochlorous acid or peracetic acid, and inactivation by ultraviolet irradiation, as well as chlorine, are thought to kill coronaviruses. In wastewater treatment plants that use membrane bioreactors, the synergistic effects of beneficial microorganisms and the physical separation of suspended solids filter out viruses concentrated in the sewage sludge.

Liu and Naddeo caution, however, that most of these methods have not been studied for effectiveness specifically on SARS-CoV-19 and other coronaviruses, and they have called for additional research.

They also suggest upgrading existing water and wastewater treatment infrastructure in outbreak hot spots, which possibly receive coronavirus from places such as hospitals, community clinics, and nursing homes. For example, energy-efficient, light-emitting, diode-based, ultraviolet point-of-use systems could disinfect water before it enters the public treatment system.

Potable water-reuse systems, which purify wastewater back into tap water, also need thorough investigation for coronavirus removal, and possibly new regulatory standards for disinfection, the researchers wrote.

The extent to which viruses can colonize biofilms is also not yet known. Biofilms are thin, slimy bacterial growths that line the pipes of many aging drinking water systems. Better monitoring of coronaviruses in biofilms might be necessary to prevent outbreaks.

The surge in household use of bactericides, virucides and disinfectants will probably cause an increase of antibiotic-resistant bacteria in the environment. Treated wastewater discharged into natural waterways demands careful monitoring through the entire water cycle. Liu and Naddeo call on

chemists, environmental engineers, microbiologists, and public health specialists to develop multidisciplinary and practical solutions for safe drinking water and healthy aquatic environments.

Lastly, developing countries and some regions within highly developed nations, such as rural and impoverished communities, which lack the basic infrastructure to remove other common contaminants might not be able to remove SARS-CoV-19 either. These places might experience frequent COVID-19 outbreaks that spread easily through globalized trade and travel. Liu and Naddeo suggest governments of developed countries must support and finance water and sanitation systems wherever they are needed.

"It is now clear to all that globalization also introduces new health risks. Where water and sanitation systems are not adequate, the risk of finding novel viruses is very high," Naddeo said. "In a responsible and ideal scenario, the governments of developed countries must support and finance water and sanitation systems in developing countries, in order to also protect the citizens of their own countries."

Story Source:
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Journal Reference:

1. Vincenzo Naddeo, Haizhou Liu. **Editorial Perspectives: 2019 novel coronavirus (SARS-CoV-2): what is its fate in urban water cycle and how can the water research community respond?** *Environmental Science: Water Research & Technology*, 2020; DOI: 10.1039/d0ew90015j