EMERGING CONTAMINANTS, FOREVER CHEMICALS, AND MORE: CHALLENGES TO WATER QUALITY, PUBLIC HEALTH, AND COMMUNITIES

(117–27)

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BEFORE THE

SUBCOMMITTEE ON
WATER RESOURCES AND ENVIRONMENT

OF THE

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TRANSPORTATION AND
INFRASTRUCTURE
HOUSE OF REPRESENTATIVES

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OCTOBER 1, 2021

SUMMARY OF SUBJECT MATTER

TO: Members, Subcommittee on Water Resources and Environment
FROM: Staff, Subcommittee on Water Resources and Environment
RE: Subcommittee Hearing on "Emerging Contaminants, Forever Chemicals, and More: Challenges to Water Quality, Public Health, and Communities"

PURPOSE

The Subcommittee on Water Resources and Environment will meet on Wednesday, October 6, 2021, at 11:00 a.m. EDT in the Rayburn House Office Building, Room 2167, and by video conferencing via Zoom, to receive testimony on "Emerging Contaminants, Forever Chemicals, and More: Challenges to Water Quality, Public Health, and Communities." The purpose of this hearing is to examine various perspectives on emerging contaminants, including so-called "forever chemicals," and their impacts on public health and water quality.

BACKGROUND

This memorandum provides a summary of both unregulated contaminants and those of growing concern in surface waters, and their effects or potential effects on human health or aquatic ecosystems. The memorandum also discusses the Clean Water Act's (CWA) framework for addressing contaminants of concern in surface waters.

EMERGING CONTAMINANTS

Emerging contaminant, often called contaminant of emerging concern (CEC), is a term that has been used by the Environmental Protection Agency (EPA) and water quality professionals to loosely describe various chemicals and other substances that have been detected in water bodies, that may cause ecological or human health effects and for which the scientific understanding of potential risks is evolving.[1] CECs typically are not regulated under current environmental laws.[2] CECs include various types of manufactured chemicals and substances, as well as naturally occurring substances, which may be found in lakes, rivers, and streams, and may have a detrimental effect on fish and other aquatic species.[3] According to the United States Geological Survey (USGS), some CECs have been known to bioaccumulate up the food chain—potentially exposing non-aquatic species through the consumption of contaminated fish. The USGS monitors and assesses CECs from their sources to waterways and all the way through the food web.[4]

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[1] *See, e.g.*, Congressional Research Service, *Contaminants of Emerging Concern under the Clean Water Act*, Report No. R45998 (Nov. 7, 2019) https://crsreports.congress.gov/product/pdf/R/R45998); Advisory Report of the Environmental Protection Agency, Science Advisory Board, *SAB Advisory on Aquatic Life Water Quality Criteria for Contaminants of Emerging Concern*, (Dec. 18, 2008) *available at* https://www.epa.gov/sites/default/files/2015-08/documents/sab_advisory_on_aquatic_life_wqc_for_contaminants_of_emerging_concern.pdf.

[2] *See* Congressional Research Service, *Contaminants of Emerging Concern under the Clean Water Act*, Report No. R45998 (Nov. 7, 2019) (located at https://crsreports.congress.gov/product/pdf/R/R45998).

[3] *Id*.

[4] U.S. Geological Service, *Mission Areas*, https://www.usgs.gov/mission-areas/water-resources/science/emerging-contaminants?qt-science_center_objects=0#qt-science_center_objects.

The potential range of CECs includes:
- Toxic chemicals, including persistent organic pollutants;
- Pharmaceuticals, analgesics, and antibiotics;
- Hormones;
- Surfactants;
- Personal care products;
- Veterinary medicines;
- Endocrine-disrupting chemicals; and
- Nanomaterials.

EMERGING CONTAMINANTS IN SURFACE WATERS

The USGS has the primary federal responsibility for water-quality monitoring of the nation's waters. Through its National Water Quality Assessment (NWQA) and the Toxic Substances Hydrology (Toxics) Program, it is a national leader in identifying CECs in the nation's surface, ground, and drinking waters. The USGS engages in program and research activities in the area of CECs, and coordinates and collaborates with other agencies such as the EPA, including with analytical methods development, occurrence in the environment, sources and source pathways, transport and fate, and ecological effects.[5]

The fiscal year (FY) 2020 enacted budget for the NWQA program was $92.5 million, and $93.5 for FY2021.[6] For the Toxic Substances Hydrology Program, the FY 2020 budget was $13.1 million and for FY 2021 it was $14.3 million.[7] The president's proposed FY 2022 budget requests $95.2 million for the NWQA program and $14.6 million for the Toxics program.[8]

In 2002, the USGS researchers released the first nationwide study of the occurrence of pharmaceuticals, hormones, and other organic wastewater contaminants in U.S. streams.[9] Since 2002, the USGS has published hundreds of reports that document and demonstrate the existence of these substances in U.S. waters, the sources of these substances, the assimilations of some of these by organisms,[10] and adverse ecological health effects.[11]

The 2002 USGS study involved monitoring for 95 CECs that may be associated with human, industrial, and agricultural waste, including antibiotics, other prescription drugs, steroids, reproductive hormones, personal care products, products of oil use and combustion, insecticides, fire retardants, solvents, and plasticizers, among others.[12] Samples were chosen based on being downstream from urban centers or livestock production, and therefore vulnerable to contamination.[13] Therefore, these results are not representative of all streams across the United States.

The 2002 study identified one or more CEC in 80% of sampled streams, with 86% of the CECs detected at least once.[14] A median of seven CECs were found in those streams in which the study authors identified a target CEC, with one stream con-

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[5] *See* U.S. Geological Survey. *More Information on the Contaminants of Emerging Concern in the Environment Investigation*. Accessed at https://toxics.usgs.gov/investigations/cec/more_cec/index.htm

[6] U.S. Geological Survey. *Budget Justification and Performance Information—Fiscal Year 2022*. Page 99. Accessed at https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/atoms/files/FY2022%20USGS%20Budget%20Justification%20%28Greenbook%29.pdf

[7] U.S. Geological Survey. *Budget Justification and Performance Information—Fiscal Year 2022*. Page 9. Accessed at https://prd-wret.s3.us-west-2.amazonaws.com/assets/palladium/production/atoms/files/FY2022%20USGS%20Budget%20Justification%20%28Greenbook%29.pdf

[8] *Id*.

[9] Kolpin, D.W., et al., 2002. "Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999–2000: A National Reconnaissance." *Environmental Science and Technology*. 36: 1202–1211.

[10] *Recent studies include*: Kinney, C.A. et al. 2008. "Bioaccumulation of pharmaceuticals and other anthropogenic water indicators in earthworks from agricultural soil amended with biosolid or swine manure." *Environmental Science and Technology*. 42: 1863–1870. and Muir, D., Simmons, D., Wang, X. *et al*. "Bioaccumulation of pharmaceuticals and personal care product chemicals in fish exposed to wastewater effluent in an urban wetland." *Sci Rep* 7, 16999 (2017). https://doi.org/10.1038/s41598-017-15462-x

[11] *Recent studies include*: Vajda, A.M., et al., 2008. "Reproductive Disruption in Fish Downstream of an Estrogenic Wastewater Effluent." *Environmental Science and Technology*. 42(9):3407–14 and Pereira, L.C., de Souza, A.O., Bernardes, M.F.F. *et al*. A perspective on the potential risks of emerging contaminants to human and environmental health. *Environ Sci Pollut Res* 22, 13800–13823 (2015). https://doi.org/10.1007/s11356-015-4896-6

[12] Kolpin, D.W., et al., 2002. "Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999–2000: A National Reconnaissance." *Environmental Science and Technology*. 36: 1202–1211.

[13] *Id*.

[14] *Id*.

taining 38 of the targeted CEC.[15] For interpretive purposes, the authors sorted the 95 CECs into 15 categories, based on their uses or origins.[16] At least six of those categories—steroids, nonprescription drugs, insect repellent, detergent constituents, disinfectants, and plasticizers—showed up in over 60% of the streams tested. Another three categories—steroids, detergent constituents, and plasticizers—made up almost 80% of the total measured concentration of contaminants.[17]

While measured concentrations of individual compounds were generally low, total combined concentrations of all targeted CECs were considerably higher in a number of instances.[18] For those substances that have drinking water guidelines or aquatic life criteria associated with them, ambient levels were not, for the most part, exceeded.[19] However, the authors noted that "many of the 95 Organic Wastewater Contaminants (OWCs) do not have such guidelines or criteria determined. . . ."[20] Thirty-three of the 95 target CECs are known, or are suspected, to exhibit at least weak hormonal influence, with the potential to disrupt normal endocrine function.[21] All of these known or suspected endocrine disruptors were detected in at least one of the stream samples during the study.[22] The study authors note that "measures of concentrations of reproductive hormones may have greater implications for health of aquatic organisms than measured concentrations of nonprescription drugs."[23] In sum, the 2002 USGS study authors concluded the implications of this research are that many such compounds survive wastewater treatment and biodegradation.[24]

Since 2002, the USGS has continued to investigate the presence of contaminants in the nation's water and their interactions with the environment. Earlier in 2021, USGS researchers found that varying amounts of pesticide transformation (degradation) products were present in 90% of the small streams in mostly urban basins that were sampled, and parent pesticides were present in 95% of those streams sampled in varying amounts.[25] However, the researchers acknowledged that the understanding of transformation products and their occurrence and potential toxicity in aquatic ecosystems remains limited.[26] In this study, the pesticide atrazine was the most frequently detected, in more than half of the samples.[27]

AQUATIC AND ENVIRONMENTAL HEALTH IMPACTS

For many CECs, the toxicological effects, or potential toxicological effects, are still being studied. The 2002 USGS study researchers found that, when exposed to organic wastewater contaminants (OWCs), "acute effects to aquatic biota appear limited because of the low concentrations occurring in the environment."[28] Measured concentrations for this study were generally low and rarely exceeded benchmark levels such as drinking-water guidelines, drinking-water health advisories, or aquatic-life criteria. However, they noted that "chronic effects from low-level environmental exposure to select OWCs appear to be of much greater concern.[29] The 2002 USGS researchers' report cites a number of studies in which long-term, chronic impacts to aquatic and environmental health have been demonstrated as a result of exposure to CECs.[30]

Over time, USGS researchers have identified toxicological or endocrine effects on aquatic and environmental health. This USGS research has included studies of developing anti-microbial and anti-biotic resistance at beaches and coastal areas,[31]

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[15] *Id.*
[16] *Id.*
[17] *Id.*
[18] *Id.*
[19] *Id.*
[20] *Id.*
[21] *Id.*
[22] *Id.*
[23] *Id.* at 1209.
[24] Kolpin, D.W., et al., 2002. "Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999–2000: A National Reconnaissance." *Environmental Science and Technology*. 36: 1202–1211.
[25] Mahler, B.J. et al., "Inclusion of Pesticide Transformation Products Is Key to Estimating Pesticide Exposures and Effects in Small U.S. Streams." *Environmental Science & Technology*. 2021. *55* (8), 4740–4752.
[26] *Id.*
[27] *Id.*
[28] Kolpin, D.W., et al., 2002. P. 1208.
[29] *Id.*
[30] *Id.*
[31] Fogarty, L.R., et al., 2003. "Abundance and Characteristics of the Recreational Water Quality Indicator Bacteria *Escberichia coli* and Enterococci in Gull Faeces." *Journal of Applied Microbiology*. 94: 865–78.

mercury and PCB (polychlorinated biphenyl) contamination of fish in the southeastern U.S.,[32] endocrine disrupting chemicals from wastewater effluent resulting in altered (cancerous, reduced sized, intersex) reproductive organs in fish,[33] and the bioaccumulation of pharmaceuticals and other wastewater effluent contaminants in earthworms from agricultural soil partially comprised with biosolids.[34]

Over the past few years, there has been increased media attention around the presence of plastics (microplastics and plastic pellets) in our waterways. Recent research suggests that some aquatic species might ingest microplastics, but whether there are long-term impacts needs more study.[35]

HUMAN HEALTH IMPACTS

Currently, the potential acute and chronic effects of many CECs on human health are not clearly understood. As demonstrated above, however, research is developing that has identified acute or chronic effects on other studied species. Contaminants in water can enter the body through several pathways, including ingestion, surface contact, and inhalation of vaporized water. Pregnant women, infants and children, and individuals with suppressed immune systems may be more at risk for negative health consequences from toxic contaminants.

The 2002 USGS study noted that there is little understanding of the potentially toxic interactive effects of complex mixtures of CECs in the environment.[36] Several compounds included among the targeted CECs in the 2002 USGS study are noted to break down into other constituents over time.[37] As a result, the study authors called for increased research into the health effects of individual CECs, mixtures of these compounds, and degradants of certain compounds.[38]

In 2008, USGS released a national reconnaissance study that identified the presence of CECs in untreated drinking water sources that were sampled across the United States.[39] Sixty-three of the 100 targeted CECs were detected in at least one water sample (taken from 74 untreated drinking water source locations.)[40] The researchers noted that the study data would help prioritize and determine the need, if any, for future occurrence, fate and transport, and health-effects research for subsets of the studied chemicals and their degradates most likely to be found in water resources used for drinking water in the United States.[41] Even though there may be no immediate health effects at the tiny concentrations in which these substances have been detected, concern has been expressed by some in the research community about the potential human health impacts of long-term, low-level exposures to these substances.[42]

One large class of substances—Per- and Polyfluoroalkyl substance (PFAS) chemicals—has received increased attention in recent years, and the EPA considers some to be CECs.[43] According to the EPA, studies of PFAS have found immunological, developmental, reproductive, hepatic, renal, and carcinogenic effects, among oth-

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[32] Hinck, J.E., et al., 2008. "Chemical Contaminants, Health Indicators, and Reproductive Biomarker Responses in Fish from Rivers in the Southeastern United States." *Science of the Total Environment*. 390:538–57.

[33] Hinck, J.E., et al., 2008, Vajda, A.M., et al., 2008.

[34] Kinney, C.A., et al., 2008. "Bioaccumulation of Pharmaceuticals and other Anthropogenic Waste Indicators in Earthworms from Agricultural Soil Amended with Biosolid or Swine Manure." *Environmental Science and Technology*. 42: 1863–70.

[35] Boechler, B.R., Granek, E.F. et al. 2019. "Microplastic occurrence and effects on commercially harvested North American finfish and shellfish: Current knowledge and future directions." *Limnology and Oceanography Letters*.

[36] Kolpin, D.W., et al., 2002. "Pharmaceuticals, Hormones, and Other Organic Wastewater Contaminants in U.S. Streams, 1999–2000: A National Reconnaissance." *Environmental Science and Technology*. 36: 1202–1211.

[37] *Id*.

[38] *Id*.

[39] Focazio, K.J., et al., 2008. "A National Reconnaissance for Pharmaceuticals and Other Organic Wastewater Contaminants in the United States—II) Untreated Drinking Water Sources." *Science of Total Environment*. 402: 201–206.

[40] *Id*.

[41] *Id*.

[42] Tee L. Guidotti, MD, MPH, Rapid Public Health Policy Response Project. 2008. *Pharmaceuticals are in the Drinking Water: What Does it Mean?* George Washington University School of Public Health and Health Services. (Dr. Guidotti was a majority witness at the September 18, 2008 Committee on Water Resources and the Environment Hearing on "Emerging Contaminants in U.S. Waters." Dr. Guidotti provided a copy of his referenced report, cited here, to the Subcommittee as an attachment to his written testimony.)

[43] *See e.g.*, U.S. Environmental Protection Agency. *Emerging Contaminants and Federal Facility Contaminants of Concern*. Last accessed at https://www.epa.gov/fedfac/emerging-contaminants-and-federal-facility-contaminants-concern.

ers.[44] A recent Harvard study found evidence that PFAS exposures may increase the severity of the coronavirus in individuals.[45]

CLEAN WATER ACT FRAMEWORK FOR ADDRESSING SURFACE WATER POLLUTANTS

The Clean Water Act (CWA)[46] is the federal government's primary statutory tool for protecting the quality of the nation's surface waters. The 1972 CWA identified two national goals: the elimination of discharge of pollutants into navigable waters by 1985; and, wherever attainable, the achievement of an interim goal of water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water by July 1, 1983 (also known as "swimmable and fishable waters").[47] While the nation has made great progress towards these goals, neither has been met yet in all waters.

The CWA includes two mechanisms through which to protect surface waters: technology-based control standards and water quality-based control standards. Technology-based standards, through the development and use of effluent limitation guidelines (ELGs), were intended to result in the complete elimination of the discharge of pollutants into surface waters by 1985, through a process of increasingly strict technology-based control standards over time. Water quality standards are intended as a backstop that would entail a strengthening of effluent guidelines until a water body is no longer listed as impaired.

Effluent Limitation Guidelines:

ELGs are national standards that the EPA develops under the CWA on an industry-by-industry, pollutant-by-pollutant basis.[48] ELGs are based on the performance of treatment and control technologies and intended to represent the greatest pollutant reductions from a given industry that are economically achievable and technically feasible. ELGs are not determined by water quality or toxicity levels in a waterbody or based on any health standard or criteria. This effluent guideline approach was envisioned by the 1972 CWA to be an interim step, with the eventual goal of an elimination of all pollutant discharges.

Since 1972, EPA has established ELGs for 59 industrial categories.[49] The ELG regulations apply to about 40,000 facilities that discharge directly to the nation's waters, 129,000 facilities that discharge to municipal sewage treatment plants, and certain construction sites.[50] The Agency periodically reviews the existing ELG regulations and updates them, as appropriate.[51] EPA considers four main factors when prioritizing existing ELGs for possible revision, including the performance of applicable and demonstrated wastewater treatment technologies, process changes, and pollution prevention strategies to reduce pollutants in an industrial category's wastewater; the costs (economic achievability) of demonstrated wastewater treatment technologies, process changes, and pollution prevention alternatives; the amount and types of pollutants in an industrial category's discharge; and the opportunity to promote technological innovation or to eliminate inefficiencies or impediments to pollution prevention.[52] EPA last updated limits for 39 of the current 59 industries across the nation more than 30 years ago, and 17 of those limits date back to the 1970s.[53]

If a sector has no specific ELG associated with it, it is up to the permit writer to establish site-specific technology-based limits to control the discharge. Under Section 304(b) of the CWA, EPA must identify and generate ELGs for those industry sectors that generate more than trivial amounts of toxic or "nonconventional" pollutants.

Pursuant to Section 307(a) of the CWA, EPA has identified a class of toxic pollutants known as "priority pollutants." EPA must develop ELGs for these substances. Currently, 126 specific toxic substances are listed on the priority pollutant list under the CWA (this list was generated from 65 pollutants and classes of pollutants.)

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[44] *See* U.S. Environmental Protection Agency. "Basic Information on PFAS." Accessed at https://www.epa.gov/pfas/basic-information-pfas.

[45] Grandjean, P., et al. 2020. "Severity of COVID–19 at elevated exposure to perfluorinated alkylates." PLOS ONE. Accessed at https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0244815.

[46] 33 U.S.C. §1251 et seq.

[47] *Id*.

[48] 33 U.S.C. § 1311.

[49] *See* https://www.epa.gov/eg/effluent-guidelines-plan.

[50] *See id*.

[51] *See id*.

[52] *See id*.

[53] *See id*.

Water Quality Standards:

In those instances where a CWA permit with technology-based discharge limitations (or secondary treatment limits for treatment works) is not sufficiently stringent to ensure that state-established ambient water quality standards will be met for the water body where the discharge is located, the CWA requires the implementation of more stringent, water quality-based effluent (discharge) limits in the permit to ensure that water quality standards for the waterbody will be met.[54]

Following implementation of all relevant technology-based controls (based on the relevant effluent guidelines) and permit limitations for all point source dischargers on a water body, if the water body's water quality standards are not being met for a water quality parameter, the CWA requires the development of water-quality based discharge limits for those chemicals or pollutants that are causing the impairment of the waterbody. However, unlike the technology-based effluent limits, water quality-based limits do not require a cost-benefit analysis but are focused on establishing specific discharge limits for pollutants that are known to cause water quality impairments to receiving waters.

In summary, the framework of the CWA provides a process for the identification of specific water bodies where the technology-based limits fail to achieve water quality standards for identified pollutants, as well as a mechanism for imposing more stringent discharge limits on dischargers of those identified pollutants that, if properly implemented, should result in the water body meeting a state's water quality standards.

FEDERAL ACTION

There has recently been Congressional interest in addressing one group of CECs—PFAS—and in using other statutes to do so. PFAS are a broad class of chemicals with diverse properties that are present in a wide variety of industries including first responder services and safety equipment, aerospace, energy, automotive, medical devices, pharmaceuticals, telecommunications, textiles, and electronics.[55] Examples of products that might contain PFAS include medical products and garments, coatings for medical devices, semiconductors, solar panels, high-performance electronics, and fuel-efficient technologies.[56]

In the 117th Congress, the House passed the Committee on Energy and Commerce's H.R. 2467, the PFAS Action Act on July 21, 2021 by a final vote of 241–183.[57] The legislation directs the EPA to designate the PFAS perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) as hazardous substances under the Comprehensive Environmental Response, Compensation, and Liability Act of 1980.[58] Within five years, the EPA must determine whether the remaining PFAS substances should be designated as hazardous substances.[59] The legislation would also require EPA to make a determination whether PFAS should be designated as toxic pollutants under the CWA. If the EPA were to designate PFAS as toxic, then the agency would be required to establish standards to limit discharges of PFAS from industrial sources into waters of the United States.[60] In addition, the legislation would also require EPA to issue a national primary drinking water regulation for PFAS that, at a minimum, includes standards for PFOA and PFOS.[61]

Among other requirements, the legislation mandates that EPA must issue a final rule adding PFOA and PFOS to the list of hazardous air pollutants, test all PFAS for toxicity to human health, and regulate the disposal of materials containing PFAS.[62] Finally, H.R. 2467 would provide incentives to address PFAS, such as grants to help community water systems treat water contaminated by PFAS.[63]

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[54] 33 U.S.C. 1312

[55] Environmental Protection Agency. "Basic Information on PFAS." Accessed at https://www.epa.gov/pfas/basic-information-pfas; *See also*: Environmental Protection Agency. "EPA's Per- and Polyfluoroalkyl Substances (PFAS) Action Plan". Feb. 2019. *Available at* https://www.epa.gov/sites/default/files/2019-02/documents/pfas__action__plan__021319__508compliant__1.pdf.

[56] *Id.*

[57] *See* https://clerk.house.gov/Votes/2021217; please note the Committee on Transportation and Infrastructure received a referral on this bill but did not mark it up in Committee.

[58] See *PFAS Action Act of 2021.* Accessed at https://www.congress.gov/bill/117th-congress/house-bill/2467/text

[59] *Id.*

[60] *Id.*

[61] *Id.*

[62] *Id.*

[63] *Id.*

Other instances where Congress has addressed PFAS-related issues include the National Defense Reauthorization Act for Fiscal Year 2021 (NDAA 2021).[64] This law included several provisions to address PFAS concerns and over $200 million in funding for studies and research and development on PFAS related issues, such as $50 million to develop technologies for the disposal of PFAS and remediation of environmental contamination[65] and $15 million to continue the Center for Disease Control and Agency for Toxic Substances and Disease Registry joint study on the health effects of exposure to PFAS.[66] Further, appropriations for Fiscal Year 2020 required EPA to report to Congress on addressing PFAS cleanup and provided $2.8 billion for the Clean Water and Drinking Water State Revolving Funds, including $20 million for state-level PFAS clean up.[67]

In addition, EPA recently announced planned actions in its Effluent Guidelines Program Preliminary Plan 15.[68] As part of Preliminary Plan 15, the EPA plans on initiating rulemakings on several new ELGs. One ELG would address the Organic Chemicals, Plastics, and Synthetic Fibers (OCPSF) category to address the discharge of PFAS substances from facilities that manufacture PFAS.[69] The EPA would also initiate a new ELG rulemaking for the Metal Finishing category to address PFAS discharges from the chromium plating operations.[70] In addition, EPA would initiate detailed studies of PFAS discharges from the Landfills and Textile Mills categories.[71]

WITNESSES

- Dr. Elizabeth Southerland, Former Director of Science and Technology, U.S. EPA Office of Water
- Chris Kennedy, Town Manager, Town of Pittsboro, North Carolina
- Dr. Elise Granek, Associate Professor, Environmental Science and Management Department, Portland State University
- Charles Moore, Research Director, Moore Institute for Plastic Pollution Research
- Dr. Katie Huffling, Executive Director, Alliance of Nurses for a Healthy Environment
- Dr. James (Jim) Pletl, Director of Water Quality, Hampton Roads Sanitation District, Virginia Beach, VA (on behalf of the National Association of Clean Water Agencies)

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[64] P.L. 116–283, The William M. (Mac) Thornberry National Defense Authorization Act for Fiscal Year 2021.

[65] Section 334, *Supra note 64*.

[66] Section 337, *Supra note 64; See also: the FY 2020 Joint Explanatory Statement, available at* https://appropriations.house.gov/sites/democrats.appropriations.house.gov/files/HR%201865%20-%20Division%20D%20-%20Interior%20SOM%20FY20.pdf.

[67] P.L. 116–94, the Consolidated Appropriations Act of 2020

[68] Preliminary Effluent Guidelines Program Plan 15, 86 Fed Reg. 51155 (proposed September 14, 2021).

[69] *Id.*

[70] *Id.*

[71] *Id.*

EMERGING CONTAMINANTS, FOREVER CHEMICALS, AND MORE: CHALLENGES TO WATER QUALITY, PUBLIC HEALTH, AND COMMUNITIES

WEDNESDAY, OCTOBER 6, 2021

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON WATER RESOURCES AND ENVIRONMENT,
COMMITTEE ON TRANSPORTATION AND INFRASTRUCTURE,
Washington, DC.

The subcommittee met, pursuant to call, at 11:02 a.m., in room 2167 Rayburn House Office Building and via Zoom, Hon. Grace F. Napolitano (Chair of the subcommittee) presiding.

Members present in person: Mrs. Napolitano and Mr. Rouzer.

Members present remotely: Mr. Huffman, Mr. Lowenthal, Mr. Malinowski, Mr. Delgado, Mr. Pappas, Ms. Bourdeaux, Mr. Carbajal, Mr. Stanton, Ms. Norton, Mr. Cohen, Mr. Graves of Louisiana, Mr. LaMalfa, and Miss González-Colón.

Mrs. NAPOLITANO. Good morning. I call this hearing to order.

Today's hearing will focus on challenges related to emerging contaminants and so-called forever chemicals. This committee has not had a hearing on this issue in more than 10 years, so we are very long overdue in addressing the topic.

Let me begin by asking unanimous consent that the chair be authorized to declare a recess at any time during today's hearing.

And, without objection, so ordered.

I ask unanimous consent that Members not on the subcommittee be permitted to sit with the subcommittee at today's hearing and ask questions.

Without objection, so ordered.

It is the responsibility of each Member seeking recognition to unmute their microphone to speak and to mute again when not speaking, when you finish. To avoid any inadvertent background noise, I request that every Member keep their microphone muted when not seeking recognition to speak. Should I hear any inadvertent background noise, I will request that Members please mute their microphone.

Finally, to insert a document into the record, please have your staff email it to DocumentsT&I@mail.house.gov.

Now for my opening statement about today's hearing, which has been a long time coming. This is our first hearing in about 10 years on emerging and persistent threats to our water and how these

threats affect human health and the health of our communities and of our environment.

In that time, there have been many studies conducted and new science developed on tracking and treating such contamination. I am glad to have a panel of experts in front of us—well, before us on the Zoom—to catch us up on latest information.

Today, we know more about the impacts of contaminants on human health, aquatic species, and the environment; however, there remain many, many gaps in our understanding. At this hearing, we will explore some of the impacts of these contaminants and the roles that Federal and the State governments should play to protect our health and the health of our water resources.

Water quality and protection of our surface water resources is not a partisan issue. The Clean Water Act was passed with overwhelming bipartisan support, enough to override a Presidential veto. I know that the goals of the act are something we can all agree on even today.

To ensure water quality for communities across the Nation, we must rely on two separate but very important elements: knowledge on threats to water quality and various tools with which to manage those threats. Also important is continued diligence, research into new and emerging contaminants.

During the last administration, we saw unprecedented steps to critically weaken both of these initiatives. The last administration needlessly weakened Clean Water Act protections over rivers, our streams, and our wetlands that provide drinking water to over 117 million Americans. But fortunately for all Americans, this illegal action has now been thrown out by the courts.

The last administration also slowed water quality enforcement efforts to a standstill, imposing political influences on decisions when or if to enforce the law. Worse still, the last administration's EPA actively tried to undermine and silence the scientific and technical expertise and the effectiveness of the Agency, putting all of our communities at risk.

The current administration has tried to restore the critical mission of EPA, which is to protect human health and the environment. However, there is lot of work to be done to correct previous inadequacies and get our research and water quality management back on track.

We must protect our most vulnerable communities from unfettered pollution and the burden of forever chemicals and the harmful contaminants. Many of the discharges being discussed today come at an extremely high cost to the health of humans and our environment, to local economies, and to local communities and local water treatment plants forced to bear the costs of removal; that is, the taxpayer.

Simply put, we cannot allow upstream polluters to introduce dangerous pollutants into our waterways at the cost of everyday citizens and businesses. We can't tolerate polluter giveaways and corporate profits at the expense of our own environment. Water is too essential to human life to be threatened anywhere by anyone.

I do look forward to hearing from our highly esteemed panel on the biggest threats to our water quality and what additional tools we can provide to eliminate these threats. We must be vigilant in

protecting our water, including learning current and future threats to human health and the environment and ensuring we meet all these challenges to clean water for all.

At this time, I would like to yield to my colleague, my good friend, Mr. Rouzer, for his statement or any thoughts he may have.

[Mrs. Napolitano's prepared statement follows:]

Prepared Statement of Hon. Grace F. Napolitano, a Representative in Congress from the State of California, and Chair, Subcommittee on Water Resources and Environment

Today's hearing has been a long time coming.

This is our first hearing in about 10 years on emerging and persistent threats to our water and how these threats affect human health and the health of our communities and our environment. In that time, there have been many studies conducted and new science developed on tracking and treating such contaminants. I am glad to have a panel of experts in front of us today to catch us up on the latest information.

Today, we know more about the impacts of contaminants on human health, aquatic species, and the environment; however, there remain some gaps in our understanding. At this hearing, we will explore the impacts of these contaminants and the roles that federal and state governments should play to protect our health and the health our water resources.

Water quality and the protection of our surface water resources is not a partisan issue. The Clean Water Act was passed with overwhelming bipartisan support; enough to override a presidential veto. I know that the goals of that Act are something we can all agree on, even today.

To ensure water quality for communities across the nation, we must rely on two separate but important elements: in-depth knowledge on threats to water quality, and various tools with which to manage those threats.

During the last administration, we saw unprecedented steps to critically weaken both of these initiatives.

The Trump EPA needlessly weakened Clean Water Act protections over rivers, streams, and wetlands that provide drinking water to over 117 million Americans—but, fortunately, for all Americans, this illegal action has now been thrown out by the courts.

The Trump EPA also slowed water quality enforcement efforts to a standstill, imposing political influences on decisions when (or if) to enforce the law. Worse still, the Trump EPA actively tried to undermine and silence the scientific and technical expertise and effectiveness of the agency—putting all our communities at increased risk.

The Biden administration has started to restore the critical mission of EPA to protect human health and the environment. However, there is a lot of work to be done to correct previous inadequacies and get our research and water quality management back on track.

We must protect our most vulnerable communities from unfettered pollution and the burden of forever chemicals and harmful contaminants. Many of the discharges being discussed today come at an extremely high cost to the health of humans and the environment, to local economies, and to local water treatment plants forced to bear the costs of removal.

Simply put, we cannot allow upstream polluters to introduce dangerous pollutants into our waterways at the cost of everyday citizens and businesses. We can't tolerate polluter giveaways and corporate profits at the expense of our environment. Water is too essential to human life to be threatened anywhere.

I look forward to hearing from our highly esteemed panel on the biggest threats to our water quality and what additional tools we can provide to eliminate these threats. We must be vigilant in protecting our water, including learning current and future threats to human health and the environment and ensuring we meet these challenges to clean water for all.

Mr. ROUZER. Well, thank you, Madam Chair. I appreciate you holding this hearing. And I would also like to thank our witnesses for being with us today.

This is a very important hearing to examine contaminants of emerging concern, including some plastics, pharmaceuticals, PFAS, and other substances that may pose risks to health and the environment.

Like other States, my home State of North Carolina is familiar with these issues. For many years, PFAS contaminants known as GenX were discharged into the Cape Fear River from industrial facilities upstream. Since then, the State, as well as local governments, have spent millions of dollars and countless hours working to remedy the situation.

This challenge is why I have been supportive of legislative efforts to make PFAS a priority for EPA so that States and communities can get better support on addressing this matter.

These communities rightfully have questions about these chemicals and how they affect the drinking water and environment, which also leads to questions about their effect on personal health, even when at very minute levels.

The scientific community is working hard to answer these questions, but there is a lot that we still don't know. More study and research and development are needed to better understand the effects of these chemicals, how widespread they are, which particular PFAS substances are ones of concern, whether those that are of concern are still used in commerce or are now just legacy pollutants, and how they can be monitored and cleaned up.

With this gap in knowledge, we need to ensure any regulatory actions or requirements are backed by science and done thoughtfully to protect communities and reduce risk. A good, strong manufacturing base that produces products American consumers want, I believe, can coexist with efforts to improve the environment, if done properly. But we must not fly blindly and make emotion-based regulatory decisions rather than using informed science and an understanding of all the risks that are involved.

For instance, water and wastewater treatment facilities are in a unique position. They are not responsible for PFAS and other contaminants of emerging concern entering water sources, but they are responsible for water treatment and cleaning it up nonetheless. While research is ongoing, at this time, there are few treatment methods for removing PFAS from wastewater and even fewer for disposal of PFAS. In the meantime, our water and wastewater utilities face the prospect of significant liability based on how they deal with these substances, even though they did not create them. The options before them are expensive, which can become a great burden for many communities and their ratepayers.

As our Government moves forward to address PFAS, it is essential we keep in mind the need for further information on PFAS and the economic impacts of cleanup on communities. Looking forward, we should think about the possible effects of substances before they become common in our lives and the products we use, which then also become common in our environment. This is equally true of other substances that might be considered as an emerging concern.

We also need to better understand where these substances come from, whether that is a manufacturing facility or from the personal products or medicines we use in our own homes that then are passed along into wastewater after being rinsed down the household drain. And there are many, many of those. There are many household products that will take your breath away if inhaled, in fact; yet they go right down the drain every day. Additionally, shampoos, hair dyes, et cetera, all go right down the drain, leaving remnants that most surely go into our drinking water. Addressing these downstream impacts beforehand can avoid a lot of health and environmental concerns and expense.

So, I am looking forward to hearing from our witnesses about these and other contaminants of emerging concern and how we can better prepare and educate our communities and, hopefully, achieve progress in this realm.

Again, thank you to our witnesses for being here.

And, Madam Chair, I yield back.

[Mr. Rouzer's prepared statement follows:]

Prepared Statement of Hon. David Rouzer, a Representative in Congress from the State of North Carolina, and Ranking Member, Subcommittee on Water Resources and Environment

Thank you, Chair Napolitano. I appreciate you holding this hearing, and I would also like to thank our witnesses for being here today. Today's hearing will examine contaminants of emerging concern, including some plastics, pharmaceuticals, PFAS, and other substances that may pose risks to health and the environment.

Like other states, my home state of North Carolina is familiar with these issues. For many years, PFAS contaminants known as "GenX" were discharged into the Cape Fear River from industrial facilities upstream. Since then, the state as well as local governments have spent millions of dollars and countless hours working to remedy the situation.

This challenge is why I've been supportive of legislative efforts to make PFAS a priority for EPA so that states and communities can get better support on addressing this matter. These communities rightfully have questions about these chemicals and how they affect the drinking water and environment, which also leads to questions about their effect on personal health even when at very minute levels.

The scientific community is working hard to answer these questions, but unfortunately there is still much we don't know. More study, and research and development are needed to better understand the effects of these chemicals, how widespread they are, which particular PFAS substances are ones of concern, whether those that are of concern are still used in commerce or are now just legacy pollutants, and how they can be monitored and cleaned up.

With this gap in knowledge, we need to ensure any regulatory actions or requirements are backed by science and done thoughtfully to protect communities and reduce risks. A good strong manufacturing base that produces products American consumers want can coexist with efforts to improve the environment if done properly.

But we must not fly blindly and make emotion-based regulatory decisions rather than using informed science and an understanding of the risks that are involved. For instance, water and wastewater treatment facilities are in a unique position. They are not responsible for PFAS and other contaminants of emerging concern entering water sources, but they are responsible for water treatment and cleaning it up, nonetheless.

While research is ongoing, at this time there are few treatment methods for removing PFAS from wastewater and even fewer for disposal of PFAS. In the meantime, our water and wastewater utilities face the prospect of significant liability based on how they deal with these substances even though they did not create them. The options before them are expensive, which can become a great burden for many communities and their ratepayers. As our government moves forward to address PFAS, it is essential we keep in mind the need for further information on PFAS and the economic impacts of clean-up on communities.

Looking forward, we should think about the possible effects of substances before they become common in our lives and the products we use, which then also become common in our environment. This is equally true for other substances that might be considered as an emerging concern.

We also need to better understand where these substances come from—whether that's a manufacturing facility or from the personal products or medicines we use in our own homes that then are passed along into wastewater after being rinsed down the household drain. There are many household products that will take your breath away if inhaled—yet they go right down the drain every day. Additionally, shampoos, hair dyes, etc. all go right down the drain leaving remnants that most surely go into our drinking water. Addressing these down-stream impacts beforehand can avoid a lot of health and environmental concerns and expense.

I'm looking forward to hearing from our witnesses about these and other contaminants of emerging concern and how we can better prepare and educate our communities and hopefully achieve progress in this realm.

Mrs. NAPOLITANO. Thank you, Mr. Rouzer. And that was quite on time.

I ask unanimous consent that a letter from the National Association of Clean Water Agencies in support of provisions from the clean water standards for PFAS be entered into the record.

Without objection, so ordered.

[The information follows:]

Letter of October 5, 2021, from Adam Krantz, Chief Executive Officer, National Association of Clean Water Agencies, Submitted for the Record by Hon. Grace F. Napolitano

OCTOBER 5, 2021.

The Honorable PETER DEFAZIO,
Chairman,
House Transportation and Infrastructure Committee.

The Honorable SAM GRAVES,
Ranking Member,
Transportation and Infrastructure Committee.

DEAR CHAIRMAN DEFAZIO AND RANKING MEMBER GRAVES:

On behalf of the National Association of Clean Water Agencies (NACWA), which represents over 340 public wastewater and stormwater utilities across the country, I write in support of language under consideration in Congress which seeks to advance the U.S. EPA's work to address PFAS through the Clean Water Act.

NACWA appreciates that your Committee has worked to craft legislation that would strategically focus on source control approaches to help keep PFAS out of our nation's waterways. Specifically, your legislation (as passed in H.R. 2467, Sec. 17) would set timelines and guardrails for EPA to establish recommended human health water quality criteria, effluent limitation guidelines and pretreatment standards for certain industrial categories.

NACWA sincerely appreciates your dedication to working with us to ensure that legislation is workable and would advance public health and environmental protection in a meaningful way, based on sound science.

Development of such standards is not without significant cost and compliance concerns for clean water agencies. But it will also provide important guidance and clarity for regulated utilities and the public. We appreciate Congress' efforts to provide funding to help public clean water agencies address new PFAS costs, helping protect the public ratepayers from burdens to manage pollution they did not create.

Enclosed, please find a document outlining considerations and requests from the public clean water sector as potential regulations advance.

Thank you again for your continued attention to PFAS concerns and the recommendations of the public clean water sector. Please don't hesitate to reach out anytime to discuss further.

Sincerely,

ADAM KRANTZ,
CEO, National Association of Clean Water Agencies.

ENCLOSURE

MUNICIPAL CLEAN WATER CONSIDERATIONS ON CLEAN WATER ACT LEGISLATIVE PROPOSALS

NACWA FACT SHEET—FALL 2021

Background and Issue

The National Association of Clean Water Agencies (NACWA) represents public wastewater and stormwater agencies of all sizes nationwide. Our more than 340 municipal clean water utility members across the country provide an essential public service of managing billions of gallons of wastewater and stormwater each day, as well as actively engaging in resource recovery including treating and managing thousands of tons of nutrient-rich biosolids.

As attention to per- and polyfluoroalkyl substances (PFAS) has grown, so has focus on clean water utilities' potential role in helping prevent the release of PFAS into the environment. NACWA is closely following efforts by both the U.S. Environmental Protection Agency (EPA) and Congress to advance scientific understanding and regulation of PFAS.

Municipal clean water utilities are passive receivers of PFAS—they do not produce, manufacture or use PFAS in their operations. Utilities simply receive PFAS in the raw influent arriving at the treatment plant, which includes a mix of domestic, commercial, and industrial wastewater streams. Given the wide range of uses for these chemicals, from consumer products in our homes to the vast commercial and industrial applications, coupled with their resistance to degradation, raw wastewater arriving at a municipal treatment plant is likely to contain some level of PFAS.

Influent concentrations depend on the nature of the discharges to the treatment plant and have the potential to be significantly reduced through source control focused on industries that contribute relatively high levels of PFAS. Reducing PFAS getting into the system in the first place is key because clean water utilities were not designed to treat emerging contaminants such as PFAS, and treatment options are limited and costly.

Currently, there are no reasonably cost-effective techniques available to treat or remove PFAS in the sheer volume of wastewater managed daily by clean water utilities. PFAS present significant treatment challenges by their very design as "forever chemicals," with most technologies unable to destroy the strong carbon fluorine bond. For this reason, NACWA strongly supports a "polluter pays" approach to addressing PFAS, with remediation and treatment costs born by those industries that profit from the production of the chemicals, not by municipal ratepayers.

NACWA supports work underway at EPA including the recent formation of its PFAS Council that will serve a critical role in leading a federal response to addressing PFAS contamination. Federal progress in understanding the fate, transport, and risk of PFAS and on any appropriate standards would provide much needed clarity and confidence with regards to how to best protect public health and the environment.

Two legislative proposals under consideration in the 117th Congress would address PFAS through the Clean Water Act. NACWA supports these efforts to advance EPA's regulatory process and appreciates that Congress has worked with the Association to refine these proposals over the past few years.

Clean Water Act Effluent Limitations Guidelines and Standards and Water Quality Criteria for PFAS (as incorporated in H.R.2467, Sec. 17)

This legislation would set timelines for EPA to establish recommended human health water quality criteria, effluent limitation guidelines and pretreatment standards for certain industrial categories.

It is critical to get these issues right so that investments made result in meaningful benefits and so the public can have confidence environmental and public health protection. NACWA appreciates that this Congressional language sets timelines and guardrails to more quickly and comprehensively advance the process at EPA without bypassing the science and addresses nine industrial sectors that are known to discharge PFAS in their wastewater streams.

Effluent limitations guidelines, or ELGs, and the pretreatment program facilitate EPA targeting the highest-priority sources of chemicals of concern, significantly and effectively reducing industrial pollutants before they enter the municipal wastewater treatment plant or waterways.

ELGs would provide national standards for PFAS discharges on an industry-by-industry basis. Industries which discharge directly to the environment would see these standards incorporated their discharge permits, and industrial facilities which send their effluent to municipal wastewater treatment plants would be regulated through EPA's Pretreatment Program.

NACWA strongly supports EPA evaluating and as necessary developing ELGs and pretreatment standards for industrial categories discharging PFAS-containing effluent to the sewer system. This reflects a "polluter pays" approach to regulating PFAS where the industrial creators of these chemicals bear much of the cost to address them. However, municipal wastewater treatment agencies will also incur costs as they administer and enforce their local pretreatment programs.

NACWA strongly supports Congress' efforts in this legislation to provide funding to clean water utilities to help them afford the new costs that will be associated with PFAS pretreatment. This will help protect municipal ratepayers who are not responsible for putting PFAS into the environment in the first place.

Addressing PFAS through ELGs and the pretreatment program can help reduce the heaviest loading into the wastewater treatment system. But it must be recognized that a municipal clean water utility's industrial pretreatment program will not control or eliminate the domestic inputs of PFAS to the wastewater treatment plant from everyday household products such as nonstick cookware, stain resistant carpets, personal care products, waterproof clothing, and many others that are ubiquitous in American homes.

Water Quality Criteria—Under the Clean Water Act, Section 304(a), the Administrator is required to publish water quality criteria that accurately reflects the latest scientific knowledge on identifiable effects on health and the environment that might be expected from the presence of pollutants, like PFAS, in water. EPA's *2019 PFAS Action Plan* and *2020 PFAS Action Plan Update* acknowledge that the Agency is determining if there is enough available data and research to support Clean Water Act water quality criteria. This process of developing criteria is important and understandably takes time.

The EPA Office of Water's Health and Ecological Criteria Division is currently working to develop recommended human health water quality criteria and ambient water quality criteria for PFAS and is expected to release draft criteria for public comment and review sometime in the near future.

NACWA appreciates that the Congressional language sets a timeline for publishing water quality criteria which we understand the Agency believes is achievable. As the scientific understanding of PFAS continues to develop, it is imperative that Congress allows EPA's work to progress and that the ultimate criterion EPA recommend rely on evidence-based science and reflect the risks posed.

EPA continues to reiterate that it will not consider implementation costs or other practical realities when it develops water quality criteria and that its sole basis is on the science. Unless any eventual water quality criteria account for background levels, costs, or the need for industrial controls to be in place first, the public clean water community could be saddled with a regulatory and economic crisis—driven by Clean Water Act permit limits for PFAS they simply cannot meet not should be responsible for.

PFAS present an acute control challenge by their very design as "forever chemicals," with most technologies unable to destroy the strong carbon-fluorine bond. Currently, there are no cost-effective technologies available to treat or remove PFAS in the sheer volume of wastewater managed daily by clean water utilities.

Public clean water utilities simply cannot treat to a zero level of PFAS. Even if "zero" were possible, removing PFAS chemicals from municipal wastewater influent and effluent would require advanced treatment techniques such as granulated activated carbon, ion exchange, or reverse osmosis—all of which are prohibitively expensive for the substantial volume of wastewater that may need to be treated to meet any Clean Water Act water quality standards. And many of these treatment technologies create PFAS-contaminated residuals that would require their own costly treatment and management options.

NACWA supports efforts that add greater scientific confidence in developing water quality criteria recommendations as these criteria could ultimately become water quality standards adopted by state and tribal regulatory authorities and incorporated into Clean Water Act permits.

Disclosure of Introductions of PFAS (as incorporated in H.R.2467, Sec. 13)

This proposal would require "owners and operators of an industrial source" that introduces any PFAS to notify the municipal clean water utility of the identity and quantity of each substance, whether the substance is susceptible to treatment by the utility, and whether the substance would interfere with the utility's operation.

NACWA supports the goals of this provision to provide utilities critical information about contaminants entering their systems. The provision also helps advance a "polluter pays" model where the producers of these chemicals are responsible for addressing their impacts.

However, NACWA requests additional legislative language to clarify that the regulatory and legal onus of notification is on the industrial sources that are indirectly discharging to the wastewater treatment plant—not on the utility administering the industrial pretreatment program. We suggest adding language such as "a treatment works shall not face liability under this section if the owner or operator of an industrial source fails to comply with the requirements in subsection (a)."

Without such protection, if an industrial source fails to notify the municipal clean water utility, the utility itself could face subsequent downstream compliance and enforcement repercussions for discharging PFAS under the Clean Water Act.

Contact: Kristina Surfus, ksurfus@nacwa.org

Mrs. NAPOLITANO. Next, I would like to proceed to hear from our witnesses who will testify. I will ask the witnesses to please turn their cameras on and keep them on for the duration of the panel. Thank you for consenting to be here, and you are most welcome.

On today's panel, we have Dr. Elizabeth Southerland, former Director of Science and Technology, Office of Water, U.S. EPA, Environmental Protection Agency; Mr. Chris Kennedy, town manager, town of Pittsboro, North Carolina; Ms. Elise Granek—I hope I pronounced that right, Ms. Elise—professor, Environmental Science and Management, Portland State University; Mr. Charles Moore, research director, Moore Institute for Plastic Pollution Research; Ms. Katie Huffling, DNP, R.N., CNM, FAAN, executive director, Alliance of Nurses for Healthy Environments; and Dr. James Pletl, director, Water Quality Department, Hampton Roads Sanitation District, Virginia Beach, Virginia, on behalf of the National Association of Clean Water Agencies.

Without objection, your prepared statements will be entered into the record. Now witnesses are asked to limit their remarks to 5 minutes.

We will start with Dr. Southerland, please. Welcome, and, please, you may proceed.

TESTIMONY OF ELIZABETH SOUTHERLAND, PH.D., FORMER DIRECTOR, OFFICE OF SCIENCE AND TECHNOLOGY, U.S. EPA OFFICE OF WATER; CHRISTOPHER F. "CHRIS" KENNEDY, TOWN MANAGER, TOWN OF PITTSBORO, NORTH CAROLINA; ELISE F. GRANEK, PH.D., PROFESSOR, ENVIRONMENTAL SCIENCE AND MANAGEMENT, PORTLAND STATE UNIVERSITY, PORTLAND, OREGON; CAPTAIN CHARLES MOORE, LL.D., RESEARCH DIRECTOR, MOORE INSTITUTE FOR PLASTIC POLLUTION RESEARCH; KATIE HUFFLING, DNP, R.N., CNM, FAAN, EXECUTIVE DIRECTOR, ALLIANCE OF NURSES FOR HEALTHY ENVIRONMENTS; AND JAMES J. PLETL, PH.D., DIRECTOR, WATER QUALITY DEPARTMENT, HAMPTON ROADS SANITATION DISTRICT, VIRGINIA BEACH, VIRGINIA, ON BEHALF OF THE NATIONAL ASSOCIATION OF CLEAN WATER AGENCIES

Ms. SOUTHERLAND. Chairman Napolitano, Ranking Member Rouzer, distinguished members of the subcommittee, my name is Elizabeth Southerland. I had the privilege of serving in the U.S. Environmental Protection Agency from January 1984 until August 2017, when I retired as Director of the Office of Science and Technology in the Office of Water. Thank you for the opportunity to testify on emerging contaminants and forever chemicals.

The Clean Water Act provides adequate authority for States and EPA to address these newly identified harmful chemicals. They have not done so, however, because they lack a national list of priority contaminants in the Nation's waters and a coordinated monitoring program by Federal, State, and interstate agencies that proactively looks for these contaminants.

We are currently suffering from a reactive system that waits for a public health or environmental crisis to occur before we begin monitoring and even considering controls. This happened with the PFAS forever chemicals and will happen in the future with other contaminants if we fail to develop a proactive approach.

Congress should require the Federal Government to develop and maintain a priority list of newly identified harmful chemicals for use by Federal and State water monitoring programs. Once monitoring data identify where these contaminants pose risk, EPA and the States can control these discharges to the Nation's waters using Clean Water Act authorities. EPA and FDA can also use this information to improve their chemical review programs to prevent new contaminants from entering the environment.

Since my retirement, I have been a member of the Environmental Protection Network, a bipartisan organization of EPA alumni volunteering their time to protect the health and welfare of the American people. While my testimony incorporates some information developed by EPN, I am here in my personal capacity.

The fiscal year 2020 National Defense Authorization Act took the first real step towards developing a proactive approach to newly identified contaminants by establishing the National Emerging Contaminant Research Initiative to protect the Nation's drinking water quality.

Congress should expand this initiative to cover all beneficial uses of the Nation's waters because certain contaminants pose a much greater risk to aquatic life, fish consumers, and swimmers than to

drinking water consumers. Congress should also require that this research initiative be used to develop and maintain a national list of priority contaminants.

Once this national list has been developed, EPA and U.S. Geological Survey must include the priority contaminants in their national monitoring programs and provide technical assistance to State and interstate agencies to add these analyses to their monitoring. EPA should get industry support by using the Toxic Substances Control Act authority to require industry to provide analytical methods and toxicity assessments for any priority contaminants that they manufacture, import, or use.

Industrial and municipal wastewater treatment plants are often not designed to reduce these unregulated contaminants so they enter water bodies through direct discharges, as well as through agricultural and urban stormwater runoff. Control of these contaminants will be most quickly achieved by EPA promulgating national technology-based permit limits for entire industries and by States setting technology-based permit limits for individual industrial facilities within their boundaries.

In order to prevent new, high-risk, man-made chemicals from entering the environment in the first place, EPA must improve the Toxic Substances Control Act's new chemical review program by requiring more comprehensive data from companies seeking to bring industrial chemicals into commerce. EPA and FDA may also need to improve their new chemical review programs for pesticides, pharmaceuticals, and cosmetics if these chemicals are found to be frequently occurring contaminants in the Nation's waterways.

Thank you for the opportunity to share my thoughts with you today. I look forward to answering any questions.

[Ms. Southerland's prepared statement follows:]

Prepared Statement of Elizabeth Southerland, Ph.D., Former Director, Office of Science and Technology, U.S. EPA Office of Water

Chairwoman Napolitano, Ranking Member Rouzer, distinguished Members of the Subcommittee, my name is Elizabeth Southerland. I had the privilege of serving in the U.S. Environmental Protection Agency (EPA) from January 1984 until August 2017 when I retired as the Director of the Office of Science and Technology in the Office of Water.

Thank you for this opportunity to testify about "Emerging Contaminants, Forever Chemicals, and More: Challenges to Water Quality, Public Health, and Communities." Today I will give you my thoughts on how states and EPA can use Clean Water Act (CWA) authorities to address contaminants of emerging concern (CECs), including the forever chemicals. I believe that the CWA provides adequate authority for states and EPA to address CECs, but they have not done so because they lack a systematic process to identify, prioritize, and monitor for CECs. Currently, the country lacks a coordinated monitoring program that proactively looks for CECs in water bodies used for drinking water, swimming, fishing, and aquatic life protection. We are suffering with a reactive system that waits for a public health or environmental crisis to occur before we begin monitoring and considering controls. This happened with the PFAS forever chemicals and will happen in the future with other contaminants if we fail to develop a proactive approach. I want to note at the outset that controlling CECs once they enter the environment presents serious challenges, as I will discuss in a moment. I urge the Committee to also consider the need to prevent harmful chemicals from entering the U.S. market by using the authorities of the Toxic Substance Control Act (TSCA), the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and the Food, Drug, and Cosmetics Act (FDCA). Under TSCA, EPA needs to require more comprehensive data from companies seeking to bring new industrial chemicals into commerce. Also, EPA needs to improve the risk

evaluation of existing industrial chemicals by evaluating all pathways of exposure, including those regulated under the CWA and the Safe Drinking Water Act (SDWA). In addition, EPA and the Food and Drug Administration may need to improve their review and regulation of pesticides, pharmaceuticals, and cosmetics to better prevent contamination of surface and ground waters if these chemicals are found to be frequently occurring CECs.

Since my retirement, I have been a member of the Environmental Protection Network (EPN), a bipartisan organization of more than 550 EPA alumni volunteering their time to protect the health and welfare of the American people. My testimony incorporates information developed by EPN, but I am here in my personal capacity.

CONTAMINANTS OF EMERGING CONCERN

There is no statutory or regulatory definition of CECs, but the term refers to unregulated substances detected in the environment that may present risks to human health, aquatic life, or the environment. CECs can be naturally occurring substances such as algal toxins or man-made substances such as pharmaceuticals, personal care products, industrial chemicals, pesticides, and microplastics. Industrial and municipal wastewater treatment systems are often not designed to treat CECs, so they can enter water bodies through direct discharges as well as through agricultural and urban stormwater runoff. In the U.S. today there are over 40,000 industrial chemicals in commerce, and new chemicals are being introduced every year, so CECs may be discovered any time there is environmental monitoring. Whenever a new contaminant is detected in the air, water, fish, or soil, citizens expect their state and federal environmental agencies to answer their questions about the toxicity, occurrence, and treatment options for those contaminants. In most cases, state and federal agencies lack the information to answer those questions, and that lack of information heightens public concerns about health risks.

NATIONAL LIST OF PRIORITY CECS

Congress should require the federal government to establish a national list of priority CECs, a formal process to develop and update that list, and a coordinated water monitoring program by federal, state, and interstate agencies that includes the priority contaminants. The FY20 National Defense Authorization Act (NDAA) took the first step towards initiating these actions by directing the Office of Science and Technology Policy (OSTP) to develop a National Emerging Contaminant Research Initiative to protect the nation's drinking water quality. On May 3, 2021, the National Institute of Environmental Health Sciences (NIEHS) published a Request for Information (RFI) for this new research initiative, asking for public comment on the research needed to identify, analyze, monitor, and mitigate drinking water contaminants of emerging concern. In this RFI, the NIEHS defined drinking water contaminants of emerging concern as "newly identified or re-emerging manufactured or naturally occurring physical, chemical, biological, radiological, or nuclear materials that may cause adverse effects to human health or the environment and do not currently have a national primary drinking water regulation." This definition is broad enough to also support a priority list of contaminants posing risks to all beneficial uses of water bodies. The responses to this RFI should be evaluated to see if they adequately address risks to aquatic life, fish consumers, and swimmers and thus support a National Emerging Contaminant Research Initiative for all beneficial uses of the nation's waters. It is important to have a research initiative that focuses on more than drinking water. Aquatic organisms are more sensitive to pesticides and other types of contaminants than humans, and human exposure to certain contaminants can be greater from eating fish and shellfish than from drinking water. This is particularly true for contaminants that are highly hydrophobic, that partition to aquatic environments through surface sediment, and that bioaccumulate in fish and shellfish.

The NDAA directed EPA and Health and Human Services (HHS) to establish an Interagency Working Group on CECs to facilitate coordination of federal research under the new Research Initiative. Congress should direct the participating federal agencies to issue solicitations for research on CECs posing risks to uses other than drinking water. The NDAA also directed EPA to evaluate ways to increase technical assistance and support for states to analyze CECs in drinking water, implement a program for states to apply for technical assistance on CECs, and develop a database of tools and resources to assist states with emerging contaminants. Congress should expand this new technical assistance program to apply to all beneficial uses of water.

MONITORING OF CECs

Once a national list of priority CECs has been developed, EPA should include the priority contaminants in its National Aquatic Resource Surveys of rivers/streams, lakes, coastal waters, and wetlands and in its Unregulated Contaminant Monitoring Program for drinking water systems. EPA should provide technical assistance and support to state and interstate agencies to analyze for these contaminants in their monitoring of surface and ground waters. The U.S. Geological Survey should include these contaminants in their National Water Quality Assessment Program and in their special studies for states. Federal and state monitoring programs should also include non-targeted laboratory analyses to discover unknown CECs so these can be added to the priority list in future years.

Detecting CECs does not prove that risks exist. The public needs to know if these substances are occurring at levels adversely affecting human health or aquatic life. At the present time, the public depends on EPA, other federal agencies, and university researchers to determine the toxicity of CECs and for EPA and the states to recommend safe levels in air, water, fish, and soil. Federal agencies and university researchers do not have the resources to assess all the CECs found in the environment and need industry to contribute to these efforts. Using Section 8 authority of TSCA, EPA should require industry to provide toxicity assessments and analytical methods they have developed for priority CECs. When industry has not yet developed these assessments and methods, EPA should issue testing orders under Section 4 of TSCA to require industry to develop this information so that monitoring and risk evaluations can begin as quickly as possible.

CONTROL OF CECs

Once monitoring has identified the concentrations and locations of CECs, studies have identified toxic effects, and exposure routes are known, EPA and states can develop regulations or voluntary approaches to limit exposures and can remediate contaminated areas. Under the CWA, the primary mechanism to control pollutants in surface water is through National Pollutant Discharge Elimination System permits. The CWA authorizes EPA and the states to limit or prohibit the discharge of pollutants through technology-based effluent limitations and through water quality-based permit limits. It is critically important that CEC discharges be controlled at the source, with polluters paying to treat their wastewater instead of downstream drinking water consumers paying to treat their tap water.

The CWA requires EPA to publish effluent limitation guidelines (ELGs), which are the required minimum technology-based standards for industrial wastewater discharges. These national permit limits must be based on a treatment technology that is economically achievable for the entire industry category being regulated. Where EPA has not set ELGs for a particular industrial category or where pollutants and processes were not considered when an ELG was developed, the CWA authorizes the permitting authority (EPA or 47 states) to impose technology-based effluent limits on a case-by-case basis using Best Professional Judgement (BPJ). Those BPJ limits must be based on a technology that is economically achievable for the single facility covered by the permit. Since it typically takes EPA about six years to promulgate an ELG for an entire industry category, states should use this BPJ authority to set facility-specific limits more quickly for dischargers of CECs posing risks to their citizens. The National Emerging Contaminant Research Initiative should be designed to provide states with the data to support these BPJ limits by funding research on effective treatment technologies for CECs in wastewater.

Where technology-based permit limits are not adequate to meet the state's water quality standards, the permitting authority needs to set water quality-based limits. Development of water quality-based permit limits for CECs will be slower than development of technology-based limits because of the process involved. The CWA requires states to adopt water quality standards to protect the designated uses of their water bodies and to adopt criteria for all pollutants on the Toxic Pollutant List for which EPA has published criteria. Most states rely on EPA to publish and "from time to time thereafter revise" water quality criteria that reflect the latest scientific knowledge. EPA can develop these criteria for CECs whenever data are available on their toxicity and routes of exposure. EPA develops human health criteria to protect people who drink the water and eat the fish, recreational criteria to protect swimmers, and aquatic life criteria to protect fish and shellfish. States use EPA's criteria as guidance in adopting enforceable water quality standards and then set water quality-based permit limits for point source dischargers that meet these standards.

The CWA clearly gives EPA and the states the authority to limit or prohibit the discharge of CECs through technology-based and water quality-based permit limits,

but these limits require adequate data on the concentrations and toxicity of CECs in wastewater and receiving waters. EPA and the states do not currently have the staff, funding, or proactive approach to collect this critical information in most cases. Absent these data, CECs will not effectively be controlled through CWA programs.

PREVENTION OF FUTURE CECS

The federal government must improve its new chemical review programs to prevent high-risk, man-made chemicals from contaminating the nation's surface and groundwater. Under TSCA, EPA needs to require more comprehensive data from companies seeking to bring new industrial chemicals into commerce. Under TSCA, EPA also needs to improve the risk evaluation of industrial chemicals already in commerce by evaluating all pathways of exposure, including those regulated under the CWA and the SDWA. In addition, EPA and the Food and Drug Administration may need to improve their regulation of pesticides, pharmaceuticals, and cosmetics to better prevent contamination of surface and ground waters if these chemicals are found to be frequently occurring CECs.

CONCLUSION

The CWA gives EPA and the states adequate authority to address CECs once they have entered the water cycle, but they cannot use this authority unless national monitoring data identify where these CECs pose risks to public health and the environment. Congress needs to require the development and maintenance of a national list of priority CECs so federal, state and interstate water monitoring programs can proactively look for these contaminants. Congress should expand the National Emerging Contaminant Research Initiative to cover contaminants posing risks to all beneficial uses of the nation's waterways. EPA should improve its use of TSCA authority to prevent new and existing chemicals from contaminating waterways and to require industry development of analytical methods and toxicity data for existing CECs. EPA and states should make broader use of their authority to set technology-based permit limits to control wastewater discharges of these contaminants.

Thank you for this opportunity to share my thoughts. I look forward to answering your questions.

Mrs. NAPOLITANO. Thank you, Dr. Southerland. And I thank all your volunteers for doing such a great job in trying to keep America safe.

Mr. Kennedy, you may proceed.

Mr. KENNEDY. Good morning, Madam Chair Napolitano, Ranking Member Rouzer, and other distinguished congressional Members. I thank you for the opportunity to speak today about the effects of emerging contaminants and forever chemicals on a small town.

My name is Chris Kennedy. I serve as the chief executive officer in the capacity of town manager for Pittsboro, North Carolina, a quaint town of 4,500 residents in the piedmont of North Carolina nestled to the west of Raleigh and southeast of Greensboro. The latter proximity is of utmost importance to Pittsboro. While we are bolstered by the expansive growth found in the sprouting markets of Wake County and the Research Triangle Park, which tout some of the highest growth rates in the country, we are also downstream of the contributors of PFOS, PFOA, and 1,4-dioxane in North Carolina's Piedmont Triad. Despite historic and continued prosperity on the industrial front—and we support a robust economy—we are fully enveloped in the negative externalities of this production.

In Pittsboro, the effects of PFOS, PFOA, and 1,4-dioxane are among the worst in the country. Pittsboro draws its water from the picturesque Haw River, a tributary into the Cape Fear River. The PFAS levels in the Haw River at our raw water intake experience consistent readings nearing 100 parts per trillion and have seen levels approaching 1,000 parts per trillion. For context, the EPA

has established a nonenforceable health advisory level of 70 parts per trillion for the sum of PFAS chemicals. For 1,4-dioxane, the EPA has a nonbinding health advisory level established between 0.35 and 35 micrograms per liter. Pittsboro, as recently as June 30 of this year, was exposed to an upstream contamination of 687 micrograms per liter.

To be clear, Pittsboro has no industry that contributes to this concern. We are simply subject to upstream contamination with little recourse to pursue remedy. The effects of continued contamination on our residents have led to numerous health-compromising effects that I will allow my counterparts, those in the microbiological and other sciences realm, to further define and describe. I can state from a nonmedical and nonscientific stance that my residents are afraid of our drinking water and its effects on their short- and long-term health.

The COVID–19 pandemic has only intensified these concerns as we now worry about the efficacy of the vaccines and our internal immune systems that are likely compromised by prolonged exposure to these contaminants via our drinking water.

Despite our scale impediments, the town has sought to remedy the problems with advanced treatment measures in our water system. We are currently in the process of implementing a $3.4 million project in our waterplant we have titled "Fast-Track GAC." We have utilized the term "fast-track" as we seek immediate action despite funding constraints. The term "fast-track" is also indicative of compromises necessary to facilitate the installation of this infrastructure.

Even at $3.4 million, this project includes compromises such as serving only one-half of our plant capacity. Infrastructure that is typically housed in a structure must be exposed to the elements and piping will be strewn across the ground because we simply cannot afford to cover or bury the infrastructure.

To afford this project, the town is spending the entirety of our ARPA funds, totaling $1.397 million, as well as the town adopting a 43-percent increase to our water rates with the adoption of this current year's fiscal budget. Frankly, such an increase in other communities would have the manager relieved of his duties. For further perspective, our entire water and wastewater budget in fiscal year 2021 was $3.9 million. So it goes without further elaboration that a single $3.4 million project that nearly exceeds our typical operating capital budget is concerning.

We have identified future costs to provide advanced treatment to eradicate PFOS, PFOA, and 1,4-dioxane to cost between $15 million and $20 million in initial capital expense and millions more perpetually in increased operational expense. Our customer base, at just over 2,100 individual accounts, cannot reasonably be burdened with this expense. The financial reality and demand to remedy these introduced contaminants is simply too great to organically, from a budgetary perspective, address the problem.

While I am not asking for funding in my testimony today as I share my story, I speak to support stricter regulations on emerging contaminants and forever chemicals. I support a common, maximum acceptable contamination level for drinking and recreational waters. Treating all bodies of water, both drinking water sources

and recreational waters, with equivalent care by eliminating the term "recommendation" in favor of clear and precise levels of acceptable contamination is what we seek.

The better the raw water, the more effective and longer lasting the treatment media or membranes. Increased efficacy and longevity reduce operational expense and future capital expansion. Cleaner water reduces demands on chemicals, filtering, electrical energy, and other costs that escalate quickly, especially in combination.

The externalities of added advanced infrastructure are not without their own concerns. For example, GAC used in granular activated carbon is typically disposed of via incineration. The disposal methods surely have secondary and tertiary effects that when compounded only displace contamination for drinking water purposes, entering the system again elsewhere or downstream.

In summary, I offer my testimony today to provide the insight of a small town that is disproportionately burdened with the need to react to the injection of emerging contaminants and forever chemicals into our drinking water without clear evidence to afford and manage such infrastructure. I support the consideration of precise, enforceable maximum contamination levels, removing the term "recommendation" from the lexicon in the standards for emerging contaminants and forever chemicals, and the equal application of these MCLs for emerging contaminants and forever chemicals for all bodies of water. Anything contrary to this action negatively affects not only my town in Pittsboro, but towns and cities all over this country.

[Mr. Kennedy's prepared statement follows:]

Prepared Statement of Christopher F. "Chris" Kennedy, Town Manager, Town of Pittsboro, North Carolina

Chair DeFazio and Chair Napolitano, I thank you for the opportunity to speak today about the effects of emerging contaminants and forever chemicals on a small town. My name is Chris Kennedy and I serve as the Chief Executive Officer in the capacity of Town Manager for Pittsboro, North Carolina, a quaint town of 4,537 residents in the piedmont of North Carolina nestled to the west of Raleigh and southeast of Greensboro. The latter proximity is of utmost importance to Pittsboro. While we are bolstered by the expansive growth found in the sprouting markets of Wake County and the Research Triangle Park, which tout some of the highest growth rates in the country, we are also downstream of the industry found in North Carolina's Piedmont Triad known for manufacturers and contributors of PFOS, PFOA and 1,4 dioxane. North Carolina is founded on an economy of industry that has supported this state, country and beyond for generations. Despite historic and continued prosperity on the industrial front, and we support a robust economy, we are fully enveloped in the negative externalities of this production.

In Pittsboro, the effects of PFOS, PFOA and 1,4 dioxane are among the worst in the country. Pittsboro draws its raw water from the picturesque Haw River, a tributary into the Cape Fear River. You may have heard about the Cape Fear River in articles discussing GenX in and around Wilmington, North Carolina. The PFAS levels in the Haw River at our raw water intake experience consistent readings nearing 100 ppt (parts per trillion) and have seen levels approaching 1,000 ppt. For context juxtaposition, the EPA has established a non-enforceable health advisory level of 70 ppt for the sum of PFAS chemicals. For 1,4 dioxane, the EPA has a nonbinding health advisory level established between 0.35 and 35 μg/L (micrograms per liter), Pittsboro, as recently as June 30, 2021, was exposed to an upstream contamination of 687 μg/L. To be clear, Pittsboro has no industry that contributes to this concern. We are simply subject to upstream contamination with little recourse financially or in terms of policy at the state or federal level to pursue remedy. The effects of con-

tinued contamination on our residents have led to numerous health-compromising effects that I will allow my counterparts, those in the microbiological and other sciences realm, to further define and describe. I can state from a non-medical and non-scientific stance, that my residents are afraid of our drinking water and its effects on their short- and long-term health. The COVID–19 pandemic has only intensified these concerns as we now worry about the efficacy of the vaccines and our internal immune systems that are likely compromised by prolonged exposure to these contaminants via our drinking water. I speak as small-town Manager who requests your attention and action to reduce the source of these contaminants.

Despite our scale inequities, the Town has sought to remedy the problems with advanced treatment measures in our water system. We pilot studied low pressure reverse osmosis (LPRO), granular activated carbon (GAC), ion exchange (IX), and ultra-violet advanced oxidation processes (UV–AOP) to remove these contaminants from our drinking water. We are currently in the process of implementing a $3.4 million project at our water treatment plant that we have titled "Fast-Track GAC". We have utilized the term "fast-track" as we seek immediate action despite our funding constraints. The term fast-track is also indicative of the compromises necessary to facilitate the installation of this infrastructure. Even at $3.4 million, this project includes compromises such as serving only one-half of our plant capacity [1.0-million-gallons of our 2.0-million-gallon plant capacity], infrastructure that is typically housed in a structure will have to be exposed to the elements and piping will be strewn across the ground because we simply cannot afford to cover or bury the infrastructure. To afford this project, the Town is spending the entirety of our American Rescue Plan Act (ARPA) funds distributed to us from the federal government to the State of North Carolina, totaling $1.397 million, on this water treatment project. We have many other ARPA related needs, but find our water quality to be most important, justifying the 100% expense of this revenue. In addition to the revenue from the ARPA funds, we adopted a 43% increase to our water rates with the adoption of this current fiscal year budget. Frankly, such an increase in other communities would have the manager relieved of his duties. For further perspective, our entire enterprise (water and wastewater) fund budget in Fiscal Year 2020–2021 was $3,993,447. So, it goes without further elaboration that a $3.4 million advanced treatment project that nearly exceeds our typical operating and capital budget is concerning. These numbers also do not contemplate the expense of previous studies. We have identified the future costs to provide advanced treatment to eradicate PFOS, PFOA and 1,4 dioxane to cost $15–20 million in initial capital expense, and millions more perpetually in increased operational expense running these sophisticated systems. Our customer base, at just over 2,100 individual accounts, cannot reasonably be burdened with this expense. The financial reality and demand to remedy these introduced contaminants is simply too great to organically, from a budgetary perspective, address the problem.

While I am not asking for funding in my testimony today as I share my story, I speak to support stricter regulations on emerging contaminants and forever chemicals. There is much discussion on what is a maximum acceptable contamination level, and whether that differs for drinking or recreational waters. However, all water basins are connected, by either literal contiguous connection or by evaporation and rain. Treating all bodies of water, both drinking water sources and recreation waters, with equivalent care by eliminating recommendations in favor of clear and precise levels of acceptable contamination ultimately provides my town financial relief by reducing my operational expense in the pre-treatment of our drinking water. The extent of expense of these advanced treatment methods is directly contingent upon the contamination levels in the raw water. The better the raw water, the more effective and longer lasting the treatment media or membranes. Increased efficacy and longevity reduce operational expense and future capital expansion costs. Cleaner water reduces demands on chemicals, filtering, electrical energy, and other costs that escalate quickly, especially in combination. Even with the ability to remove emerging contaminants, the impediments for advanced treatment methods are not merely price considerations. The externalities of the added advanced treatment measures are numerous and not without their own concerns. For instance, the granular activated carbon utilized in a GAC filtering system produces excellent filtering of PFOA and PFOS contaminants, however, this media is typically disposed of via incineration. The disposal methods, be they incineration or another, surely have secondary and tertiary effects that when compounded only displace the contamination briefly for drinking water purposes, entering the system again elsewhere or downstream. Reverse osmosis, considered by many to be the best technology available, produces a concentrated effluent loaded with contaminants removed from the raw water. This concentrated effluent must be discharged somewhere, often back into the stream; again, only displacing the chemicals temporarily for a specific

end user. Despite the technological advances that allow better filtration and removal of these emerging contaminants and forever chemicals from our drinking water, if we are only displacing these contaminants and we wish to alter this scenario, source reduction has to be at the forefront of our strategies.

In the past year, I have interviewed with The Guardian and Consumer Reports, and countless other media outlets. Now, here I speak with each of you. Small-town Managers barely break the front page of their local newspaper most days, and yet, due to our water quality, here I am in front of the United States Congress representing not only Pittsboro, but other communities like us, that are disproportionately affected with increased costs and demands on our water system due to chemical contamination without clear avenues to afford and manage such sophisticated infrastructure. My town is on verge of expansive growth with a project named Chatham Park that includes 22,000 homes and twenty-two million square feet of commercial development. This project alone will propel us from a small town with a population just under 5,000, to over 60,000 people at buildout. Economic development is a fierce competition, and the upstream contamination of our drinking water source is hindering our efforts. Our ability to see the fruits of this project and other development opportunities are compromised by our water quality. Realtors are now using real estate disclosures to alert potential buyers about our water system. This negatively affects both residential and commercial growth. Even in a no-growth scenario, I find this plight unacceptable. Our current citizens and residents deserve better. The demand for more sophisticated water treatment methods robs from other needed utility projects that facilitate our growth. Duke University and North Carolina State University are studying the levels of contamination in my residents by drawing blood and sampling domestic water in our homes. This is a testament to our community's willingness to be a part of the solution, but it mainly serves as a reminder that we are closer to the statistical testing data in a lab analysis than the real solutions for the problem. I have the privilege of serving an engaged and willing elected body, citizenry, and customer base with little ability to effectuate real progress as we are continually subjected to contaminated water. Again, I speak to support proactive approaches rather than reactive treatments.

So, in summary and simply, I offer my testimony today to provide the insight of a small-town that is disproportionately burdened with the need to react to the injection of emerging contaminants and forever chemicals into our drinking water. I support the consideration of precise and enforceable maximum contaminant levels (MCLs), removing the term "recommendation" from the lexicon in the standards for emerging contaminants and forever chemicals, and the equal application of these MCLs for emerging contaminants and forever chemical standards for all water bodies. Anything contrary to this action negatively affects not only my town of Pittsboro, North Carolina, but towns and cities all over this country. I close with this: As the adage goes, water is the source of life. For me, water has become the source of consistent frustration and despair.

Mrs. NAPOLITANO. Thank you, Mr. Kennedy. And I am sure that if others had a chance to testify, they would say the same thing about the contamination of their water.

Dr. Granek, you may proceed.

Ms. GRANEK. Thank you, Chair Napolitano, Ranking Member Rouzer, and members of the subcommittee, for the opportunity to present to you.

I am a marine ecologist with 20 years of experience conducting field and laboratory research on coastal marine ecosystems, including on emerging contaminants, such as microplastics, pharmaceuticals, and pesticides.

Emerging contaminants are ubiquitous in marine and freshwater ecosystems, as well as in our bodies. Drinking water extracted from rivers, fish, shellfish, sea salt, and craft beer we consume, freshwater and marine animals we value for tourism, are all exposed to a cocktail of dozens to hundreds of contaminants in our streams, rivers, lakes, and oceans. We are, in turn, exposed to these contaminants. Yet in the United States, our regulatory policy takes a pollutant-by-pollutant approach with benchmarks set for a very

limited number of the thousands of contaminants currently in production and use today.

These numerous chemicals can interact synergistically to become more toxic in combination than individually. Therefore, managing a subset of chemicals on an individual basis fails to address how humans and animals experience chemicals in the environment and likely underrepresents human health and environmental effects of multiple contaminant exposure, and some chemical effects are exacerbated by warming water temperatures.

Microplastics are plastics smaller than the width of a pencil and include a large number of different chemical compositions from those in synthetic clothing, like fleece jackets and raincoats, to polymers used in chip bags, straws, or PVC tubing. Our research findings show microplastics are pervasive in our waterways and aquatic organisms.

Here in the Pacific Northwest, in recreationally harvested razor clams and commercially valuable Pacific oysters and pink shrimp, 95 out of 100 individuals have microplastics in their tissues. All black rockfish we have examined contain microplastics. Again, all of these in their consumable tissue.

Other studies report microplastics in drinking water, sea salt, craft beer, and honey. So, it isn't surprising that a recent study out of New York State found that all infant and adult stool samples collected contained microplastics.

Not only are microplastics in plants, animals, and humans, but dozens of studies have now identified harmful effects of microplastic exposure in corals, lobsters, and other shellfish, finfish, and humans. Deleterious effects range from adverse reproductive outcomes, physical organ damage, and altered growth and development, to behavioral changes, reduced immune response, and inflammation, all of which can affect populations of commercial or endangered species.

Since microplastics have been found in human placentas of newborn babies and colon tissue of colon cancer patients, these microplastics may be affecting human health. Yet no Federal regulations currently exist to inform consumers of microplastics in their food, set safe levels of microplastics in human food items or drinking water, or to limit microplastic release into waterways.

Pharmaceuticals are biologically active chemicals manufactured to generate a biological response in the body. Personal care products or hygiene products—toothpaste, soaps, sunscreens, cosmetics—identified as contaminants of emerging concern. These compounds together called PPCPs enter rivers, estuaries, and oceans after being washed down the drain from industry, hospitals, animal care facilities, and households, and enter our waterways in large part because there is no regulated disposal process nationally, and current wastewater infrastructure does not remove many of these compounds.

In Puget Sound, Washington, federally listed juvenile Chinook salmon accumulated 36 different PPCPs in their tissue, some at concentrations higher than in effluent released from nearby wastewater treatment plants. Pharmaceutical effects on humans can also be observed in animals. For example, fluoxetine in the antidepressant Prozac can reduce inhibition in humans and ensure

crabs went around their predators, leading to increased loss of limbs and death for the crabs. Some of these chemicals impact wild animals that are endangered, of cultural importance and/or critical to recreational and commercial fishing.

Pesticides, including herbicides, insecticides, rodenticides, and fungicides, are widely used in agriculture, forestry, and farming by municipalities and homeowners to reduce unwanted vegetation, decrease wildfire risk, and increase yield of target species. About one-third of U.S.-grown crops use pesticides which then enter waterways via spray drift, groundwater, and runoff post-rainfall. Over 100 pesticides are documented to cause harmful effects on aquatic plants, animals, human development, and human health, including genetic damage, decreased growth, reduced reproductive output, and behavioral change.

In summary, though more multiple-stressor studies are needed to understand the full scope of how these contaminants, paired with environmental stressors resulting from climate change, are affecting freshwater and marine plants and animals, there is ample scientific evidence that these contaminants affect freshwater and marine organisms, with potential implications for human consumers.

More active management between policymakers and scientists is needed to determine appropriate benchmarks for these chemicals, both individually and in combination with other chemicals, to safeguard environmental and human health. Benchmarks need to consider how simultaneous exposures to multiple contaminants affect animals, including commercially important and endangered species, as well as public health.

Thank you for the opportunity to speak to you, and I welcome questions.

[Ms. Granek's prepared statement follows:]

Prepared Statement of Elise F. Granek, Ph.D., Professor, Environmental Science and Management, Portland State University, Portland, Oregon

I would like to thank Chair DeFazio, Chairwoman Napolitano, Ranking Member Rouzer, and Members of the Subcommittee on Water Resources and Environment for this opportunity to present written testimony on *Emerging Contaminants, Forever Chemicals, and More: Challenges to Water Quality, Public Health, and Communities*.

Emerging contaminants, including forever chemicals and other compounds, are ubiquitous in our marine and freshwater ecosystems as well as in our bodies. The drinking water we extract from rivers, the fish and shellfish that are the backbone of the fishing industry, the sea salt, and craft beer we consume, and the freshwater and marine animals that we value for tourism, are exposed to not just a single contaminant, but a cocktail of contaminants as they swim in or attach to the bottom of our streams, rivers, lakes, and oceans. Similarly, we humans are exposed to these same contaminants when we swim in lakes and oceans, eat food harvested from those waters, and even when we breathe the air around us (e.g., Brahney et al. 2021, Zhang et al. 2020). Yet in the United States, our regulatory policy takes a pollutant by pollutant approach, with benchmarks indicating safe levels of exposure for aquatic animals or human consumers for a very limited number of the thousands of contaminants currently in production and use today (https://www.chemicalsafetyfacts.org/chemistry-context/debunking-myth-chemicals-testing-safety/). Aquatic plants, animals and humans are experiencing and consuming many chemicals simultaneously, some of which interact synergistically—more toxic in combination than individually, some interacting antagonistically—in which case the effects of one may counteract the effects of another. As a result, managing a subset of chemicals and doing so on an individual basis is an unrealistic representation of how humans and animals are experiencing chemicals in the environment—and like-

ly under-represents the human health and environmental effects of any individual contaminant or suite of contaminants. Moreover, the effects of some of these chemicals on plants and animals is exacerbated by warming water temperatures (Noyes and Lima, 2015).

These issues are relevant to state and federal agencies tasked with managing species and ecosystems, to federally recognized tribes, many of whom depend on aquatic items as first foods (such as salmon and lamprey here in the Pacific Northwest), as well as industry groups including the aquaculture industry, whose product and livelihood can be affected by chemical contamination.

PROFESSIONAL BACKGROUND

I am a marine ecologist with 20 years of experience conducting field and laboratory-based research on coastal marine ecosystems and 12 years of experience conducting research on emerging contaminants in coastal marine and freshwater ecosystems and species.

I offer information from studies by my lab group and those of my collaborators and colleagues on emerging contaminants in our fresh and marine waters. My expertise in this sphere is limited to the scientific information on the presence and effects of emerging contaminants, with particular focus on microplastics, pharmaceuticals, and pesticides on fresh- and marine waters, sediment, and animals.

MICROPLASTICS

My students, colleagues, collaborators, and I have been studying microplastics in river water, shellfish, and more recently finfish in the Pacific Northwest (Oregon and Washington). Microplastics are small plastics, smaller than the width of a pencil and down to microscopic sizes. They include an array of chemical compositions ranging from the types of plastics used to make synthetic clothing like fleece jackets to other polymers used in chip bags, straws, etc. Our research findings align with studies conducted elsewhere in the US and internationally that have found microplastics to be pervasive in our waterways and aquatic organisms. For example, 99 out of 100 razor clams sampled in the Pacific Northwest have microplastics in their tissue. Similarly, for Pacific oysters, an important shellfish species for aquaculture in our region, 99 out of 100 individuals have microplastics in their tissues (Baechler et al. 2020a, b). In pink shrimp, an economically important fishery in the region, 9 out of 10 contain microplastics. Additionally, all of the Black Rockfish we have examined contain microplastics in their consumable tissue.

In addition to microplastics in shellfish and finfish, many studies report microplastics in our drinking water, sea salt, craft beer, and honey (Zhang et al. 2020). So perhaps it isn't surprising that a recent study out of New York State found that all infant and adult stool samples collected contained microplastics (Zhang et al. 2021).

Why does it matter that we find microplastics in waterways, drinking water, salt, and seafood?

A large body of research identifies effects of microplastic exposure in animals ranging from corals, crustaceans (e.g., lobsters) and shellfish, to finfish and humans (see Table 1 below). The deleterious effects range from adverse reproductive outcomes, physical organ damage, and altered growth and development, to behavioral changes, reduced immune response, and inflammation (see Granek et al. *In Press*).

Additionally, other chemicals in waterways, some of which I will discuss below, can stick to the surface of plastic pieces in the environment providing a transport pathway for such chemicals to enter the bodies of animals and humans.

In summary, when microplastics affect the growth and reproductive output of animals (such as those harvested commercially), then organisms grow more slowly and may have fewer offspring. From a human health perspective, microplastics have been found in human tissue ranging from the placentas of newborn babies (Ragusa et al. 2021) to colon tissue of cancer patients (Ibrahim et al. 2020). So these microplastics are making their way into humans with potential effects on human health. Yet no federal regulations currently exist to inform consumers of microplastics in their food, to limit microplastic release into waterways, or to set safe levels of microplastics in human food items.

PHARMACEUTICALS AND PERSONAL CARE PRODUCTS (PPCPS)

Pharmaceuticals are biologically active chemicals manufactured to induce a response in humans or other animals. Personal care products are personal hygiene products (including toothpastes, soaps and shampoos, sunscreens, etc.) and cos-

metics and are identified as contaminants of emerging concern. These compounds are washed down the drain from industry, hospitals, animal care facilities, households, etc. and enter our waterways in part *because there is no regulated disposal process* nationally and current wastewater infrastructure does not remove most of those compounds (Ehrhart et al. 2020). Once washed down the drain, these chemicals enter rivers, estuaries and oceans. Though pharmaceuticals generally do not bioaccumulate, because they are constantly released into waterways from wastewater treatment plants and septic systems, they are considered pseudo-persistent.

In Puget Sound, Washington, juvenile Chinook salmon (federally listed under the Endangered Species Act) accumulated 36 different pharmaceuticals and personal care products (PPCPs) in their tissue, often at concentrations similar to or greater than concentrations of the effluent released from wastewater treatment plants nearby (Figure 1; Meador et al. 2016). Similarly, 18 PPCPs were detected in Olympia oysters, a protected species in Oregon.

Because pharmaceuticals are designed to be biologically active, the effects they have in humans can translate into effects on other animals. For example, as use of prescribed oral antibiotics affects gut microbiota in humans, those same antibiotics alter the gut microbiota in shellfish exposed to antibiotics in their water environment (e.g., Teixeira 2017). Fluoxetine, the active ingredient in the antidepressant Prozac, can reduce inhibition in humans; similarly, shore crabs exposed to fluoxetine have a reduced inhibition around their predators, leading to increased loss of limbs and death (Peters et al. 2017).

Why does it matter that freshwater, estuarine, and marine animals are exposed to pharmaceuticals and personal care products?

Some of these chemicals can reduce growth or increase predation in wild populations of animals that are grown commercially, harvested recreationally, of cultural importance to tribes, and that are endangered.

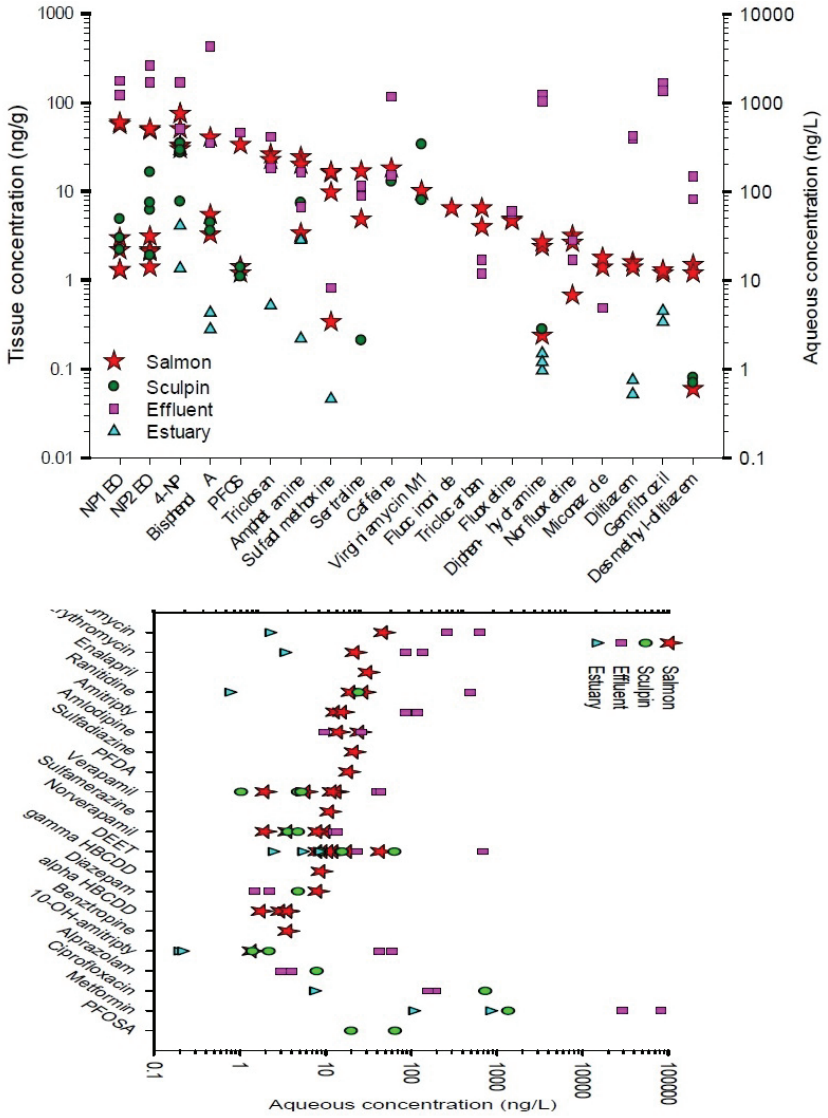

Figure 1. Occurrence of detected analytes in fish (salmon = stars, sculpin = circles), estuarine water, and wastewater effluent. Data are ordered from high to low concentrations in juvenile Chinook salmon. All replicate data shown for each matrix. From Meador et al. 2016.

Pesticides

Pesticide use, including herbicides, insecticides, rodenticides, and fungicides, extends across numerous industries, including agriculture, forestry, and Christmas tree farming as well as by municipalities and homeowners to manage vegetation in public right-of-ways and on private property. Herbicide applications are used to reduce competition from unwanted vegetation, decrease wildfire risk, and increase survival and yield of target species (Shepard et al. 2004; Clark et al. 2009). Approximately ⅓ of U.S.-grown crops use pesticides, and while they are generally applied

directly to target plants, pesticides enter the environment via spray drift, runoff following rainfall, and groundwater (Tudi et al. 2021).

Once applied, pesticide properties and watershed characteristics affect how they move and where they go in the environment, with some compounds degrading or moving quickly through the watershed and others persisting in the environment and in organisms for long periods of time (Wang et al., 2019). These and other factors influence how organisms are exposed to potentially harmful pollutants which can have detrimental effects on development, reproduction, and behavior in aquatic plants and animals (Luschak et al. 2018).

Of the wide array of pesticides used in each industry, over a hundred have been documented to cause deleterious effects on aquatic plants, animals and/or human development and health (e.g., Bhardwaj et al. 2018; Cimino et al. 2016; Gonzalez-Alzaga 2015; Mnif et al. 2011; Rani et al. 2020). Exposure to atrazine can cause genetic damage and decreased growth, in Pacific oysters (*Crassostrea gigas*) (Bouilly et al. 2004), reproduction and growth in zooplankton, ovarian growth in crabs (Silveyra et al. 2017), and reproduction and behavior in fish (e.g., zebrafish—*Brachydanio rerio* and rainbow trout—*Oncorhynchus mykiss*; Graymore et al. 2001). Moreover, the highest toxicity has been reported in earlier, more fragile aquatic invertebrates life stages (Lindsay et al. 2010) . These negative impacts on reproductive success of some organisms, including humans (Figure 2) have implications for future populations.

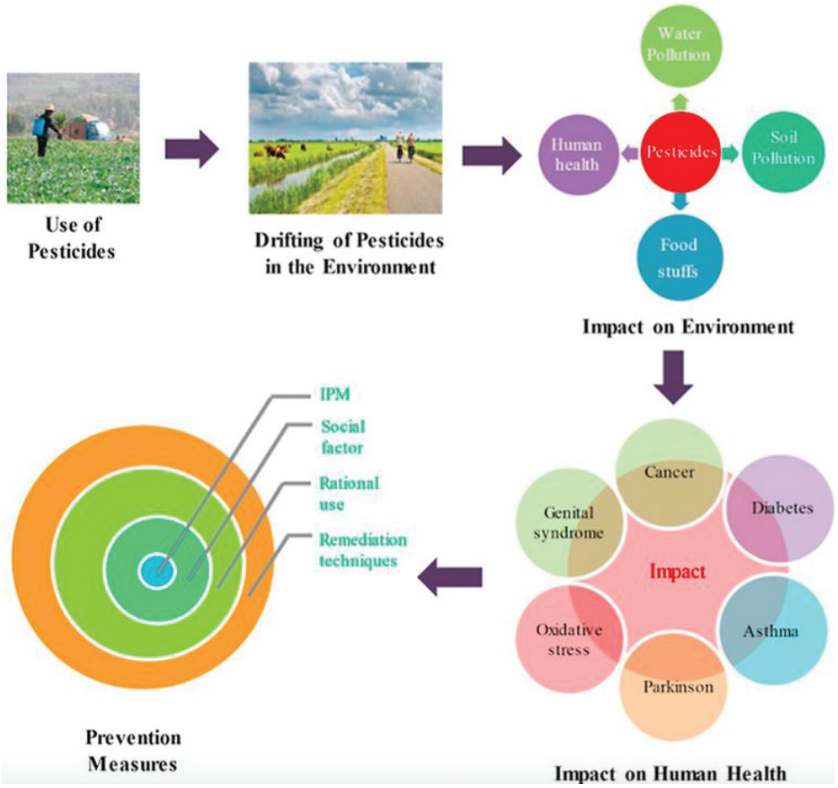

Figure 2. Consequences of chemical pesticides on human health and the environment. From Rani et al. 2020.

Why does it matter that freshwater, estuarine, and marine animals are exposed to pesticides?

Some of these chemicals can affect fitness and survival of animals preyed on by commercial species as well as the commercial species themselves. Some of these compounds can accumulate in shellfish tissue (e.g., Scully-Engelmeyer et al. 2021) that is then consumed by humans. Dozens of studies have identified human health

effects of exposure to agricultural pesticides (Bhardwaj et al. 2018; Cimino et al. 2016; Gonzalez-Alzaga 2015; Rani et al. 2020). Ultimately, sublethal levels of pesticide exposure pose a threat to organisms; this threat can be challenging to quantify and monitor, but can have disruptive effects on animal populations (Stark and Banks, 2003).

OTHER CHEMICALS

PFAS

Per- and polyfluoroalkyl substances (PFAS) are found or used in hundreds of consumer products and industrial processes, including but not limited to stain- and oil-resistant coatings on clothing and in food packaging, hydraulic fluids used in aviation, paints, adhesives, and fire-fighting foams (Cousins et al., 2019; Lau et al., 2007). PFAS are a ubiquitous class of industrial contaminants found in waterways nationwide. Ecotoxicity data on newer PFAS are scarce, and to-date just a handful of studies have been conducted with freshwater aquatic organisms (Hoke et al., 2016, 2015) with very little data for effects on marine organisms. Yet a myriad of studies have identified a variety of negative health effects resulting from exposure to PFAS ranging from adverse reproductive and developmental outcomes and cancer to liver disease, lipid and insulin dysregulation, kidney disease, and altered immune and thyroid function (e.g., Fenton et al. 2021).

Tire wear particles and associated chemicals

A complex mixture of chemicals associated with tire wear particles enter the environment primarily through stormwater runoff (Johannessen et al. 2021). As cars drive along our roadways, small tire fragments wear off and end up in roadways or aerosolized. These tire wear particles and associated chemicals have recently been identified as a significant driver of coho salmon mortality in the Pacific Northwest, affecting up to 90% of returning salmon in some streams (Tian et al. 2021). A chemical commonly used in car tire manufacturing interacts with ozone in the environment creating a toxic by-product, 6PPD-quinone, which then enters the environment when it leaches from tire wear particles that are washed off roadways and into our waterways during rain events (Johannessen et al. 2021, Tian et al. 2021). These particles and their associated chemicals are toxic to a number of species in our waterways (Khan et al. 2019, Wik 2008). Other unidentified chemicals have been detected in tire wear particles, as the chemical mixtures used in tire manufacturing are complex, proprietary, and largely unregulated (Tian et al. 2021, Wik & Dave 2009). The formation of a previously unknown chemical, 6PPD-quinone, as an unintended by-product from car tire manufacturing highlights the potential for understudied chemicals to produce unforeseen environmental sequences and the need for regulatory mechanisms to protect species from these effects.

SUMMARY

In our collaborative research with colleagues across multiple universities, state and federal institutions, federally recognized tribes in the Pacific Northwest, Industry groups, and non-governmental organizations, there is concern about the threats emerging contaminants pose to freshwater and marine animals as well as human consumers.

Though more multiple-stressor studies are needed to understand the full scope of how these contaminants, paired with environmental stressors resulting from climate change—such as ocean acidification and increasing sea surface temperature—are affecting freshwater and marine plants and animals, *there is ample scientific evidence that these contaminants affect freshwater and marine organisms, with potential implications for human consumers*.

More active engagement between policy makers and scientists is needed to determine appropriate benchmarks for these chemicals, both individually and in combination with other chemicals, to safeguard environmental and public health. Such *benchmarks need to consider how simultaneous exposure to multiple contaminants affects animals, including commercially important and endangered species, as well as public health*.

Thank you for the opportunity to speak with you.

Table 1. Ecological and biological effects of microplastic fibers on organisms by species and material type (modified from Granek et al. *In Press*)

Level	Type of Effect	Organism Clade	Genus species	Plastic Material Type	In Text Citation
Sub/ Cellular	Adverse Immune Response	Bivalves	*Mytilus spp.*	Polyamide Nylon	(Cole et al., 2020)
		Coral	*Acropora sp.*	n/a	(Mendrik et al., 2021)
		Coral	*Seriatopora hystrix*	n/a	(Mendrik et al., 2021)
Sub/ Cellular	Cellular Response	Annelid Worms.	*Lumbricus terrestris*	Polyester	(Prendergast-Miller et al., 2019)
		Bivalves	*Mytilus galloprovincialis*	composite household lint	(Alnajar, Jha and Turner, 2021)
		Coral	*Acropora sp.*	n/a	(Mendrik et al., 2021)
		Coral	*Seriatopora hystrix*	n/a	(Mendrik et al., 2021)
		Crustaceans	*Nephrops norvegicus*	Polypropylene	(Welden and Cowie, 2016)
		Humans	*Homo sapiens*	nylon, polyester	(Dijk et al., 2020)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)
		Rodents	*Mus musculus*	nylon, polyester	(Dijk et al., 2020)
Sub/ Cellular	Oxidative Stress	Annelid Worms.	*Lumbricus terrestris*	Polyester	(Prendergast-Miller et al., 2019)
		Bivalves	*Mytilus spp.*	Polyamide Nylon	(Cole et al., 2020)
		Bivalves	*Mytilus spp.*	Polyamide Nylon	(Cole et al., 2020)
		Coral	*Acropora sp.*	n/a	(Mendrik et al., 2021)
		Coral	*Seriatopora hystrix*	n/a	(Mendrik et al., 2021)
		Echinoderms	*Apostichopus japonicus*	n/a	(Mohsen et al., 2021)
		Fish	*Dicentrachus labrax*	polyethylene (80%); polyester (19%); rayon (1%).	(Barboza et al., 2020)
		Fish	*Trachurus trachurus*	polyethylene (80%); polyester (19%); rayon (1%).	(Barboza et al., 2020)
		Fish	*Scomber colias*	polyethylene (80%); polyester (19%); rayon (1%).	Barboza et al., 2020)
		Fish	*Danio rerio*	polypropylene	(Qiao et al., 2019)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)
		Terrestrial Snails.	*Achatina fulica*	polyethylene terephthalate (PET).	(Song et al., 2019)
Organ	Growth Development	Bivalves	*Mytilus galloprovincialis*	composite household lint	(Alnajar, Jha and Turner, 2021)
		Crustaceans	*Emerita analoga*	polypropylene	(Horn, Granek and Steele, 2020)
		Crustaceans	*Artemia franciscana*	polypropylene, polyethylene terephthalate.	(Kim et al., 2021)
		Fish	*Carassius auratus*	ethylene vinyl acetate (EVA).	(Jabeen et al., 2018)
Organ	Inflammation	Fish	*Carassius auratus*	ethylene vinyl acetate (EVA).	(Jabeen et al., 2018)
		Fish	*Danio rerio*	polypropylene	(Qiao et al., 2019)
		Rodents	*Cavia porcellus*	polyester	(Pimentel et al., 1975)
		Zooplankton	*Artemia franciscana*	polyethylene terephthalate (PET).	(Kokalj, Kunej and Skalar, 2018)

Table 1. Ecological and biological effects of microplastic fibers on organisms by species and material type (modified from Granek et al. *In Press*)—Continued

Level	Type of Effect	Organism Clade	Genus species	Plastic Material Type	In Text Citation
Organ	Oxidative Stress	Crustaceans	*Homarus americanus*	polyethylene terephthalate (PET).	(Woods et al., 2020)
		Fish	*Danio rerio*	polypropylene	(Qiao et al., 2019)
Organ	Physical Organ Damage	Bivalves	*Mytilus galloprovincialis*	composite household lint	(Alnajar, Jha and Turner, 2021)
		Crustaceans	*Artemia franciscana*	polypropylene, polyethylene terephthalate.	(Kim et al., 2021)
		Crustaceans	*Nephrops norvegicus*	Polypropylene	(Welden and Cowie, 2016)
		Fish	*Dicentrachus labrax*	polyethylene (80%); polyester (19%); rayon (1%).	(Barboza et al., 2020)
		Fish	*Trachurus trachurus*	polyethylene (80%); polyester (19%); rayon (1%).	(Barboza et al., 2020)
		Fish	*Scomber colias*	polyethylene (80%); polyester (19%); rayon (1%).	(Barboza et al., 2020)
		Fish	*Carassius auratus*	ethylene vinyl acetate (EVA).	(Jabeen et al., 2018)
		Fish	*Danio rerio*	polypropylene	(Qiao et al., 2019)
		Humans	*Homo sapiens*	polycarbonate, polyamide, polypropylene.	(Ibrahim et al., 2021)
		Humans	*Homo sapiens*	polyester	(Pimentel et al., 1975)
		Rodents	*Cavia porcellus*	polyester	(Pimentel et al., 1975)
		Terrestrial Snails.	*Achatina fulica*	polyethylene terephthalate (PET).	(Song et al., 2019)
		Zooplankton	*Artemia franciscana*	polyethylene terephthalate (PET).	(Kokalj, Kunej and Skalar, 2018)
Organism	Adverse Reproductive Response	Crustaceans	*Emerita analoga*	polypropylene	(Horn, Granek and Steele, 2020)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)
		Terrestrial Veg.	*Lolium perenne*	high-density polyethylene (HDPE); polylactic acid (PLA).	(Boots et al., 2019)
		Worm	*Aporrectodea rosea*	high-density polyethylene (HDPE); polylactic acid (PLA).	(Boots et al., 2019)
		Zooplankton	*Ceriodaphnia dubia*	polyethylene terephthalate (PET).	(Ziajahromi et al., 2017)
Organism	Behavioral Change	Annelid Worms.	*Lumbricus terrestris*	Polyester	(Prendergast-Miller et al., 2019)
		Bivalves	*Mytilus galloprovincialis*	composite household lint	(Alnajar, Jha and Turner, 2021)
		Bivalves	*Mytilus edulis*	Nylon	(Christoforou et al., 2020)
		Bivalves	*Macomona liliana*	Polyethylene terephthalate (PET).	(Hope et al., 2020)
		Cnidarians	*Aiptasia pallida*	nylon, polyester, polypropylene.	(Romanó de Orte et al., 2019)
		Crustaceans	*Hyalella azteca*	Polypropylene	(Au et al., 2015)
		Crustaceans	*Nephrops norvegicus*	Polypropylene	(Welden and Cowie, 2016)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)
		Terrestrial Snails.	*Achatina fulica*	polyethylene terephthalate (PET).	(Song et al., 2019)

Table 1. Ecological and biological effects of microplastic fibers on organisms by species and material type (modified from Granek et al. *In Press*)—Continued

Level	Type of Effect	Organism Clade	Genus species	Plastic Material Type	In Text Citation
		Zooplankton	*Daphnia magna*	Nylon, Polyethylene terephthalate.	(Hernandez et al., 2019)
		Zooplankton	*Tigriopus japonicus*	Polyester	(Kang et al., 2020)
Organism	Growth Development	Bivalves	*Macomona liliana*	Polyethylene terephthalate (PET).	(Hope et al., 2020)
		Crustaceans	*Hyalella azteca*	Polypropylene	(Au et al., 2015)
		Crustaceans	*Emerita analoga*	polypropylene	(Horn, Granek and Steele, 2020)
		Crustaceans	*Carcinus maenas*	polypropylene	(Watts et al., 2015)
		Crustaceans	*Nephrops norvegicus*	Polypropylene	(Welden and Cowie, 2016)
		Crustaceans	*Homarus americanus*	polyethylene terephthalate (PET).	(Woods et al., 2020)
		Microphytobenthos.	*Cyanobacteria*	Polyethylene terephthalate (PET).	(Hope et al., 2020)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)
		Terrestrial Veg.	*Lolium perenne*	high-density polyethylene (HDPE); polylactic acid (PLA).	(Boots et al., 2019)
		Worm	*Aporrectodea rosea*	high-density polyethylene (HDPE); polylactic acid (PLA).	(Boots et al., 2019)
		Zooplankton	*Daphnia magna*	Nylon, Polyethylene terephthalate.	(Hernandez et al., 2019)
		Zooplankton	*Artemia franciscana*	polyethylene terephthalate (PET).	(Kokalj, Kunej and Skalar, 2018)
		Zooplankton	*Ceriodaphnia dubia*	polyethylene terephthalate (PET).	(Ziajahromi et al., 2017)
Organism	Neurological	Fish	*Dicentrachus labrax*	polyethylene (80%); polyester (19%); rayon (1%).	(Barboza et al., 2020)
		Fish	*Trachurus trachurus*	polyethylene (80%); polyester (19%); rayon (1%).	(Barboza et al., 2020)
		Fish	*Scomber colias*	polyethylene (80%); polyester (19%); rayon (1%).	(Barboza et al., 2020)
Organism	Survivorship or Mortality	Crustaceans	*Hyalella azteca*	Polypropylene	(Au et al., 2015)
		Crustaceans	*Emerita analoga*	polypropylene	(Horn, Granek and Steele, 2020)
		Crustaceans	*Emerita analoga*	polypropylene	(Horn, Granek and Steele, 2020)
		Crustaceans	*Artemia franciscana*	polypropylene, polyethylene terephthalate.	(Kim et al., 2021)
		Crustaceans	*Nephrops norvegicus*	Polypropylene	(Welden and Cowie, 2016)
		Crustaceans	*Homarus americanus*	polyethylene terephthalate (PET).	(Woods et al., 2020)
		Zooplankton	*Daphnia magna*	polyethylene terephthalate	(Jemec et al., 2016)
		Zooplankton	*Ceriodaphnia dubia*	polyethylene terephthalate (PET).	(Ziajahromi et al., 2017)
Population	Adverse Reproductive Response	Crustaceans	*Emerita analoga*	polypropylene	(Horn, Granek and Steele, 2020)
		Nematodes	*Caenorhabditis elegans*	polyethylene terephthalate	(Liu et al., 2021)

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Mrs. NAPOLITANO. Thank you very much, Dr. Granek.

Wondering if the manufacturer has found replacements for some of the chemicals.

Before we begin, I would like to recognize Representative Lowenthal to say a few words about Mr. Moore.

Mr. Lowenthal.

Mr. LOWENTHAL. Thank you, Madam Chair.

This is my great pleasure to introduce my friend, Captain Charles Moore. Captain Moore is the founder of the Algalita Marine Research Foundation, and he is the research director of the Moore Institute for Plastic Pollution Research. Both of these are located in Long Beach, California.

Captain Moore has been credited, and rightfully so, with the discovery and the early research related to the North Pacific Gyre or what we commonly know as the Great Pacific Garbage Patch.

I have been lucky to have been able to call Charlie my friend for more than 30 years, and credit him for my interest and work related to addressing plastic pollution. After early research trips that Charlie would take out to the middle of the Pacific Ocean—he would go out on these research trips—he would come back and show me samples of the plastic that he had collected and he would explain to me all about his findings. This has had and continues to have a profound impact upon me.

Charlie, thank you for being here with us today, and I look forward to your testimony.

Thank you, Madam Chair.

Mrs. NAPOLITANO. Thank you, Mr. Lowenthal.

Mr. Moore, you may proceed.

Mr. MOORE. Thank you, Honorable Chair Napolitano and Ranking Member Rouzer and members of the committee, and Alan.

Plastics, the giant molecules that have come to characterize the modern age, are not well understood by the average citizen. We Americans love stories of explosive growth that leads to expansion of our economic base, and that plastic story is easily told. We had to manufacture the first plastics to win World War II. After the war, new mass-produced plastics replaced traditional material, and because of their infinite moldability, became the designer's dream that ushered in the throwaway society and, boy, did we throw plastics away. That story of plastic is a bad one.

I wish the Ellen MacArthur Foundation's estimate of an ocean half plastic, half fish by mid-century in just 29 years was alarmist propaganda, but it is based on peer-reviewed science. So is the estimate that we breathe in 16 bits of plastic every hour, a credit card's worth every week. Synthetic polymer, litter, and dust are different from their natural cousins because of their endurance. Even when they break apart and appear to go away, they persist as tiny microplastic pieces.

So, as I discovered these microplastics in the Great Pacific Garbage Patch in 1999, six times as much as the associated zooplankton, I have been writing and lecturing on plastic use and waste. The topic has little political baggage. No one has suggested to me that vagrant plastic is a good thing for our environment, and it would be nice to see more.

For today's hearing, my goal is to explain how waste plastics from the molded chair to the crispy chip bag to the broken down microplastic particle constitute serious impairments to land, air, and water quality, public health, our communities, and threaten the health of the biosphere.

Every year we make more plastic than the weight of the Earth's human population, and as much as one-third of it goes AWOL. For the ocean, a dump truck full goes in every minute. Many plastics are made from harmful monomers such as styrene, vinyl chloride, bisphenol A. A small percentage of these remain as free monomers, even after the majority have been chained together by industrial polymerization, and these free monomers can leach out. Also, the monomer additives in consumer plastics can leach into things that touch the plastic. Flame retardants, UV stabilizers, softeners, colorants, biocides, blowing and foaming agents are mixed into the resin. There may be a dozen or more and they can be half the weight of the product. Coming into contact with such products allows them to enter the circulatory system.

One of the most studied of these endocrine disrupters or gender benders is bisphenol A. BPA was among the EDs selected by the Endocrine Society in a detailed 2012 explanation of how they exploit sensitive hormone systems. BPA and similar molecules derail normal cellular function, organ development, and behavior, especially during fetal and neonatal period when babies are very sensitive to chemicals that alter hormone signaling. This results in damage to brain development, reproduction, the immune system, cardiovascular system, and metabolism.

The volume of laboratory studies on BPA numbers in the hundreds and the list of associated human health problems reads like a catalog of modern Western diseases. To highlight one, changes in mammary glands leading to the rise in breast cancer were viewed as conclusive. Plastic ingestion by whales and seals, fishes and birds, jelly fish, marine worms, bivalves, corals—said to find the plastic tasty—and zooplankton, point to its ability to mimic natural food. Even the terrestrial soils where a common soil arthropod consume plastic perturbing its gut microbiota.

Plastic food does not provide nutrients. It blocks passages, delivers pollutants, causes false feelings of being full, and damages the epithelial lining. These effects have been noted in nine species of fish, four species of mollusks, two crustaceans, two mammals, and

two human cell cultures. In a fish study, the microplastics crossed the blood-brain barrier and inhibited feeding behavior. What will they do in our brains? Being insulators, they are sure to interfere with electrical signaling.

Plastics were found in a human placenta in four of six women after childbirth, rendering the fetal placental unit vulnerable to adverse effects. Even leafy plants can contain the smallest waste plastic. They accumulate on the roots of the plants and in one study were transported to leafy parts of failed cress as it grew.

Plastic waste is hazardous waste, and the Environmental Protection Agency should take action to limit microplastic pollution. The Break Free from Plastic Pollution Act of 2021 has critically needed features, such as a moratorium on virgin plastic production, minimum recycled plastic content, a national bottle bill, and attention to environmental justice implication. We should make sure its funds go directly to cities and counties to build the needed infrastructure. The extended producer responsibility provisions of the bill need to support local decisionmaking. The American recycling infrastructure plan prepared by the National Recycling Coalition, Zero Waste USA, and the Institute for Local Self-Reliance provides guidance for these investments.

Thank you.

[Mr. Moore's prepared statement follows:]

Prepared Statement of Captain Charles Moore, LL.D., Research Director, Moore Institute for Plastic Pollution Research

Honorable Chair DeFazio, Ranking Member Sass, and Sub Committee Chair Napolitano

Since discovering the Great Pacific Garbage Patch a quarter of a century ago, I have been warning of the threat to Water Quality, Public Health, and Communities posed by plastic; not only plastic waste, but plastic in common use by all types of consumers. It only took three generations for man-made polymers, once an exotic material, to attain ubiquity. We wear them, sit on them, drive in them, carpet our homes with them, and sleep on them. Single use and many washable face masks are made of plastic fibers. We have made plastics the packaging system for nearly all our food and nearly every product we purchase. The road to technical modernity is paved with unintended consequences, and synthetic polymers have surprised us with unwanted outcomes that are only now being studied. From space junk in orbit, to trash on the slopes of Mount Everest, down to bottles at the bottom of the deep ocean, vagrant plastics symbolize technical know-how's dirty secret: developing exciting new products and materials is profitable, but issues of safety and recovery are often externalized, becoming "someone else's problem."

KEY CONCEPTS

- We live in the Plastic Age, but there is general ignorance about the plastic materials humans use most in their daily lives.
- Plastics are polymers, meaning that single molecules called monomers are joined together by modern chemistry into long chains composed of thousands of monomers, making them *Giant Molecules* [1].
- The vast majority of plastics in common use do not break down through biodegradation, or any other means, fast enough to matter. Thus plastic accumulates in the environment over time [2] [3]. Cracking and breaking of polymer chains by sunlight and oxidation results in the creation of microplastics (plastic smaller than 5 mm in size) [4].
- Microbeads are manufactured microplastics that have been purposely added to toothpaste and cosmetics, now largely banned through legislation [5]. The Clean Water Act regulates all plastic over 5 mm in size [6], however, most microplastics are unregulated, including fibers shed from clothing and those derived through fragmentation of larger objects.

- Manufacturers of plastic products largely divorce themselves from the issue of recovery of the material after its useful life. Collection and recovery of their vagrant plastic waste is left to municipalities, organized and informal recyclers, non-governmental organizations and concerned citizens. Unfortunately, current efforts fail to collect millions of tons per year worldwide [7].
- Plastics are often made from harmful chemical monomers, e.g., styrene, vinyl chloride, and bisphenol A; a percentage of which is still free even after most have been chained together by polymerization. Other chemical additives give desired characteristics to consumer plastics. These mixed in monomers can and often do leach out into things touching the plastic. The diversity of plastic materials represents a serious challenge for managing and predicting the impacts of plastic on the environment [8].
- Increasing numbers of studies are documenting developmental derailments, including hormonal disruption and cancers, attributable to certain plastic monomers, e.g., bisphenol A, styrene, and plastic additives, e.g., phthalates, brominated flame retardants and nonylphenols, at environmentally relevant doses [9].
- Plastic is now recognized as constituting a "Planetary Boundary Threat," which disrupts essential planetary systems.
- The political landscape is changing. Policy measures to combat plastic pollution are increasing rapidly at all governmental levels, national, state and local.

A Brief History of Plastic

Natural polymers, such as lignin, rubber and silk are abundant, but nature's plastics have not been implicated in persistent environmental or health issues, principally because they biodegrade. The post-World War II era has been increasingly dominated by man-made polymer materials designed to defeat oxidation and other natural decay processes. During WWII the warring nations were cut off from traditional supply routes for raw materials. This created an urgent need for ramping up production of important synthetic replacements which had been invented in the 1930's, such as nylon, polyvinyl chloride (PVC) and acrylic (polycarbonate/plexiglass). After the war, this new mass production technology would not be left idle. It would serve as an addition to the post-war economy of Keynesian consumerism, ushered in with a "Life Magazine" article from August, 1955 titled "Throw Away Living." The article included the famous photo by Peter Stackpole of a nuclear family—mom, dad and their daughter—throwing disposable food service items into the air next to a trash can. It claimed that the modern housewife would soon be liberated from the chore of doing dishes; she would simply throw them away and buy more. A decade later, in 1967, the father figure in the movie "The Graduate" famously exhorts the young protagonist, Benjamin Braddock (Dustin Hoffman): "There's a great future in plastics." This scene is often invoked by those concerned with plastic's dark side as an example of prophesy fulfilled, but with unforeseen consequences. If an age in history is defined by the material most used by the citizens of that era, then we live in the plastic age. With the help of polymer chemists, about half of all the world's chemists, plastic production at around 3 million tons in 1970 went up a hundred fold to over 300 million tons in 2020 [10].

Lack of Recovery Infrastructure

According to the Ellen MacArthur Foundation, nearly one-third of all plastics are not collected by any waste management system and end up in and on land, lakes, rivers and the ocean [11]. The quantity of plastic waste "improperly" disposed of per year worldwide by cities with an ocean coastline has been estimated at 31.9 mil metric tons [7]. Given the ominous proliferation of plastic in the environment, the question arises as to why more plastics are not recovered for reuse and recycling. There are several reasons, principal among them is that the cost to recover, clean and reprocess the used plastic exceeds, in nearly all cases, the cost of virgin plastic resin. Plastics are hydrophobic/lipophilic molecules that readily sorb (adsorb/absorb) oily contaminants that are not easily washed off. Plastics melt at low temperatures, which fail to oxidize these contaminants before becoming new plastic feedstock. For this reason, recycled plastics cannot be used in food contact applications and would require an expensive process of lining a recycled plastic container with a protective layer of virgin plastic. Furthermore, nearly all plastic products fashioned from recovered waste plastics require a significant percentage of virgin resin in order to meet specification requirements.

Due to the lack of profitability in recycling the innumerable different types of plastic, and the constant introduction of new plastics, nearly all recycled plastics are traditional resin types with a large market share, such as high density polyethylene

(HDPE #2), Polyethylene terephthalate (PET #1) and Polyproylene (PP #5). Still, many of these require subsidies by government or industry in order to be profitable. State bottle bills that require a deposit are one example. The lack of take back infrastructure for unprofitable plastics is a contributing factor in the proliferation of plastic waste in the environment.

Burning and so-called "chemical recycling" that processes mixed plastics for fuel create greenhouse gasses that contribute to climate change [12]. Theoretically, chemical recycling can create a feedstock for new plastics, but this is not currently the focus of that industry, as virgin feedstocks are far less expensive.

The Planetary Boundary Threat of Plastic Pollution

Plastic pollution is crossing what is termed a planetary boundary threat [13]. Three criteria are used to determine if plastic pollution is a planetary boundary threat:

1) Is it pooly reversible?
   a. This has clearly been met. It will be impossible to remove plastic waste from most niches of the environment, e.g. deep sea [14].
2) Are there effects only visible at a planetary scale?
   a. Villarrubia-Gomez [15] states: . . . "the mismanagement of discarded plastic is already implicated in globally systemic alteration to food webs, habitats, and biogeochemical flows." If it is not clear that criteria #2 has already been met, it shortly will be. In my own research, I have identified large areas of the ocean where surface plastics outweigh and in some cases outnumber the associated zooplankton [16]. The San Francisco Estuary Institute and the 5 Gyres Institute surveyed river and stream plastic inputs to San Francisco Bay. They estimated annual discharge of microplastics to the Bay via stormwater was 7 trillion.[17]
3) Is there a disruptive effect on Earth-system processes?
   a. Criteria #3: I believe there is enough evidence from widely diverse sources to make the claim that the fitness of earth's biology as a whole is negatively affected by plastics and their associated chemicals. Oceanographer Curtis Ebbesmeyer has termed ocean plastic pollution, "the greatest infection of the sea," and plastic pollution of air and fresh water threatens the circular loop of the water cycle as a clean source for drinking.

Health Effects

The volume of research in this area is growing exponentially, with new revelations of worrisome effects every year. As mentioned above, thousands of monomer molecules are linked together to produce a single giant polymer molecule, but industrial polymerization never succeeds in uniting 100% of the monomers. Three plastics in particular have been singled out because of the toxicity of their unbonded monomers: polycarbonates, polyvinyl chloride and polystyrene. The monomers of all three are ranked among the highest volume chemicals produced worldwide, each at billions of pounds annually.

Bisphenol A (BPA)

Probably no single plastic constituent has been studied as extensively or generated as much debate among scientists, industry and regulatory agencies as BPA, the key monomer in the synthesis of both polycarbonate plastics (including food packaging) and the resin lining of many food and beverage cans and water pipes. Though BPA was never used as a drug, it was first synthesized to be an oral synthetic estrogen. This came well before the discovery that reacting BPA with phosgene (a chemical warfare gas used in WWII) created polycarbonate, a clear material that is so shatter-proof that it performed well as windshield material in WWII aircraft. This welcome finding led to widespread use of polycarbonates in common nonbreakable items like baby bottles, sippy cups, 5-gallon water bottles, dinnerware, medical devices, eyeglass lenses, CDs and DVDs. BPA's high production volume, estrogen mimicry and especially widespread infant exposure triggered an avalanche of research, starting with the 1997 publication of a ground-breaking finding by developmental biologist Frederick vom Saal. He discovered that feeding very low doses of BPA to pregnant mice produced prostate enlargement in male offspring [18] [19]. That BPA is also widely used in thermal paper receipts, where it is free (non-polymerized) and directly adsorbed dermally while handling [20], has recently intensified concerns about the risks of exposure in adults too. The National Institute of Environmental Health Sciences defines endocrine disruptors (EDs) as chemicals that "may interfere with the body's endocrine system and produce adverse developmental, reproductive, neurological, and immune effects in both humans and wildlife." Unraveling the ED properties of BPA has helped overturn two traditional no-

tions in toxicology: that the dose makes the poison and that the relationship between dose and toxicity is linear. Thus, the response to low dose exposure cannot be predicted by what happens at high doses, and detrimental effects seen at low doses can be absent at high doses. Low dose exposure effects are seen in the picomolar and nanomolar ranges at which natural hormones are active. Hormonal systems are so designed that even modest changes in hormone concentrations within the low dose range can trigger significant biological effects.

BPA was among EDs selected by The Endocrine Society in a detailed 2012 explanation of how ED's exploit these sensitively engineered hormone systems. In essence, BPA and some similar molecules derail normal cellular function, organ development and behaviors, especially during fetal and neonatal periods which are specifically sensitive to chemicals that alter endocrine signaling [21] [22]. Consequently, exposure in adulthood can have negligible impact at the same exposure levels which have profound effects at critical points in early development. BPA binds not only to the nuclear and membrane estrogen receptors, but also to the thyroid hormone and androgen receptors, which likely explains its many affected endpoints in animal studies: prostate, mammary gland, brain development and behavior, reproduction, immune system, cardiovascular system and metabolism. In under just two decades, the volume of laboratory studies alone numbers in the hundreds, so a complete review of all the reports of harm is not possible here. However, the changes seen in mammary gland histology and rise in mammary (breast) cancer incidence are viewed as conclusive, though there is ample evidence also that the development of the prostate gland is affected by fetal or perinatal low dose exposure.

Vinyl chloride

Polyvinyl chloride (PVC) is sometimes dubbed *the poison plastic* because of toxicities associated with all stages of its lifecycle, starting with synthesis. Its vinyl chloride monomer is made from chlorine and ethylene and is a highly flammable and explosive gas. By far, the number one use of vinyl chloride is producing PVC polymer for plastics like shower curtains, window frames, house sidings, household plumbing, garden hoses, medical tubing, carpeting, upholstery, school lunch boxes and backpacks. Many studies dating back as far as the 1930s demonstrated that even short-term exposure to vinyl chloride in laboratory animals and factory workers caused liver damage, and by the early 1970s, studies linking rare hepatic tumors (angiosarcoma) to chronic workplace exposure via inhalation or dermal contact had the attention of industry and governments [23]. Worldwide, air pollution in communities around factories using vinyl chloride also became an issue.

Styrene

The styrene monomer is the building block of polystyrene plastics. The International Agency for Research on Cancer (IARC) has determined that styrene is a possible carcinogen, and the National Toxicology Program classifies styrene as "reasonably anticipated to be a human carcinogen." For the general public, breathing indoor air, as well as ingestion of styrene migrants into foods and beverages packaged or served in polystyrene are primary routes of exposure. For example, several studies have documented styrene contamination of hot beverages (like tea, milk and coffee) served in crystal or foamed polystyrene cups and in water bottled in polystyrene, with increasing contamination as the beverage temperature, fat content and time in the container increase [24].

Additives to Plastic Polymers

The categorical list of allowed additives is alone alarming: catalyzers, hardeners, strengtheners, softeners, flame retardants, lubricants, antioxidants, colorants, texturizers, stabilizers, UV protectors and blowing/foaming agents. Industry has multiple options within each category. Additives can be over half the mass, and the number in a finished product can easily be in the double digits, all of which are unknown to the consumer because the ingredients are deemed proprietary.

Furthermore, some products have multiple plastic parts, like baby bottles with a nipple, ring, bottle and cap, multiplying the number of additives present. Unlike a plastic's monomers, the additives are not chemically bonded to the polymer, just mixed in, and thereby free to migrate out depending on conditions the product encounters. Heating, freezing, acidity, microwaving, dishwashing, UV radiation, storage duration and impact stress are all conditions which can promote leaching out of additives. This discussion focuses on two high production volume additives associated with health hazards: phthalate plasticizers and polybrominated diphenyl ether flame retardants.

Phthalates

Phthalates are a family of esters used as softeners primarily in PVC plastics. They allow the polymer molecules to slide along one another. By weight they can comprise as much as half of the final product. Common consumer items containing phthalates include food containers and wrappers, shower curtains, raincoats, floor tiles, rubbery or squishy toys, vinyl upholstery and car interior/dash components (that *new car smell*). Plastic medical devices like infusion bags and tubing often derive their flexibility from phthalates, a concern in both adults undergoing hemodialysis and in neonatal intensive care units where exposure can be continuous for extended periods. Early life exposure in male rodents has identified a *phthalate syndrome* with many features of androgen deficiency and feminization of male reproductive development: reduced testosterone production, *decreased sperm counts*, malformations of the epididymis, seminal vesicles, vas deferens and prostate, as well as hypospadias, cryptorchidism, nipple/areolae retention and a reduced anogenital distance indicative of demasculinization of the perineum. Phthalates are also known obesogens in animal models. Exposure *in utero*, in newborns, or in adulthood all cause weight gain with increased number and size of adipocytes[25]. Because of the clear cut anti-masculine effect of early life exposure in rodents and an emerging literature documenting similar effects in humans, the U.S. Congress, in 2008, placed permanent bans on three phthalates—DEHP (di-2-ethylhexyl phthalate), DBP (dibutyl phthalate) and BBP (benzyl butyl phthalate)—and an interim ban on three others—DINP (di-isononyl phthalate), DIDP (di-isodecyl phthalate) and DnOP (di-n-octyl phthalate)—in childcare items designed for children 3 years and under that can be placed in a child's mouth: includes toys, baby bottles, sippy cup, sucking aids and teethers. The permanent ban is most restrictive as it applies to any children's toy. Similar bans on the same phthalates were enacted three years earlier in the European Union. Manufacturers of child care items are free to use any other phthalates or substitute plasticizer they deem safe, based on industry's internal assessment of safety.

Polybrominated diphenyl ethers (PBDEs)

PBDEs arose as a replacement for the legacy pollutant PCB. They are a family of flame retardants widely used in products like upholstery, textiles, bedding, televisions and electronic appliances where flammability is an issue. Because they are not chemically bonded in plastics, PBDEs migrate out into air and dust and are a worldwide environmental contaminant. PBDE levels are especially high in offices because of computers and other electronic devices. Whereas indoor air and diet are thought to be main routes of exposure for most adults, dust may be more important for toddlers because of greater hand to mouth activity. The breast milk levels of North American women indicate the highest body burden in the world, 40 times higher than the highest levels reported for Swedish women. Like PCBs, PBDEs are structurally similar to the thyroid hormone thyroxine (T_4), so it's not surprising that laboratory studies find thyroid-disrupting effects attributable to PBDEs. In 2003, California passed a bill to phase out certain PCBs by 2008. The flame retardant industry argues that the benefits accrued through saving lives by fire prevention outweigh any medical consequences. Over time, however, the cost/benefit ratio is likely to shift[26].

KEY ACTIONS AND POLICY MEASURES TO REDUCE PLASTIC POLLUTION

Prevention efforts work better than recovery at reducing impacts to the environment[7 27]. Cleanup cannot address the waste going into the environment today[27]. Ending waste means rethinking waste management. Waste materials are actually resources waiting to be reused. Landfills will be and are being mined for raw materials as they become scarce. Additionally, landfilling requires valuable space and is not part of a circular economy. The plastic never creates new products. We need to embrace the cradle to cradle concept and encourage the circular economy to increase the value of materials. Bans, such as the plastic bag ban in California, the Microbead-Free Waters Act of 2015 microbead ban, and local municipal Styrofoam bans have been shown to drastically reduce those types of litter from ending up in the environment. Corporate social responsibility initiatives, even volunteer ones like Operation Clean Sweep, if adhered to, result in reductions[28]. Extended Producer Responsibility measures like those proposed in the Break Free From Plastic Pollution Act of 2021 are gaining prominence based on the idea that prevention and cleanup should be subsidized by the producers most responsible for the waste. The bill has critically needed features such as a moratorium on virgin plastic production, minimum recycled plastic content, a national bottle bill and attention to environmental justice implications. We have to make sure that funds go directly to cities

and counties to build the needed infrastructure. The EPR provisions of the bill have to support local decision-making. The American Recycling Infrastructure Plan (prepared by the National Recycling Coalition, Zero Waste USA and Institute for Local Self-Reliance) provides the guidelines for investments.

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Mrs. NAPOLITANO. Well, thank you for your testimony, Mr. Moore. I notice that not every plastic is being recycled, so that is an addition to that.

Dr. Pletl, you may proceed.

Oh, I am sorry. Ms. Katie Huffling. I am sorry, I got ahead of myself here.

You may proceed, Ms. Huffling.

Ms. HUFFLING. Thank you.

Thank you to Chair Napolitano, Ranking Member Rouzer, and distinguished members of the subcommittee. Thank you so much for the opportunity to provide testimony here today.

My name is Dr. Katie Huffling, and I am the executive director of the Alliance of Nurses for Healthy Environments. I am also a nurse midwife.

The alliance is the only national nursing organization focusing solely on the intersection of health in the environment. My work in environmental health began early in my midwifery career when I recognized what an important component the environment is to having a healthy pregnancy and healthy babies. I now work with nurses and nursing organizations around the country and globally to address the health impacts caused by environmental toxins.

A core part of nursing practice is working to prevent disease. We work every day to help our patients stay healthy. Unfortunately, we now know that exposures to environmental toxins are implicated as one of the sources of rising rates of health issues in children such as asthma, leukemia; neurodevelopmental impacts such as autism and ADHD; diabetes and obesity. Environmental exposures make it much more difficult for nurses and other health professionals to do our jobs.

So why are environmental exposures such an issue in children's health? Children are not just little adults; they eat more, breathe in more air, and drink more per body weight than adults. They ingest more toxins pound for pound, and due to their hand-to-mouth activities and time spent on the floor, are at increased risk of exposures. And their little bodies are still developing, so they process environmental contaminants differently than adults and may experience more significant health impacts.

Besides the pain and suffering experienced by children and families facing health impacts from environmental exposures, there are also significant financial impacts. In the United States, we are spending approximately $76.6 billion every year on environmentally related diseases in children. The average cost for one child with cancer, including healthcare costs and parental days lost from work, is $833,000.

Just the loss of one IQ point decreases that child's lifetime earning potential by $11,000 to $15,000. This amount quickly adds up as IQ points are lost and can mean the difference between poverty and middle class for these children over a lifetime. By addressing environmental causes of disease, we have an immense opportunity to improve the lives of children and families across the United States and significantly reduce healthcare and societal costs.

As we are seeing with PFAS water contamination and have seen historically with many other chemical exposures linked to human health impacts, we have a failure of regulatory oversight. Chemicals need to be proven safe before being put on the market. When chemicals are pulled from the market only after harm has occurred, our children and families are unwittingly being used as human experiments.

Also, the way safety testing is currently performed on chemicals does not mirror the way we are all exposed to chemicals in everyday life. Chemicals are usually tested individually; however, none of us are exposed to a single chemical on a single day. Research is greatly needed into the area of these cumulative exposures for regulatory agencies to make appropriate decisions related to the health impacts of chemical exposures.

PFAS exposure from water sources is very concerning for the health of infants and children. PFAS can pass through the placental barrier and has been found in cord blood, indicating fetal exposure during pregnancy. It is also passed through breast milk. And if an infant is formula fed, they would be getting exposed to PFAS every time they were fed if the drinking water source was contaminated.

An area of great concern to the nurses I work with is the link between PFAS exposure and decreased vaccine effectiveness. I was recently part of a meeting of the National Academy of Sciences

committee investigating guidance on PFAS testing and health outcomes. Over the course of the meeting, it became clear that communities are frightened. Their health providers don't know how to assess for exposures and don't know what to do if an exposure is found. They are frustrated that exposures from water supplies are taking so long to be assessed and addressed. And many communities, especially small communities, lower income communities, and some communities of colors, are struggling to pay for filtration systems that will remove PFAS from their water supplies. They are wondering why they are being forced to pay for a problem they did not cause.

Clean water is essential to health. The alliance strongly supports efforts that will decrease environmental exposures through our drinking water system and encourages this committee to move swiftly to address these growing areas of concern.

Thank you so much.

[Ms. Huffling's prepared statement follows:]

Prepared Statement of Katie Huffling, DNP, R.N., CNM, FAAN, Executive Director, Alliance of Nurses for Healthy Environments

Thank you for the opportunity to provide testimony here today. My name is Dr. Katie Huffling and I'm the Executive Director of the Alliance of Nurses for Healthy Environments. I am also a nurse-midwife. The Alliance is the only national nursing organization focusing solely on the intersection of health and the environment. My work in environmental health began early in my midwifery career when I recognized what an important component the environment is to having a healthy pregnancy and healthy babies. I now work with nurses and nursing organizations around the country and globally to address the health impacts caused by environmental exposures.

Thank you for holding this hearing to learn more about emerging contaminants in water and their potential for health impacts, especially in those who are most vulnerable—such as infants and children. A core part of nursing practice is working to prevent disease. We work every day to help our patients stay healthy. We would be happy to see you just once a year for your annual wellness visit, rather than a sick visit for your child. Unfortunately, we now know that exposures to environmental toxins are implicated as one of the sources of rising rates of health issues in children such as asthma, leukemia, neurodevelopmental impacts such as autism and ADHD, diabetes, and obesity.[1] Environmental exposures make it much more difficult for nurses and other health care professionals to do our jobs.

So why are environmental exposures such an issue in children's health? Children are not just little adults. They eat more, breathe in more air, and drink more per body weight than adults. They ingest more toxins pound for pound and due to their hand to mouth activities and time spent on the floor are at increased risk of exposures. And their bodies are still developing so they process environmental contaminants differently than adults and may experience more significant health impacts.

Besides the pain and suffering experienced by children and families facing health impacts from environmental exposures, there are also significant financial impacts. In the United States, we spend approximately $76.6 billion every year on environmentally related diseases in children.[2] The average cost for one child with cancer, including healthcare costs and parental days lost from work, is $833,000.[3] Just the loss of one IQ point decreases that child's lifetime earning potential by $11,000–$15,000.[2] This amount quickly adds up as IQ points are lost and could mean the difference between poverty and middle class for these children over a lifetime. By addressing environmental causes of disease, we have an immense opportunity to improve the lives of children and families across the United States and significantly reduce healthcare and societal costs.

As we are seeing with PFAS water contamination, and have seen historically with many other chemical exposures linked to human health impacts, we have a failure of regulatory oversight. Chemicals need to be proven safe before being put on the market. When chemicals are pulled from the market only after harm has occurred, our children and families are unwittingly being used as human experiments. Also,

the way safety testing is currently performed on chemicals does not mirror the way we are all exposed to chemicals in everyday life. Chemicals are tested individually, however none of us are exposed to a single chemical in our daily life. Research is greatly needed into the area of these cumulative exposures for regulatory agencies to make appropriate decisions related to the health impacts of chemical exposures.

PFAS exposure from water sources is very concerning for the health of infants and children. PFAS can pass through the placental barrier and has been found in cord blood, indicating fetal exposure during pregnancy. It is also passed through breastmilk and if an infant is formula fed, they would be getting exposed to PFAS every time they were fed if the drinking water source was contaminated. An area of great concern to the nurses I work with is the link between PFAS exposure and decreased vaccine effectiveness.[4]

I was recently part of a meeting of the National Academy of Sciences committee investigating guidance on PFAS testing and health outcomes. Over the course of the meeting, it became clear that communities are frightened. Their health providers don't know how to assess for exposures and don't know what to do if an exposure is found. They are frustrated that exposures from water supplies are taking so long to be assessed and addressed. And many communities, especially small communities, lower income communities, and some communities of colors, are struggling to pay for filtration systems that will remove PFAS from their water supplies. They are wondering why they are being forced to pay for a problem they did not cause.

Clean water is essential to health. The Alliance strongly supports efforts that will decrease environmental exposures through our drinking water system and encourages this committee to move swiftly to address these growing areas of concern.

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Mrs. NAPOLITANO. Thank you, Ms. Huffling. It is important they also check the imports of the U.S. because we don't test any of those.

Mr. Pletl, you may proceed. How do you pronounce your name, please?

Mr. PLETL. Certainly. Last name pronounced Pletl, just like metal.

Mrs. NAPOLITANO. Pletl. Thank you, sir. Thank you. You are on.

Mr. PLETL. Good morning, and thank you, Chair Napolitano, Ranking Member Rouzer, and all members of the subcommittee, for the invitation to testify before you today on behalf of the National Association of Clean Water Agencies, or NACWA, on the important issue of emerging contaminants.

I am Dr. James Pletl, the director of the Water Quality Department for the Hampton Roads Sanitation District, which provides public sanitary sewer services to 1.7 million people in southeastern Virginia. I am honored to be here today to represent NACWA and the more than 340 public clean water utilities the association represents nationwide, who like HRSD, are on the front lines protecting public health and the environment every day. I appreciate

the opportunity to testify today regarding the perspectives of the public clean water utility community and our recommendations for addressing emerging contaminants.

Emerging contaminants include a wide array of chemical substances that can be detected in the environment, such as pharmaceuticals, personal care product ingredients, nanomaterials, and other chemicals, including per- and polyfluoroalkyl substances, or PFAS.

Public clean water utilities do not produce or manufacture these chemicals or use them in the treatment process. Utilities simply receive PFAS in the raw influent that arrives at the treatment plant, which includes a mixture of wastewater streams from domestic, commercial, and industrial sources. Utilities are required to treat the influent they receive in accordance with all appropriate laws and regulations.

Clean water utilities were not designed to treat these emerging contaminants, and treatment options are limited and costly. PFAS presents significant treatment challenges by their very design as forever chemicals, with most technologies unable to destroy the strong carbon fluorine bond. Currently, there are no reasonably cost-effective techniques available to treat or remove PFAS in the sheer volume of wastewater managed daily by clean water utilities. HRSD alone treats 55 billion gallons of wastewater annually.

For these reasons, source control and eliminating the use of these chemicals in the manufacture of our everyday commercial and consumer products must be at the heart of any fair and cost-effective efforts to reduce PFAS entering the environment. We urge the Federal Government to advance understanding of the PFAS risk to human health and the environment, and based on improved understanding, take necessary measures to eliminate nonessential uses and reduce PFAS at its source of use.

NACWA strongly supports EPA using its authority under the Clean Water Act to evaluate and, as necessary, develop effluent limitation guidelines and pretreatment standards for industrial categories discharging PFAS-containing wastewater directly or through municipal sewer systems. However, as these standards are developed, there are subsequent burdens placed on clean water utilities which administer and enforce their local pretreatment programs.

We appreciate efforts by Congress to provide important funding to clean water utilities to help them afford the new costs associated with addressing PFAS through the pretreatment program.

It is important to note that a clean water utility's industrial pretreatment program will not control or eliminate the domestic inputs of PFAS to the wastewater treatment plant because they originate from the use of everyday household products, such as nonstick cookware, personal care products, waterproof clothing, and others. Removing PFAS chemicals from municipal wastewater influent and effluent will not be readily affordable in the near future because the advanced treatment technology required is expensive and there is little benefit to scale of treatment. Large and small systems will experience significant financial burden if required to adopt these technologies. These financial constraints underscore

the need to first reduce industrial inputs and nonessential uses of PFAS and consumer goods.

Utilities are also understandably concerned about the development of any requirement to meet water quality criteria for PFAS. Unless water quality criteria account for background levels, cost, and the priority of putting upstream industrial controls in place first, the clean water utilities could be faced with a cost and compliance crisis; namely, permit limits that simply cannot be met without unaffordable cost.

Better scientific understanding of PFAS fate, risk, and transport is also crucial to help municipalities make sound management decisions with regards to treated wastewater residual solids or biosolids. Increased concerns over PFAS and municipal residuals have appeared at the State level. Some clean water utilities are facing severe regulatory constraints on their biosolids management programs without sufficient scientific study. Clear Federal guidance is critical to support the local management of residuals in a safe and cost-effective manner.

In closing, as science further evolves on PFAS and how to best protect public health, public utilities stand ready to do our part to ensure the communities we serve are best protected from risk. We look to Congress and the administration to be a long-term partner with us and assist our communities in this shared effort.

NACWA thanks you for the invitation to provide this testimony. I look forward to continuing to work together on policy solutions that protect the health of our communities through the application of risk-based science.

That concludes my testimony. I would be happy to answer any questions the committee might have.

[Mr. Pletl's prepared statement follows:]

Prepared Statement of James J. Pletl, Ph.D., Director, Water Quality Department, Hampton Roads Sanitation District, Virginia Beach, Virginia, on behalf of the National Association of Clean Water Agencies

Good morning and thank you to the Chairs DeFazio and Napolitano, Ranking Members Graves and Rouzer, and all members of the Subcommittee for the invitation to testify before you today on behalf of the National Association of Clean Water Agencies, or NACWA, on the important issue of emerging contaminants.

My name is James Pletl, and I am the Director of the Water Quality Department for the Hampton Roads Sanitation District (HRSD), which provides public sanitary sewer services to 1.7 million people in Southeastern Virginia. I am honored to be here today to represent NACWA and the more than 340 public clean water utilities the Association represents nationwide who, like HRSD, are on the front lines protecting public health and the environment every day.

Emerging contaminants include a wide array of chemical substances that, due to increasingly-sensitive analytical methods, can now be detected in the environment at increasingly lower levels and are garnering attention because many have not yet been fully evaluated as to the risks they may pose. Emerging contaminants include pharmaceuticals, personal care product ingredients, nanomaterials, and other chemicals including per- and polyfluoroalkyl substances, or PFAS. PFAS chemicals have been manufactured and used in countless everyday products in the U.S. and around the world since the 1940s and continue to be found in our consumer goods. Unfortunately, while these manufactured chemicals have existed for decades, much about them remains unknown. While we can detect PFAS in the environment at the part per trillion level, the potential risks to our environment and ourselves is still being researched and the scientific understanding of PFAS continues to develop, including how these chemicals move through the environment and the toxicology at various concentrations.

Clean water utilities closely follow emerging contaminant-related issues because our mission is to protect human health and the environment, and we know we may be called upon to help address them. I appreciate the opportunity to testify today regarding the perspectives of the public clean water utility community and our recommendations for addressing emerging contaminants. These include focusing on source control, developing our scientific understanding of toxicity and risk assessment to guide regulatory policy, and ensuring that the costs of controlling current industrial sources as well as addressing pre-existing pollution impacts are not unfairly shifted to public ratepayers who are already facing affordability challenges and were not the cause of the pollution.

I'd like to emphasize two points at the outset.

First, public clean water utilities are passive receivers of PFAS, meaning utilities do not produce or manufacture these chemicals or use them in the treatment process. Utilities simply receive PFAS in the raw influent that arrives at the treatment plant, which includes a mixture of wastewater streams from domestic, commercial and industrial sources. Utilities are required to treat the influent they receive in accordance with all appropriate laws and regulations. Given the wide range of uses for these chemicals, from consumer products in our homes to the vast commercial and industrial applications, coupled with their resistance to degradation, raw wastewater arriving at the municipal treatment plant is likely to contain some level of PFAS. Whether influent concentrations are relatively lower or higher will likely depend on the nature of the user's discharges to the treatment plant.

Second, clean water utilities were not designed to treat these emerging contaminants, and treatment options are limited and costly. PFAS present significant treatment challenges by their very design as "forever chemicals," with most technologies unable to destroy the strong carbon fluorine bond. Currently, there are no reasonably cost-effective techniques available to treat or remove PFAS in the sheer volume of wastewater managed daily by clean water utilities.

For these reasons, source control and eliminating the use of these chemicals in the manufacture of our everyday commercial and consumer products must be at the heart of any fair and cost-effective efforts to reduce PFAS entering the environment. We urge the federal government to advance understanding of the risks to human health and the environment associated with PFAS and, based on improved understanding, take necessary measures to eliminate non-essential uses and reduce PFAS at its source of use. NACWA has encouraged EPA to look holistically across the broad array of existing federal statutes and regulations and develop a comprehensive path forward to best protect human health and the environment given limited resources to do so.

Under the Clean Water Act, NACWA strongly supports EPA using its authority to evaluate and, as necessary, develop effluent limitations guidelines (ELGs) and pretreatment standards for industrial categories discharging PFAS-containing wastewater directly or through municipal sewer systems. Industries that discharge their wastewater to municipal wastewater treatment plants would be regulated through the National Pretreatment Program, a successful cooperative effort among federal, state, and local clean water utility authorities, that gives clean water utilities the ability to develop local limits to better meet the needs of their specific treatment facilities. Using national ELGs and pretreatment standards would also help to establish an approach to regulating PFAS where the industrial creators of these chemicals are responsible for the cost to address them, rather than shifting their costs to municipal ratepayers.

ELGs and the pretreatment program facilitate EPA targeting the highest-priority sources of chemicals of concern, significantly and effectively reducing industrial pollutants before they enter the municipal wastewater treatment plant or waterways. However, as these standards are developed, there are additional burdens created and required of clean water utilities which administer and enforce their local pretreatment programs. Utilities may need to create a pretreatment program if they do not have one already or they may need to scale up an existing pretreatment program to cover a potentially expansive list of upstream industrial sources of PFAS.

We appreciate efforts by Congress to provide important funding to clean water utilities to help them afford the new costs associated with addressing PFAS through the pretreatment program. Congressional attention is also important to ensure EPA has the resources needed to identify the appropriate industrial categories and set science-based guidelines. NACWA is opposed to any efforts to bypass science or established regulatory processes or set timelines that cannot credibly be met. It is, in short, critical to get this right before proceeding with any actions and to take the time necessary to do so based on sound science.

Addressing PFAS through ELGs and the industrial pretreatment program can help reduce some of the largest PFAS sources into the wastewater treatment sys-

tem. But it must be recognized that a municipal clean water utility's industrial pretreatment program will not control or eliminate the domestic inputs of PFAS to the wastewater treatment plant from everyday household products such as nonstick cookware, stain resistant carpets, personal care products, waterproof clothing, and many others.

Acknowledging the limits of source control and pretreatment, some are looking to clean water utilities to provide treatment technology to target PFAS. But due to the widespread use of these chemicals, their persistence in the environment and the technological and financial limitations of large-scale wastewater treatment, public clean water utilities simply cannot treat PFAS to levels being expected of drinking water systems with current technology. Removing PFAS chemicals from municipal wastewater influent and effluent will require advanced treatment technologies such as granulated activated carbon, ion exchange, reverse osmosis, or pyrolysis—all of which are prohibitively expensive for the substantial volume of wastewater that will need to be treated. Many of these treatment technologies result in residuals that would be PFAS-contaminated and require their own treatment and management options; leading to a never-ending circular path of waste that is extremely expensive to eliminate.

For these reasons, utilities are understandably concerned about the development of any regulated requirement to meet standards of quality like water quality criteria. EPA has time and again stated that it will not consider implementation costs or other practical realities when it develops water quality criteria—they must only be based on the science. Unless any eventual water quality criteria account for background levels, cost, and the priority of putting upstream industrial controls in place first, the clean water utility communities could be faced with a cost and compliance crisis: namely, permit limits that simply cannot be met. Once these requirements are written into regulation a municipality has little opportunity to modify them.

Better scientific understanding of the actual risks posed by PFAS and the environmental and health benefits of actions being taken to address them is also crucial to help municipalities make sound management decisions for the communities they serve. This is especially true in the management of treated wastewater residual solids, or biosolids, where there are currently only three reliable management options: they can be applied to land as a fertilizer and soil amendment, sent to a landfill, or incinerated.

Each of these biosolids management options may have their own challenges when emerging contaminants are considered. While EPA continues its work on understanding the potential risks of PFAS in biosolids, increased concerns over PFAS in municipal residuals have started to appear at the state level. Some clean water utilities are facing severe regulatory pressures on their biosolids management process without sufficient scientific study on how these new regulations will impact their management of thousands of tons of residuals generated each day; a necessary result of the wastewater treatment process. Clear federal guidance is critical to provide assurances regarding how the management of residuals can be safely and cost-effectively carried out. Biosolids land application has remained a long-held and safe practice with clear benefits to utilities, farmers, and the environment. Curtailing or banning land application due to trace levels of PFAS will create a significant challenge for public utilities, increase loading to landfills—which can in turn negatively impact clean water utilities that are looked at to treat landfill leachate—or put increasing pressure on already dwindling incinerator capacity, all at increased cost to ratepayers.

Lastly, PFAS and other emerging contaminants highlight the need for Congress to continually focus on and modernize the process by which U.S. EPA and other federal agencies review and approve chemicals to be produced and used in the marketplace. The long-term environmental fate and potential health and ecosystem impacts must be considered prior to production and use of any chemical, rather than looking to communities and public utilities to remediate or remove new concerning compounds after they have been used and discarded.

As public utilities across the country deal with a variety of growing water quality challenges and increasing compliance obligations, communities are facing critical decisions on how to invest in and update their critical clean water infrastructure while maintaining affordable rates for customers. Each time an emerging contaminant comes to the forefront for potential regulation, it must be reviewed through a consistent and scientific regulatory process with a focus on meaningful risk assessment and not simply reacting to public/political outcry.

In closing, as science further evolves on PFAS and how to best protect public health, public utilities stand ready to do our part to ensure the communities we serve are best protected from risk. As stewards of the environment and public

health this is our key goal, and we look to Congress and the Administration to be a long-term partner with us and assist our communities in this shared effort.

NACWA thanks you for the invitation to provide this testimony, appreciates the ongoing engagement by the Committee with the public clean water sector on this issue, and looks forward to continuing to work together on policy solutions that protect the health of our communities through the application of thorough, risk-based science. That concludes my testimony, and I would be happy to answer any questions the Committee may have.

Mrs. NAPOLITANO. Thank you, Mr. Pletl. It is great testimony because I think it is incumbent upon all of us to begin to question where all these contaminants are coming from, what we are doing about it, and how we can help address it.

Thank you to all our witnesses. We will now have questions for you, and we will use the timer to allow 5 minutes of questions from each Member. If there are additional questions, we may have additional rounds as necessary.

I will begin the questioning, and I will give the order. We have Mr. Huffman, Mr. Malinowski, Mr. Pappas, and Mr. Cohen following me and my colleagues.

The question for the panel of witnesses, all of you, I will ask a simple question of the witnesses to start discussion, a simple yes or no will do.

Do you think that Congress and EPA and other agencies are doing all they can to protect human health from all emerging contaminants?

I will start with Dr. Southerland and then go down the line.

Ms. SOUTHERLAND. Absolutely not.

Mrs. NAPOLITANO. Mr. Kennedy?

Mr. KENNEDY. No, ma'am.

Mrs. NAPOLITANO. Ms. Granek?

Ms. GRANEK. Absolutely not.

Mrs. NAPOLITANO. Mr. Moore?

Mr. MOORE. No.

Mrs. NAPOLITANO. Ms. Huffling?

Ms. HUFFLING. No, they are not.

Mrs. NAPOLITANO. Thank you.

And Mr. Pletl?

Mr. PLETL. That is no.

Mrs. NAPOLITANO. Thank you very much.

We all agree with you. We think that we require more research and a more honest approach to this.

The followup question is for Dr. Southerland. You said you don't think Congress and EPA and other agencies are doing enough to protect us from the emerging contaminants. What actions would you prioritize?

Ms. SOUTHERLAND. Thank you, Chairwoman, for that question. They really need to build on this National Emerging Contaminant Research Initiative. It has really gotten off to a great start, but it is really right now just focused on drinking water quality. Congress needs to expand the mission of that research initiative and require this national list of priority contaminants to be developed. They also need to require a coordinated monitoring program to look for these contaminants so we can find out where we need to focus our efforts.

And then I really think we have to have some kind of targeted appropriation that will allow EPA to really expand the tiny little effluent guideline program they have for these technology-based permit limits on industries. I think they only have like 20 people now, and they cannot possibly address this. The water quality approach that Jim talked about in his testimony takes years and years to develop water quality criteria and standards and TMDLs to implement. The only fast way to do this is technology based.

Mrs. NAPOLITANO. Well, do you think that EPA shouldn't be the only agency?

Ms. SOUTHERLAND. Well, absolutely. We need to have the new chemical review programs under the Toxic Substances Control Act and the Pesticide Act really take a look at what they need to do. We have some specific suggestions for the TSCA program. Right now, they allow—like GenX, which is certainly a problem in North Carolina, was passed through the new chemical review program several years ago and now we have this enormous problem from that.

Mrs. NAPOLITANO. It got imported.

Ms. SOUTHERLAND. Exactly. So EPA needs to improve their new chemical review program under the Toxic Substances Control Act and require more comprehensive data from industry.

Mrs. NAPOLITANO. Thank you very much.

In your testimony, you mentioned several areas that require additional research on emerging contaminants, including how these contaminants interact with each other and how they interact with the environmental stressors. Even though additional research is needed, do you think we should wait until the research is done before we begin action on these?

Dr. Granek?

Ms. GRANEK. Thank you for the question, Chair Napolitano. Although there is more research needed, there is ample evidence that action is needed now. We have ample data on all of these groups of contaminants indicating environmental impacts, impacts on aquatic and marine organisms, and on human health.

So, waiting for more data, we could wait for a thousand years for more data. We have enough data to act to know these chemicals are problematic and that the interactions of these chemicals are problematic.

Mrs. NAPOLITANO. There has been a lot of research done on it already.

Ms. GRANEK. Yes.

Mrs. NAPOLITANO. All research. We need to be——

Ms. GRANEK. There is a large body of research, hundreds of papers if you look across all of these compounds.

Mrs. NAPOLITANO. Go ahead.

Ms. GRANEK. I was just going to say, the area of research that is really lacking is looking at how these compounds interact and affect organisms. We have a number of studies, but that is probably the area that has the least amount of research done.

Mrs. NAPOLITANO. Thank you.

Real quickly, Mr. Kennedy. I appreciate you sharing with the committee the story of Pittsboro.

Do you think the Federal Government is doing enough to keep the water supply of towns like yours, small cities, safe for use, and what is your recommendation?

Mr. KENNEDY. I would say no, Madam Chair. And my recommendation will be centered upon source reduction. I do believe that we need to find the source of these contaminants. I do believe that we need to invest in alternatives to PFAS, PFOA, and other types of emerging contaminants, find equivalent materials that provide the same benefits of these without the negative externalities.

And so, we do feel as a small town that we are kind of left on the island. We have a significant impediment in terms of finances in order to try to eradicate these from our drinking water, and we are struggling to find reasonable solutions despite our creativity and need to correct those.

Mrs. NAPOLITANO. Thank you very much.

I am sorry, Mr. Rouzer, you're next.

Mr. ROUZER. Thank you, Madam Chair.

Dr. Pletl, a couple questions for you before I get to some of the others. So why is careful analysis of contaminants of emerging concern so important? And then followup, what happens if this process is short-circuited?

Mr. PLETL. So, at the basis of most of our process in this world of dealing with emerging contaminants is monitoring and analytical measurements. And having reliability and analytical measure is extremely critical. For example, right now, there is a proposal out for a particular method, an analytical method, to be used to evaluate PFAS chemicals, and the position right now is that that analytical method can be used for a number of matrices, biosolids, water, what have you.

The problem with that in its current state is that it has only been done in its—performance has only been established in a single laboratory, and we really haven't had a chance to see what that performance looks like. So, at the same time, EPA is recommending that we start to use this method as we make measurements out in the environment, make measurements in effluent, influent, so have you.

So, we need to have reliability, because if we are going to do this within a permanent regulatory program, there are liabilities associated with this information. And I personally sign hundreds of discharged monitoring reports every year citing the truth and accuracy of the information that is submitted to the State, in this case, Virginia, and to do that for a method that has only been shown to perform in a single lab falls far short of what we normally expect for analytical methods.

So, the foundation of this program, this approach really does depend on analytical measurement. And we have lots of different universities and research labs across the country that are using different methods. It is extremely important when we start to talk about regulating compounds so that the foundation of that whole process, the analytical measurement, we are sure that the information is reliable, so that when current actions and legal liability that comes along with those permit actions are defensible, we know that

we can go back to that data and that data is defensible. So, the analytical measurement is critical.

Did I answer all of your question?

Mr. ROUZER. Yes. And following up on that, so what type of impact does this have for ratepayers?

Mr. PLETL. So if we, for example, start to take some measurements and those measurements don't have the certainty that we believe they do, and we are going to make decisions on whether we should install a new treatment technology at a wastewater treatment plant to perhaps address that, the compound or the group of compounds, that is going to increase the cost of treatment and that cost is going to be translated to the ratepayer.

So, we need to be sure that the information that we are using is reliable in deciding what technologies will be installed, whether it be necessary or not. So, relating data back to toxicity information, impact information that we have in the literature, it is all very important for us to make sound decisions for the ratepayers so that the outcome that will result from us installing some type of technology is going to be the outcome that we are all hoping for.

Mr. ROUZER. In 45 seconds left here, and this is for anyone on the panel, has anyone done any kind of economic analysis of the impact to consumers and users of the products that contain these various CECs? And then a followup question, too. What do you replace these chemicals with? On the one hand, we want a strong manufacturing base in this country. On the other hand, we want to make sure that we are protecting the environment as well.

I just have a few seconds, if anyone has a quick answer.

[Pause.]

Mr. ROUZER. I guess there is not a quick answer. Part of the value of this hearing is drilling down on this, because, obviously, if you end up banning certain chemicals, that affects the nature of the product that you are producing that consumers want. And, obviously, there needs to be some type of replacement in order to produce those products. So, anyhow, just a fundamental question that we have got to contend with.

Thank you, Madam Chair.

Mrs. NAPOLITANO. Thank you, sir.

I think we have rising complaints that EPA is overreaching, not how they are trying to protect our children and our families.

Mr. Huffman, you are next. You may proceed.

Mr. HUFFMAN. Thank you. Madam Chair, thanks for holding this important hearing. And I want to thank the witnesses for their insights.

I have worked in the water world for almost my entire career, going back to my time on my local water board. And I certainly have my share of opinions on how we can rise to this challenge that others have described to making sure that we address emerging contaminants and these forever chemicals so we can protect our health and environment.

But I want to start with asking Dr. Southerland a little bit about biosolids. I know EPA recently awarded four grants for some research on the fate and transport of PFAS and other constituents in biosolids.

Dr. Southerland, with your experience at EPA, how would you expect the results of this research to support future rulemakings and inform the work of EPA in that area?

Ms. SOUTHERLAND. So, I absolutely expect that the results are going to show we need to have controls on PFAS through the pretreatment program, so that the utilities, as Jim Pletl was just saying, won't have to bear the cost of all the treatment of PFAS coming into these municipal treatment plants.

I am convinced that the biosolid study is going to show—we already know from Decatur, Alabama, experience—that biosolids are going to be concentrated with these forever chemicals. And that, in turn, really eliminates the really wonderful beneficial use of biosolids that all of us depend on, not just for good use of that product, but also for really defraying the cost from municipal treatment plants.

Mr. HUFFMAN. Yes. Thank you for that. Another reason to get upstream to the source of these contaminants and do something about that.

Dr. Pletl, I will go to you next. Your testimony brings the perspective of a clean water utility that is on the front lines of dealing with these problems. I think people forget that you have to deal with everything we flush down the drain.

I once did a bill on the problem of flushable wipes. Companies come up with a product that they think can be flushable, and it might make it down the toilet, but it clogs up wastewater systems and causes all sorts of havoc further downstream. And that is just one of many ways in which you have to contend with the back end of these problems. And so, I agree that polluters, not ratepayers, should really bear the bulk of the cost to controlling things like PFAS pollution.

And as someone downstream of this, let me ask you to speak to how wastewater agencies are the passive receivers of these problems. And what are some ways that EPA and other agencies can do more to help?

[Pause.]

Mr. HUFFMAN. Are you there, Doctor? Did we lose Dr. Pletl?

Mr. PLETL. I am here.

Mr. HUFFMAN. Oh, sorry.

Mr. PLETL. Yes. I wanted to show support for something that Dr. Southerland said about the Toxic Substances Control Act. And I think we can do a much better job on the front end of this process. A little bit more accountability on the part of agencies that want to introduce products into the environmental stream, if you will, in the United States. And think about a little bit more about not just initial exposures and possibilities, but long term, especially for some of these chemicals that do not degrade readily.

So, I think we can do a much better job on the front end, even before our consumers, our public use these products, making sure that we understand what is going to happen to those chemicals once they are released from each home or each commercial business. So, we need to do a better job there.

Mr. HUFFMAN. Would you agree that an obvious place to start would be in products that don't have to have these chemicals? And

would you support efforts to phase out nonessential uses of PFAS, for example, in everyday household goods?

Mr. PLETL. Yes. That was actually part of my statement, that the two places we should focus on, obviously, are where chemicals are being produced; and then second, where those chemicals are actually being used in products.

Mr. HUFFMAN. Thanks.

And in the few seconds I have left, I would like to ask Dr. Southerland about how EPA can do more through TSCA to make sure that companies don't bring the next new emerging contaminant into commerce. What else can we do with TSCA and other laws?

Ms. SOUTHERLAND. So, actually, the new TSCA amendments gave EPA a really important role about doing a safety evaluation before the chemical enters commerce. In the old TSCA, we had to wait until we had some horrifying problem and then we could try to take the thing out of commerce. So, what we find is a real need for EPA to use—which they did not do in the previous administration—all their authorities to require adequate data from the chemical company asking to bring a new chemical into commerce so that they can make a good, reasonable safety decision. We find that that was not done frequently in the previous administration, and that needs to be fixed.

Mr. HUFFMAN. Thank you, Doctor. I appreciate that.

I yield back.

Mrs. NAPOLITANO. Thank you, Mr. Huffman.

Mr. LaMalfa, you are next.

[Pause.]

Mrs. NAPOLITANO. Mr. LaMalfa? There you are.

Mr. LAMALFA. Oh, thank you, Madam Chair. I would like to defer a couple rounds here, please.

Mrs. NAPOLITANO. Then we will go on to Mr. Garret Graves.

[Pause.]

Mrs. NAPOLITANO. Garret Graves?

[Pause.]

Mrs. NAPOLITANO. OK. We will go on to Mr. Malinowski.

Mr. MALINOWSKI. Thank you. Thank you, Madam Chair. Thanks to all the witnesses.

So, unlike Mr. Huffman, I can't claim to be a lifelong expert on the issue that we are discussing today, but I have listened very carefully to all of the witnesses. I have also consulted, in recent days, with my senior policy adviser, John Oliver, of HBO, who did a wonderful presentation on this. We probably should have had him as one of the witnesses today.

I really want to start with a broad historical question for Ms. Southerland first, and that is, how did we get here? After all, this is not a new issue. If we look at PFAS, for example, we know that the companies that produce products like Teflon—DuPont's chief among them—knew about the dangers, extreme risks posed by these chemicals going back to, I guess, at least the early 1990s, which means that the scientific community was aware, was doing studies and reports.

From your perspective, as somebody who has spent many, many years at EPA, what is it about our system of monitoring and regu-

lating these kinds of chemicals that causes it to fail for so long, even when the scientific knowledge is there?

Ms. SOUTHERLAND. So let me just start with just a little historical aspect. The old TSCA did require us to show a problem before we could take action on the chemical. And there is a lot of protection for the chemical industry from confidential business information. So, we were really hamstrung, and that is part of what John Oliver was pointing out last night—or Sunday, is that we did not have the studies that the industry had. There was no transparency or sharing of that information.

The new TSCA gives us all kinds of new authority to, first, before you even allow a chemical into commerce, to require adequate data from the industry. When it is a confidential business information, we cannot share it as openly with the public but certainly within the Agency we can. And I just saw, actually today, an announcement that EPA is going to start a whole new database with all of the studies that they can find on all 9,000 of the PFAS chemicals and make that publicly available.

So, transparency and the new authorities under TSCA will be able to cure these problems that John Oliver so brilliantly exposed in his show.

Mr. MALINOWSKI. OK. What about the problem of—it seems to me we are still there with the wide variety of PFAS chemicals, that we are kind of—we are approaching this one compound at a time, right, where one particular variety of PFAS is shown to be harmful or toxic. So hopefully we ban that. But then what stops the industry from just moving on to a similar substance that has not yet gone through the rigorous testing? Are we always going to be one or two steps too late?

Ms. SOUTHERLAND. Well, the—and I did want to respond to Representative Rouzer on this, but I was too intimidated by the time limit.

The issue is, really, we do have—because of the pressure on PFAS, we have already developed all kinds of safe alternatives for firefighting foam and for certain types of food packaging. We already have corporate action actually saying that they will no longer buy these PFAS-contaminated products. And that, in turn, has a big marketplace. So, there is enormous innovation in the chemical industry that would allow them to come up with safe alternatives. We just have to use the authority we have to crack down on the ones that we know are causing problems.

And I am convinced the Biden administration is going to use the TSCA authority to treat whole groups of chemicals as a category that can then be run through the TSCA process of regulating them. The question is, how long are you willing to wait for those categories to complete that minimum 7-year process? It would be a lot quicker for Congress to ban nonessential uses of PFAS than to wait for this TSCA process to take place.

Mr. MALINOWSKI. And so we should. Thank you so much.

And I yield back.

Mrs. NAPOLITANO. Thank you, Mr. Malinowski.

Next is Miss González-Colón, you may proceed.

Miss GONZÁLEZ-COLÓN. Thank you, Madam Chair. I will continue—can you hear me now?

Mrs. NAPOLITANO. You are on.

Miss GONZÁLEZ-COLÓN. OK.

Mrs. NAPOLITANO. We can hear you.

Miss GONZÁLEZ-COLÓN. Thank you.

My question will be to Dr. Southerland, if you are available to me. Dr. Southerland, it is known that there are carcinogens in groundwater. Should the EPA have removed regulatory guidelines for contaminants in some wells that people utilize for drinking water?

Ms. SOUTHERLAND. OK. So, the authority that EPA has for setting drinking water standards applies to public water systems that have to have a certain number of users to be eligible for drinking water standards. All these individual private wells, of course, we would want them to meet the water quality and drinking water standards that we have set for the community water systems. But, really, EPA does not have the authority. We have to work with local health departments to try to ensure that these individual private wells are meeting those standards.

Miss GONZÁLEZ-COLÓN. The second question I need to know is that, should the Federal Government provide further testing in the instance of private wells when they are located near Superfund sites?

Ms. SOUTHERLAND. So, under the Superfund program, we have lots of authority to require the responsible party for the contamination to provide safe drinking water for the residents. And, of course, if it is an orphan site where there is no viable responsible party, EPA will do that. So that is why you will see, in many of these cases, they will be giving bottled water to people, or they will be putting filtering systems on each individual household's water well in order to provide them with the safe drinking water. So, we do have that authority.

Miss GONZÁLEZ-COLÓN. So, the question I am making is, if you fail to study a specific source or route of exposure, could risk be adequately determined?

Ms. SOUTHERLAND. Sorry, I didn't hear that.

Miss GONZÁLEZ-COLÓN. If you fail to study a specific source or a specific route of exposure, could the risk be adequately determined?

Ms. SOUTHERLAND. I am sorry, I can't hear.

Miss GONZÁLEZ-COLÓN. Hypothetically, if one of my constituents drinks well water but the Federal Government assumes that no one is consuming safe water in their health risk assessments, could the Federal Government adequately assess the risk?

Ms. SOUTHERLAND. So, we try to do risk assessments when we are dealing with a contamination cleanup. And, usually, if there are private wells involved, we actually want to do the monitoring, the real monitoring for where those wells exist. We don't just assume that they are all meeting the national drinking water standards. We actually get information from that specific geographic area where we suspect there is a contamination problem.

Miss GONZALES-COLON. The reason I am making this question is—and I would like, Madam Chair, I would like to submit a 2020 PFAS report for Vieques, which concluded that residents of Vieques don't drink from private wells in Puerto Rico. However, just this

year, the mayor of Vieques has stated in the Natural Resources Committee in June of this year that residents do, in fact, drink from wells on the island.

And I would love to submit that for the record, Madam Chair, if you are amenable.

Mrs. NAPOLITANO. Yes, ma'am. So ordered.

[The information follows:]

Excerpt from Report Titled, "Final Preliminary Assessment Report for Per- and Polyfluoroalkyl Substances: Atlantic Fleet Weapons Training Area—Vieques, Former Naval Ammunition Support Detachment and Former Vieques Naval Training Range—Vieques, Puerto Rico," April 2020, Prepared for Naval Facilities Engineering Command Atlantic by CH2M Hill, Inc., Submitted for the Record by Hon. Jenniffer González-Colón

The report excerpt is retained in committee files and is available online at: https://www.navfac.navy.mil/niris/ATLANTIC/VIEQUES/N69321__004181.pdf, pages 52–68.

Miss GONZÁLEZ-COLÓN. Thank you.

The reason I am making this question is to—you know, they are near a Superfund area. People said at the time that they were not drinking water from the wells in the area. Now the mayor established that, yes, they do. So that was the reason of my question.

Do you have any comment on that?

Ms. SOUTHERLAND. No. You actually need site-specific data from those wells before you can assume that they are safe. I mean, it sounds like there is a high chance that they are highly contaminated.

Miss GONZÁLEZ-COLÓN. Thank you, Doctor.

I yield back.

Mrs. NAPOLITANO. Thank you, Miss González-Colón. Appreciate your questions.

Next would be Mr. Pappas. You may proceed.

Mr. PAPPAS. Well, thank you very much, Madam Chair and to the ranking member, for holding this hearing today. I appreciate the expertise and the comments of our panelists here about these important issues.

I actually just came from an event in my district. It was a roundtable conversation with EPA Administrator Regan, as well as concerned citizens in a community that has been contaminated with PFAS by an industrial polluter. This has been going on for years. I have got hundreds of households in my district that are receiving bottled water right now as they await a safe drinking water hookup. People are very concerned about what this means for their health, what they are able to do in their own homes and on their property.

And so, we know that this issue is not just emerging for our communities. It is one that is well studied, where we are aware of the dangers of PFAS, but yet we haven't seen the kind of regulation we need at the Federal level to move us forward.

Now, our State has put in place some important regulations, some aggressive regulations, when it comes to PFAS and drinking water specifically, but we just can't allow States to figure this problem out on their own. We really need to leverage the expertise, the

research, and the regulatory power of the Federal Government to make progress on this.

So, I know we are awaiting a roadmap coming forward from EPA to help us realize these next steps. I think the Administrator was pretty clear today that he wants to move forward as quickly as possible. And that is maybe my first question, maybe I can turn to Dr. Southerland first.

Could you talk a little bit about how long it takes EPA to decide whether an emerging contaminant should be regulated and how Congress could potentially help EPA make these determinations faster?

My concern here is that we are going to be 2, 4, 6 years down the line and not have in place the kind of regulations we need to be protecting people, both from the legacy contamination that is out there in districts like mine, as well as active contamination that is ongoing. So, if you have any thoughts about how we can speed that process up and what that looks like moving forward, I think that would be helpful for us.

Ms. SOUTHERLAND. Yes. This is a huge issue that, you know, we have had this since the beginning of time, and that is, if you don't know that you should monitor for it, you are not ever going to look for it, and then you are never going to find it. And so, the system we have now is fully reactive. We have to have some horrifying crisis, either, you know, all the fish are killed, or people are deathly ill, something that would cause you to then finally monitor and check for where there could be pollutants that you were not previously aware of that could be causing this public health or environmental crisis.

So, I think the only way to fix this—and that is what I tried to focus on in my comments—we need to have a national list of priority contaminants and a coordinated monitoring program from Federal and State agencies that continually looks for these things and then finds them before the horrifying crisis occurs, so that we can then begin to come up with controlled mechanisms or remediation mechanisms of some kind.

Mr. PAPPAS. Well, thanks for those comments. I support that approach. And I am wondering about some legislation that I have introduced, it would help make these determinations, when it comes to PFAS and the Clean Water Act, issuing regulations under that Clean Water Act. And I am wondering—the legislation also looks at deadlines—if you think legislative deadlines for EPA would at all be helpful in kind of moving the Agency forward?

Ms. SOUTHERLAND. So, deadlines are deeply problematic on an agency now that is the smallest it has been since the 1980s. I was particularly pushing in my testimony for an increase in the effluent guideline program. They are the guys that do the technology-based permit limits for entire industries. They are down to 20 people right now, and they cannot possibly handle all the various industries that are discharging PFAS right now.

So, to put deadlines in now when the Agency is in such a critical condition is really not going to be helpful, because they literally do not have the human capital to carry these things out on any kind of tight deadline. We need to beef up the staff, train them, and then we can worry about having tight deadlines.

Mr. PAPPAS. Well, thanks for those thoughts.

And I think as we take a look at the roadmap, I am hoping it is going to come with a set of recommendations for how we can best support the Agency and give it the resources it needs to move with great speed, because this is a problem, as far as most of my constituents are concerned, that should have been addressed yesterday.

With that, I see my time has expired, so I yield back, Madam Chair.

Mrs. NAPOLITANO. Thank you, sir. We might have a second round going.

But I would like to call Mr. Rouzer next. But before I do, next are Mr. Cohen, Mr. Stanton, Ms. Norton, and Mr. Lowenthal.

Mr. Rouzer, you are on.

Mr. ROUZER. Thank you, Madam Chair. And I appreciate you letting me go a second time before I have to head to the airport soon.

Dr. Granek, I was intrigued with some of the comments in your testimony. And I would like for you to elaborate, you know, what sort of items do you find contaminants of emerging concern in?

And I go back to my original experience with GenX. When I first heard about it, we had a meeting down in Wilmington, North Carolina, with the Governor and the State secretary of health and human services. And we were talking about GenX and PFAS and PFOS. And I got to thinking about it, and I was like, well, how many emerging contaminants are there—shampoos, dyes, everything that we use every day. There are household cleaners that we use that, if you happen to open it and you get a strong whiff of it, it will take your breath away. All of this stuff goes into the drain or down the drain on a continual basis day after day after day.

And you mentioned some of that or a lot of that in your testimony. And I am just curious if you wouldn't mind talking about some of those items and what they are. What consumer products are we seeing these contaminants turn up in? And what do we use those substances for?

Ms. GRANEK. Thank you for that question. If I understood correctly, I think you were asking what animals they are found in as well as what kind of compounds. Is that correct?

Mr. ROUZER. Well, you had a wide variety of—or a layout of a wide variety of influences of the compounds. And I just thought maybe you want to address that a little bit. And I am just trying to learn too.

Ms. GRANEK. Yes. When we start looking—as Dr. Southerland mentioned, when we start looking in the ocean or in freshwater at what organisms have these compounds, what animals, we see them in finfish. We see many of these compounds in Chinook salmon. We see them in shellfish, like clams and oysters. And we see effects, as I mentioned, that, again, vary by compound, but we see effects on reproduction and development. We see effects on immune response, right, which, as one of other speakers mentioned, is problematic, especially during COVID since we know that reduced immune response can affect the effectiveness of vaccines.

To your question, I think about what kind of compounds we are seeing, we are seeing a number of compounds that are in household cleaners, as you mentioned. There are a set of compounds that we

see called alkylphenols that are surfactants in cleaners. Alkylphenols are used both in household cleaners like shampoos and soaps and laundry detergent and dishwashing detergent. But they are also used actually as surfactants in pesticide and herbicide mixtures applied to agricultural and forestry lands. And so those get applied sometimes aerially or ground applications to land. They can get washed into waterways as well.

We see a number of pharmaceuticals in personal care products; things ranging from triclosan, which is an antibacterial and antibacterial soap, to caffeine which we consume in our coffee and tea. And we see a number of antibiotics like azithromycin or erythromycin, et cetera, as well as some legacy contaminants in PFAS chemicals.

Mr. ROUZER. How many emerging contaminants are there? The range of things that you just described is basically what we all use every day. It is really, when you drill down—the more you drill down on this, the more expansive, the more universal—you see just how expansive all this is. So——

Ms. GRANEK. Yes. Oh, excuse me.

Mr. ROUZER. When it comes to smart regulation and having a balanced approach here, how do we handle this if there are so many different emerging compounds out there of concern?

Ms. GRANEK. Yes. My expertise is definitely not in the regulatory side of things. Dr. Southerland mentioned classes of compounds, and I do think that that is an approach to take. But, yes, there are hundreds of emerging contaminants that we don't yet regulate or have any sort of benchmarks for what levels are safe for aquatic organisms or for human health.

Mr. ROUZER. I yield back, Madam Chair.

Mrs. NAPOLITANO. Thank you, sir. I appreciate that.

The cumulative impact is frightening, really it is.

Mr. Cohen, you are next.

Mr. COHEN. Thank you, Madam Chair. And indeed it is frightening, for I am a lifelong—and that is longer than many—user of Teflon product, thinking that I was saving myself calories, and I am killing myself, apparently.

Ms. Granek, you talked about PFAS, and your testimony states Federal regulations not [inaudible] Consumers of microplastics in their food.

Somebody, something [inaudible] there is background noise——

Mrs. NAPOLITANO. You are cutting out, sir.

Mr. COHEN. I am cutting out.

Mrs. NAPOLITANO. In and out.

Mr. COHEN. Ms. Granek? Ms. Granek, can you hear me? Hello?

Ms. GRANEK. I think I can hear you now. Yes.

Mr. COHEN. Great. Thank you, thank you.

Tell me about the PFAS and microplastic releases in our waterways and our bodies. Should I be concerned about dying very soon because I have done Teflon all my life and used certain shampoos?

Ms. GRANEK. My research actually is not specifically on human health, although many of the studies on animals we find that the effects can translate to human health. My research doesn't focus on PFAS, so I can speak less to PFAS.

What I can say is that we are exposed to microplastics on a daily basis, both when we drink from water bottles, nonreusable water bottles. We are breathing microplastics in when we breathe air. Microplastics are so pervasive that they are in our shellfish, they are in our beer, they are in our sea salt, they are in our water. If our water comes from—if there are upstream municipalities that are releasing treated wastewater into a waterway and then a downstream municipality takes in that water as drinking water——

Mr. COHEN. Let's take it as a given that they are a lot of places. What can we do as Government officials in laws to see to it that we protect the human species?

Ms. GRANEK. Great question. I think that we need regulations on release of microplastics into waterways and benchmarks for what is safe in drinking water and perhaps in food, so we have regulations of levels of mercury, for example, that are safe in fish. But we have no benchmarks for levels of plastics that are safe for consumption, for example.

Mr. COHEN. Thank you, ma'am.

Ms. Huffling, do you [inaudible] knowledge of PFAS and its harms on human beings? Ms. Huffling, did you hear me?

Ms. HUFFLING. I am sorry, I did not.

Mr. COHEN. Do you have knowledge of PFAS and its harmful effects on human species?

Ms. HUFFLING. Yes.

Mr. COHEN. [Inaudible.]

Ms. HUFFLING. The National Health and Nutrition Examination Survey, which studies the health and well-being of the U.S. population, has found pretty much everyone in the U.S. has PFAS in their body. And what we are now learning about PFAS is that exposure is associated with a number of health impacts, such as thyroid impacts. It can impact birth with—associations with preterm birth, decreased effectiveness of vaccines, which is very concerning as a public health professional. It is also associated with some types of cancer, such as testicular cancer, as well as elevated cholesterol levels. Many of these are things that we are seeing rising rates of throughout the United States and can be incredibly costly to treat.

Mr. COHEN. What could we do to mandate that they are limited in their application on foods and the effect on human species?

Ms. HUFFLING. Right. Food is an important source of PFAS exposure in humans. Reducing its use in food containers and food processing plants is important, moving away from Teflon-based pans and things, using things like cast iron pans that have a more natural, nonstick capability without the addition of these additional chemicals.

There are ways that all of us can move away from these things that I think, regulatorywise, moving away from its use and food packaging and processing is a really important way that we can reduce exposures in humans.

Mr. COHEN. Is using plastic containers in your microwave dangerous?

Ms. HUFFLING. Heating up plastic in your microwave can definitely increase the chances of different chemicals within that plas-

tic to leach into your food. So definitely not recommended that you microwave plastic.

Mr. COHEN. Well, some of them that I have say they are microwave safe. Should there be some type of more clear delineation on the product that you are risking your health?

Ms. HUFFLING. Definitely. I think, again, it is an issue with the way our regulatory system works that we are not required to be saying in many products what the different ingredients are, how they may be leaching out into the human body or into our food. I think it is definitely an area that there can be improvement.

Mr. COHEN. Thank you very much. And I have learned a lot. I watched the John Oliver tape, and that is scary as heck. When I go to my grave, I will be emanating PFAS or something, chemicals. It is dangerous. And the PFAS legislation taught me a lot. When I first saw it, I thought it had something to do with Flomax, but I know now it is worse than that.

I yield back the balance of my time.

Mrs. NAPOLITANO. Thank you, Mr. Cohen.

Mr. LaMalfa, you are next. You are on, sir, proceed.

Mr. LAMALFA. Thank you, Madam Chair. I appreciate the opportunity.

I think when we have this discussion here, ultimately—and I have seen it here in California—the move will be made to ban plastic products that are used for containers, so have at it. But they will have to be replaced with glass, have to be replaced with aluminum or stainless steel or other products in order to hold fluids, hold other products that require shipping. And so, when you do all this—heck, maybe even wooden barrels.

If you want to go back to these things, they are going to be heavier, they are going to be more complicated to produce and tote our products that people use every day. It will be a lot different game when you ban plastics like this. I have no doubt there will be legislation to push this. If it doesn't come from our California Legislature, it will be coming from certain folks in DC. It will be an interesting discussion going down the line. We can certainly improve how we do things, but I think the banners will be out to do this.

I also find it fascinating in the conversation here, it was mentioned that we are using our kids as an experiment. So that is amazing with the mandates coming down the pike in the pharmaceutical thing where kids under the age of 12 are going to be forced to get certain vaccines that have been untested on them.

So that all said, we will get back to the focus here. Now, in my northern California district here, we have had 1½ million acres' worth of forest fires releasing all sorts of stuff into the air, ultimately into our streams, our rivers, our water, our stored water, and our lakes. And so, we have battled year after year to try and get forest management that makes sense so all this ash, all this byproduct does not end up in our streams. If you want to talk about an impact, that is going to be a big one very immediately.

And so, we do a little about it. The Forest Service is unable to get out of its tracks due to either legislation stopping it or lawsuits. I fret for that, because our water supply in California is already in peril. And we have folks trying to remove dams to get rid of the threat to fish, supposedly, up on the Klamath, whereas the situa-

tion there isn't really about fish. And we don't mention the 20 million cubic yards of silt and material behind those dams that can get into our waterways and will get into the waterways. We gloss over all that and go after this. It is really pretty discouraging in this issue.

What we have is, in California and the West, a lot of things have gone on with mining in the early days. And so we end up with things like the WOTUS rule under the Obama administration. And it went way too far in regulation, I believe, and a lot of us in the West believe, in farming and agriculture.

What is it we are really looking at here with the regulations coming down the pike, whether it is on plastics or on water in general? I would like to ask Dr. Pletl about that. I am sure you have had some intense reaction to regulations on policy before. Can you give us some detail on the best practices that our officials will be looking at to engage with landowners in the private sector on how to reduce the pollution without immediately making an enemy out of the folks that are out there producing our crops, and our mined products, and our timber that we need to be harvesting instead of burning 2 million acres of each year? What do you think, Dr. Pletl?

Ms. SOUTHERLAND. Well, I certainly know the Biden administration has announced that they are already underway with a very comprehensive nationwide approach to talk to all stakeholders about where they should go next in protecting waters of the U.S. And, of course, this is the fundamental issue of the Clean Water Act, where do the NPDES permits and the approaches apply? What waters, what wetlands are covered? And to be 50-some years after the passage of that act and still not have clarity on that is really hurting the program.

Mr. LAMALFA. Dr. Pletl, it is being reinterpreted to mean that every pond that a farmer has on his ranch, his irrigation ditches, his drainage ditches, that those are somehow now in the scope of what was passed in the early seventies as meaning completely different. Do you have any idea how many millions of acre-feet of water are being flushed out of our stored areas and taken away from agriculture?

In order to flush the bay delta—the delta is being flushed with so much of the water that could be used for people in agriculture. Instead, because of municipalities that have overflow from their sewer systems, all surrounding the San Francisco Bay area and even coming from upstream a little bit, municipalities, when their sewers overflow, water has to be taken from other people in order to make that equation come out somehow a little bit better on the parts per billion or million in the water in the bay area. What we are talking about here is an appropriation of water taken away from people making good production of it because others are polluting with it.

What do you think about the need to do more in the San Francisco Bay area with those municipalities surrounding the bay?

Ms. SOUTHERLAND. What I will say is EPA cannot, by any rulemaking, take away all the many agricultural exemptions that are already provided for in the Clean Water Act. The Clean Water Act already envisioned your concern. They told the agricultural community, you don't have to apply for any permits on your farm ponds,

on your irrigation ditches; you don't have to worry about gullies or puddles that form during stormwater. All of those, by statute, are limited——

Mr. LAMALFA. Ma'am, I am sorry to interrupt. EPA, in concert with the Army Corps of Engineers, is doing that very thing in northern California. They are making people get permits to plow their land to change crops because of some waterways the United States interpretation that they are so far getting away with.

Ms. SOUTHERLAND. The Clean Water Act provides a full exemption from all farmland that has been previously farmed. It is only if you want to move into agriculture in an area that has never been farmed before like——

Mr. LAMALFA. Ma'am, you need to let the EPA and the Army Corps of Engineers know about that——

Mrs. NAPOLITANO. Mr. LaMalfa, your time is up.

Mr. LAMALFA [continuing]. Because they're enforcing otherwise. Thank you.

Sorry, Madam Chair.

Mrs. NAPOLITANO. Thank you, sir. Thank you, Ms. Southerland.

Next we will go to Mr. Stanton, and then followed by Ms. Norton and Mr. Lowenthal.

Mr. Stanton.

Mr. STANTON. Thank you very much, Madam Chair, for holding this hearing. I want to thank each of the witnesses for your very important testimony.

In the desert Southwest, climate change has caused a long-term drought, and the reservoirs that supply water to the region, Lake Powell and Lake Mead, are at historically low levels, threatening the long-term sustainability of this critical water source.

Southern Arizona in particular is heavily dependent on water delivered from the Colorado River, by way of the Central Arizona Project. Unfortunately, they are finding PFAS in groundwater, their only other reliable potable water source near the Air Force base and the Air National Guard installation in Tucson, and it is spreading throughout the community. As a result, the drinking water aquifer that serves over 700,000 people is at risk.

To add to the complications, Tucson is a closed basin water system with little to no surface water that can flush PFAS out of the basin, making the community even more vulnerable to PFAS contamination. The longer we wait to treat the PFAS contamination, the more at risk our water will be, and the more it will cost to clean up. And most importantly, PFAS-contaminated water is water the city of Tucson cannot use, even in the middle of this historical drought.

In addition to Tucson, thousands living near Luke Air Force Base in the Phoenix metropolitan area have had to use bottled water for drinking and cooking for most of this year after a high level of PFAS was found in their tap water.

The Infrastructure Investment and Jobs Act provides Federal funding for the treatment of PFAS. This is a start, and I look forward to working with my colleagues here on the committee to do even more to address this issue that affects one of our most precious resources, our water.

I have a couple of questions for Dr. Southerland. Dr. Southerland, what else can be done to address PFAS contamination in areas that are particularly vulnerable due to long-term drought?

Ms. SOUTHERLAND. You know, I think the entire Superfund program had an initiative that was suspended during the previous administration, but they are picking back up on now, which is to evaluate every Superfund site for its vulnerability to climate change impacts, and that could be drought as in the hellish situation you have, or it could be flooding in the Northeast. And so, they are often running now on really trying to update all their evaluations of their contaminated sites.

That is also going to be a major initiative of the Biden administration and EPA, to make sure every program—air, water, land—incorporates environmental justice concerns into their evaluations of new projects, not just the old ones like Superfund sites, but any new evaluations they do of community threats.

Mr. STANTON. Dr. Southerland, what additional resources are needed to expedite the investigations and remediation of PFAS in communities like Tucson?

Ms. SOUTHERLAND. I think Congress has looked at special appropriations already for PFAS. I know they are working very carefully with the Department of Defense to make sure the Department of Defense addresses their contamination problems. I think they are far enough along now on DoD, they have done a lot of monitoring and they know where their problems exist, and now they just need the funds. And I think they have got a good start on that to start the cleanup.

Mr. STANTON. I thank you very much.

Mr. Kennedy, I am a former mayor of a city, so I have a lot of respect for town managers and city managers. My city manager saved my bacon many times when I was mayor of Phoenix.

In your testimony, you discussed the challenges and efforts your community has faced in remediating PFAS in the drinking water. As I noted, the infrastructure bill includes investments to address PFAS in drinking water, specifically $5 billion to help small and disadvantage communities, $4 billion to help drinking water utilities remove PFAS from their supplies or connect well owners to local water systems. You did address it in your earlier testimony, but I will give you a chance to add some, if you would like.

I would like to know what additional steps you think the Federal Government should take to assist smaller communities like your own which can face significant hurdles to implement necessary remediation?

Mr. KENNEDY. Thank you, sir, for the question. I would say, amongst all the challenges we have, I think those funding opportunities are going to be a tremendous benefit to us. We are trying to leverage everything we can, be it working with our council of governments, other agencies, partnerships with other communities around us, trying to leverage better opportunities to secure that funding.

We are looking at funding coming to North Carolina right now with some of those funds. We are lobbying to get in excess of the posted 3.07 percent. There are hundreds of millions of dollars of need in North Carolina.

I run a very small utility. Our waterplant is only 2 million gallons a day which, on the grand spectrum, is tiny. And we are looking at multiples of tens of millions of dollars. And so, when you apply this to the much larger facilities, it is an enormous amount of money. So, I think the funding streams that are identified so far are a huge help.

I also believe that having tangible limits, the MCLs, having those be precise numbers will go a long way, because as we have looked to go towards kind of the product market and potential litigation to recoup costs that we are incurring, having recommendations removed and saying that there is an established standard will help us tremendously. Because just like if you are going down the highway or you go around a curve and there is a yellow sign says recommended speed is 45; well, the police officer is not going to pull you over for going 55. And so, we are experiencing that at the contamination level.

There are recommendations, all of our numbers far exceed that, but from a tort claim or other types of product, having a precise number would be of great benefit to us.

Mr. STANTON. Thank you for your testimony, and thank you for your service.

And I yield back.

Mrs. NAPOLITANO. Thank you, Mr. Stanton.

Ms. Norton, you follow. You are recognized.

Ms. NORTON. Thank you, Madam Chair. I very much appreciate this important hearing, and I know how bipartisan the concern is about water in our country.

This question is for Dr. Southerland. You warned that essentially, our Nation has a reactive system with public health waiting for a crisis to occur before we begin monitoring and considering it. My constituents here in the District of Columbia have only one water source, the Potomac River. That furnishes water to almost 5 million people in the DC metropolitan area. Meanwhile, there are other metropolitan areas, like New York and Los Angeles, that have a second one, and many are planning a third one.

A contamination event in the Potomac River would affect all the major water utilities in this area, and that includes Federal infrastructure as well. In your opinion, would having a second source of water supply for the DC metropolitan area help to reduce the threat of high-risk, man-made chemicals contaminating our surface groundwater? Have you got any idea where we could get a secondary source?

Ms. SOUTHERLAND. Unfortunately, I don't. But that is an important backup system you definitely need. I know that the Chesapeake Bay Program is doing everything they can to really monitor closely for all kinds of contaminants to make sure the source water for DC's drinking water is as clean as possible, but it is a slow process and very complex.

Ms. NORTON. Are there a lot of other jurisdictions that have only one water supply?

Ms. SOUTHERLAND. I just don't have the information on that.

Ms. NORTON. That is an area, Madam Chair, that needs to be investigated, because that is a clear and present danger.

My next question is for Mr. Moore. You have described how manufacturers of plastic largely divorce themselves from the issue of recovery. I am concerned about how our current system passes the responsibility of plastic waste on to individuals.

We know that prevention efforts work better than recovery at reducing impacts on the environment, and there, of course, are prevention efforts like recycling, we have that here in the District of Columbia, but we fail to collect millions of tons of plastic waste each year worldwide. In what ways can Government regulation and oversight help shift the duty back to plastic producers and combat misleading claims of recyclability that some use to skirt responsibility for the waste they produce?

Mr. MOORE. Thank you, Representative Norton, for that important question. The key is that products be what we call benign by design, that they have built into their plan of an afterlife for their product some infrastructure that can take it back and make it part of what we call a cradle-to-cradle production system, where these manufactured products are like biological products in the biological world, where natural substances turn back into compost and turn into trees.

We need the manufactured plastics to come back into industry and become new products, and that infrastructure has not been created by the industries that produce the products. The cleanup has been externalized. It is much like what our colleagues have been talking about. The sewage treatment plants have to deal with products they have no role in producing. We have the municipalities have to deal with the refuse they have no role in creating.

So benign by design, redesign of products, infrastructure as part of the productive process needs to be the mandate of kind [inaudible] thought. I like to use the term "precycle," think before you produce, and make recycling part of the program.

Ms. NORTON. I understand it begins at the source.

Thank you very much, Madam Chair.

Mrs. NAPOLITANO. Thank you, Ms. Norton.

Mr. Lowenthal, followed by Mr. Delgado.

Mr. Lowenthal.

Mr. LOWENTHAL. Thank you, Madam Chair.

And I am going to follow up on some of the very important questions that were just raised by Representative Norton about our broken recycling system, and I will get to that in a minute.

But I want to thank all the witnesses for your very important testimony. While these issues are complex, there seems to be a common thread in that the best way to address the toxic chemicals and the pollutants is to ensure that they don't get into our environment and waterways in the first place. That is really—and once these materials are produced, they burden our waste streams, like our local wastewater facilities; or worse, they pollute our environment and cause harms to our ecosystems and to our bodies.

Because it is critically important that we ensure that these contaminants do not enter our waterways in the first place, I included several provisions in my bill, the Break Free from Plastic Pollution Act, to protect our environment, as well as municipal water districts from the downstream impacts. It also really has what is called extended producer responsibility. That is, instead of commu-

nities and individuals being responsible for the cleanup—because we know a tiny percentage of our recycle material actually gets recycled when we do it, just a fraction. I think lower or smaller than 3 percent. So, this model is just broken.

But I want to talk about what we can do also, in addition to making the producers responsible for it, for the funding of the recycling, for the design of the programs, for the managing of these programs, not leaving it up to the taxpayers to do that. But I also am interested very much in the proper labeling of plastic. And in the bill, it includes labeling of plastic wet wipes to ensure that they are not flushed; requirements of manufacturers to include microfiber filters in washing machines, because there is so much that ends up in our water system from our washing machines; and ensuring that toxic chemicals by having zero—and one thing by also having zero discharge of plastic pellets.

What we see is that the producers of our plastic have been able to discharge millions and millions of plastic pellets into our waterways. There should be zero discharge of plastic pellets. And we have to ensure that toxic chemicals are no longer included in the manufacturing of plastic products that we use every day.

So, Captain Moore, I want to go back to your statements that you mentioned before. Can you go into more detail regarding how plastic products, like single-use plastic, Styrofoam, and others break down into microplastics, nanoplastics, and how these can disrupt our ecosystems or, even worse, enter our bodies? Can you kind of explain to us a little bit about this process?

Mr. MOORE. In my testimony, I mentioned blowing and foaming agents. Polystyrene is heavier than water, but when it is blown and foamed in to make Styrofoam, it floats. And it floats because it has millions of tiny bubbles of air that create great insulation. That is why it delivers hot beverages and you don't feel the heat on a thin cup. It is hot on the inside, but you don't feel it on the outside because it is insulated by all this air.

Well, when those things get left in the environment, they go through a breakdown process in which those thin walls crack, allowing the item to become water-logged, and then begins to sink, since the styrene is denser than water, and it begins to populate the entire water column. So, it undergoes a fracturing process, it becomes smaller particles. Those particles then look like food to marine creatures, gets consumed. And then it goes through the stage of becoming a micro or nanoplastic in which it becomes ingested voluntarily/involuntarily.

Much of the feeding that goes on in the ocean is not looking and seeing and tasting and eating. It is a sweeping vacuuming action in which zooplankton have developed ways to sift water, and everything was considered to be food, biodegradable. But plastics, not being biodegradable, get swept up and become nonnutritive. So that is only one aspect of an answer to your question, but since we are out of time, but that would be a start.

Mr. LOWENTHAL. Well, thank you, Captain Moore.

And since I am out of time, I am going to yield back.

Mrs. NAPOLITANO. Thank you, Mr. Lowenthal.

Mr. Delgado, you may proceed.

[Pause.]

Mrs. NAPOLITANO. Mr. Delgado?

Well, I believe he may not be on, so I guess I will have to go to myself.

I will ask Dr. Huffling, your testimony states that chemicals need to be proven safe before being put on the market. Similarly, most of you agree, the position of the ranking member and I, that it is more cost effective to prevent these chemicals from entering the environment than to treat them afterwards.

To all the panel, again, a yes or no will do, do you agree that more of the burden needs to be placed on those who manufacture or produce these chemicals than to leave the economic and environmental responsibility to the public?

Ms. SOUTHERLAND. I will start. Absolutely, yes.

Mr. KENNEDY. Madam Chair, yes, ma'am.

Ms. GRANEK. Madam Chair, absolutely, yes.

Mrs. NAPOLITANO. Mr. Moore?

Mr. MOORE. Yes.

Mrs. NAPOLITANO. Mr. Pletl?

Mr. PLETL. Madam Chair, yes.

Mrs. NAPOLITANO. Well, it is very important that we consider this a very—not important—critical issue for all of us, and I trust in talking to my colleague, the ranking member, we need to have a followup hearing. Do you agree? We should have followup hearing with the industry to come and tell us what they are doing about preventing these chemicals from being put out to the general public.

Anybody?

Ms. SOUTHERLAND. Yes.

Ms. HUFFLING. Yes, that would be great.

Mrs. NAPOLITANO. Well, then, we—too many unknowns of the impact right now because a lot of these are not regulated, and my concern is too many cancers have been prevalent the last, I would say, two generations. The last 20 years it is just unbearable. And we also must have the agencies come together for quicker action and also provide funding to be able to help small communities deal with it. So, we propose at the next meeting, we will battle beyond the horizon, I hope. I think Mr. Rouzer and I agree that it is important enough to be able to clarify some of the questions that were brought up today.

I am now closing because I am asking for unanimous consent that the record of today's hearing remain open until such a time as our witnesses have provided answers to any questions that may be submitted to them in writing. And unanimous consent that the record remain open for 15 days for any additional comments and information submitted by Members or witnesses. Please, witnesses, any additional information, please send it to us to be included in the record of today's hearing.

And, without objection, so ordered.

I would suggest to all the Members, if you have any ideas for the next meeting that I would like to hold, and I think Mr. Rouzer agrees with me, please send them to us.

I would like to thank all my witnesses very profusely for their insight and their testimony today.

Then, if no other Members have anything to add, the committee stands adjourned.

Thank you.

[Whereupon, at 1:02 p.m., the subcommittee was adjourned.]

SUBMISSIONS FOR THE RECORD

Prepared Statement of Hon. Sam Graves, a Representative in Congress from the State of Missouri, and Ranking Member, Committee on Transportation and Infrastructure

Thank you, Chair Napolitano, and thank you to our witnesses for being here today.

The topic of contaminants of emerging concern or "CECs" is not new to this committee—or to Congress.

Congress has provided authorities to the EPA to address CECs. Over the last few years, interest in CECs has focused on a particular group of substances known as PFAS.

Due to the vast number of PFAS compounds—and by "vast" I mean thousands—there is still much we do not know. We have more questions than answers.

As this committee considers the most effective way to approach management of PFAS in our Nation's wastewater systems, it is critical Congress not just act to say we did 'something'. Too often when Congress rushes to act it leads to doing more harm than good.

I look forward to hearing an update today on PFAS, and other CECs, and how we can best equip our communities with the most up-to-date information and data about these compounds.

Thank you, Chair Napolitano. I yield back.

Prepared Statement of Hon. Eddie Bernice Johnson, a Representative in Congress from the State of Texas

Thank you, Subcommittee Chairwoman Napolitano, and Ranking Member Rouzer, for holding today's hearing on contaminants and the many serious water quality challenges we face today. I would also like to thank our panelists.

Clearly, the issue of contamination in our water supply is one of extreme concern. Although the potential effects of many emerging contaminants or "CECs" on human health are still being studied, research has identified many adverse chronic effects that these contaminants have on other species.

It is alarming that these potentially injurious water contaminants can enter the human body with relative ease, through ingestion, surface contact, or merely though the inhalation of vaporized water. Even more concerning is that those demonstrated to be most at risk are pregnant women, infants, and children, and those with suppressed immune systems: our most vulnerable populations.

In my congressional district, Texas' 30th, the United States Geological Survey (USGS), along with the Dallas Water Utility is conducting a study on the Trinity River. In this study, USGS' Texas Water Science Center is collecting and analyzing samples from inflows and outflows of five Dallas water treatment plants and five sites in the Trinity River for pharmaceuticals and other compounds of emerging concern. Along with many residents in the Dallas area, I am anxious to see the results of this study to find out if there are any salient items of concern that may impact my constituents and how they could be addressed.

Letter of October 6, 2021, from Advance Carolina et al., Submitted for the Record by Hon. Grace F. Napolitano

OCTOBER 6, 2021.

Sent via Email

Administrator MICHAEL REGAN,
Environmental Protection Agency,
1200 Pennsylvania Avenue, N.W., Washington, DC 20460, [Redacted]@epa.gov

DEAR ADMINISTRATOR REGAN:

Thank you for making a commitment to aggressively address per- and polyfluoroalkyl substances (PFAS) contamination as Administrator of the Environmental Protection Agency.

On behalf of our members, partners, and community advocates across the country, we urge you to include strong commitments to curb industrial releases of the toxic "forever chemicals" known as PFAS in the upcoming PFAS Road Map being developed by the EPA. Our groups are on record strongly supporting the Clean Water Standards for PFAS Act of 2021, a bill that would establish deadlines for EPA to determine how to address industrial discharges of PFAS under the Clean Water Act, which was included the bipartisan PFAS Action Act of 2021 and PFAS Action Act of 2020 as well as H.R. 3684, the INVEST in America Act, which have all passed the House.

As you know, PFAS are a family of over 5,000 synthetic compounds used in a variety of industrial processes and consumer products from non-stick cookware to stain-resistant coatings and grease-proof packaging. Often referred to as "forever chemicals," PFAS chemicals are extremely persistent in the environment and the human body, and many have been linked at very low doses to serious health harms, including cancer, damage to the reproductive and immune system, reducing the efficacy of vaccines, and thyroid and kidney disease.

According to recent analysis, nearly 30,000 industrial facilities could be discharging PFAS into the air and water. Industrial discharges of PFAS waste threaten the drinking water for millions of Americans, including vulnerable communities in Latino, low-income, rural and environmental justice communities who are already overburdened by pollution. While some states like Michigan have taken steps to curb industrial discharges, most have not. Unfortunately, recent action by EPA falls short of what is needed to sufficiently address industrial discharges of PFAS both in terms of scope and urgency.

As Secretary of the North Carolina Department of Environmental Quality, you took enforcement action against The Chemours Company to compel them to control their PFAS discharges. Now we urge you to protect communities across the country just as you did for communities in North Carolina.

Your enforcement action was based on a simple premise—PFAS dischargers must disclose their pollution to permitting agencies before they can be allowed to contaminate our streams and rivers. If EPA made clear that this existing legal requirement applies to PFAS, dischargers across the country would be forced to take responsibility for their pollution. EPA should also learn from the cleanup happening under the Chemours Consent Order. The technology that Chemours has applied to nearly eliminate PFAS discharges in many instances can be used in case-by-case technology-based effluent limit determinations to clean up rivers across the country while EPA prepares nationwide effluent limitation guidelines. EPA should require use of these tools across the country.

Earlier this month, EPA released its Preliminary Effluent Guidelines Program Plan 15. While we recognize that this is a positive first step, Plan 15 excludes most of the industry categories that are making the PFAS pollution challenge even bigger—despite the well documented risks posed by PFAS exposure in humans and our environment. Plan 15 also fails to set deadlines for new standards. We find this extremely disappointing.

By contrast, the U.S. House of Representative has twice passed bipartisan legislation that would require the EPA to set PFAS standards for nine industry categories within four years. We believe that anything less ambitious than the standards endorsed by the House would fall short of what communities struggling with PFAS pollution expect from EPA.

We urge you to finalize a robust PFAS Road Map that shifts responsibility for stopping the ongoing PFAS crisis to polluters. We encourage EPA to use existing authorities to require disclosure of PFAS and use of technology to control discharges, set a PFAS drinking water standard, quickly set nationwide standards to restrict industrial releases of PFAS, designate PFAS as hazardous substances, end needless uses of PFAS, and ensure that PFAS wastes are properly disposed.

Thank you for your ongoing leadership in addressing the PFAS contamination crisis, and we hope the EPA's upcoming PFAS Road Map will include a commitment to expand efforts to curb industrial releases of PFAS.

Sincerely,

ADVANCE CAROLINA.
ADVOCATES FOR A CLEAN LAKE ERIE.
ALABAMA RIVERS ALLIANCE.
ALABAMA STATE ASSOCIATION OF COOPERATIVES.
ALASKA COMMUNITY ACTION ON TOXICS.
ALIANZA NACIONAL DE CAMPESINAS.
ALLIANCE FOR THE GREAT LAKES.
ALLIANCE OF NURSES FOR HEALTHY ENVIRONMENTS.
AMERICAN SUSTAINABLE BUSINESS COUNCIL.
ANTHROPOCENE ALLIANCE.
BLACK WARRIOR RIVERKEEPER.
BREAST CANCER PREVENTION PARTNERS.
CAHABA RIVER SOCIETY.
CAHABA RIVERKEEPER.
CAPE FEAR RIVER WATCH.
CATAWBA RIVERKEEPER FOUNDATION.
CENTER FOR BIOLOGICAL DIVERSITY.
CENTER FOR ENVIRONMENTAL HEALTH.
CENTER FOR PROGRESSIVE REFORM.
CENTER FOR PUBLIC ENVIRONMENTAL OVERSIGHT.
CHARLESTON WATERKEEPER.
CHILDREN'S ENVIRONMENTAL HEALTH NETWORK.
CHOCTAWHATCHEE RIVERKEEPER.
CHOICES INTERLINKING.
CHURCH OF THE LIVING GOD.
CITIZENS FOR SAFE WATER AROUND BADGER (CSWAB).
CLEAN CAPE FEAR.
CLEAN WATER ACTION.
COALITION ON THE ENVIRONMENT AND JEWISH LIFE.
COMMON GROUND CONSULTING, LLC.
COMMUNITY ACTION WORKS CAMPAIGNS.
COMMUNITY WATER CENTER.
CONGAREE RIVERKEEPER.
CONSUMER REPORTS.
COOSA RIVERKEEPER.
CRAWFORD STEWARDSHIP PROJECT.
DEFEND OUR HEALTH.
DELAWARE RIVERKEEPER NETWORK.
DUKE UNIVERSITY.
EARTHJUSTICE.
EASTERN PANHANDLE (WV) GREEN COALITION.
ECOLOGY CENTER.
ENDANGERED HABITATS LEAGUE.
ENVIRONMENT AMERICA.
ENVIRONMENTAL JUSTICE TASK FORCE IN TUCSON.
ENVIRONMENTAL PROTECTION NETWORK.
ENVIRONMENTAL WORKING GROUP.
FAMILY FARM DEFENDERS.
FANNIE LOU HAMER CENTER FOR CHANGE.
FIGHT FOR ZERO.
FOOD & WATER WATCH.
FOR LOVE OF WATER (FLOW).
FRIENDS OF THE DETROIT RIVER/DETROIT RIVER PUBLIC ADVISORY COUNCIL.
FRIENDS OF THE RIVERS OF VIRGINIA.
FRIENDS OF TOPPENISH CREEK.
GAS FREE SENECA.
GREAT LAKES PFAS ACTION NETWORK.
GREEN SCIENCE POLICY INSTITUTE.
GREENCAPE.
GREENLATINOS.
GUNPOWDER RIVERKEEPER.
HARPETH RIVER CONSERVANCY.
HAW RIVER ASSEMBLY.
HEALTHY GULF.
HOMETOWN ACTION.
ILLINOIS COUNCIL OF TROUT UNLIMITED.
KENTUCKY RESOURCES COUNCIL.
KOOTENAI ENVIRONMENTAL ALLIANCE.
LEAGUE OF CONSERVATION VOTERS.
LEAGUE OF UNITED LATIN AMERICAN CITIZENS (LULAC).
LIVING RIVERS & COLORADO RIVERKEEPER.
LOS ANGELES WATERKEEPER.
LOUISIANA GREEN CORPS.
LYNNHAVEN RIVER NOW.
MASSACHUSETTS RIVERS ALLIANCE.
MERRIMACK CITIZENS FOR CLEAN WATER.
MIAMI WATERKEEPER.
MICHIGAN LEAGUE OF CONSERVATION VOTERS.
MIDWEST ENVIRONMENTAL ADVOCATES.
MILITARY POISONS.
MILWAUKEE RIVERKEEPER.
MISSISSIPPI RISING COALITION.
MISSISSIPPI RIVER COLLABORATIVE.
MISSOURI CONFLUENCE WATERKEEPER.
MISSOURI NAACP.
MOMS FOR A NONTOXIC NEW YORK.
MOUNTAIN WATERSHED ASSOCIATION.
MOUNTAINTRUE.
NANTUCKET LAND COUNCIL, INC.
NATIONAL LATINO FARMERS & RANCHERS TRADE ASSOCIATION.
NATIONAL WILDLIFE FEDERATION.
NATURAL RESOURCES DEFENSE COUNCIL.
NJ AUDUBON.
OGEECHEE RIVERKEEPER.
OREGON ENVIRONMENTAL COUNCIL.
OVEC–OHIO VALLEY ENVIRONMENTAL COALITION.
PAX CHRISTI USA, NEW ORLEANS.
PECONIC BAYKEEPER.
PENNSYLVANIA COUNCIL OF CHURCHES.
PEOPLE'S JUSTICE COUNCIL.
PFOAPROJECTNY.
PHYSICIANS FOR SOCIAL RESPONSIBILITY.
POLICYLINK.
POTOMAC RIVERKEEPER NETWORK.
PUBLIC INTEREST RESEARCH GROUP.
PUGET SOUNDKEEPER.
RACHEL CARSON COUNCIL.
RIVER NETWORK.
RIVERKEEPER.

ROCKBRIDGE AREA CONSERVATION COUNCIL.
ROGUE RIVERKEEPER.
RURAL ADVANCEMENT FUND OF THE NATIONAL SHARECROPPERS FUND, INC.
RURAL COALITION.
SAFER STATES.
SAN ANTONIO BAY ESTUARINE WATERKEEPER.
SATILLA RIVERKEEPER.
SAVE RGV.
SAVE THE SOUND.
SC IDLE NO MORE, SCIAC.
SCIENCE AND ENVIRONMENTAL HEALTH NETWORK.
SENECA LAKE GUARDIAN.
SIERRA CLUB.
SOCIAL SCIENCE ENVIRONMENTAL HEALTH RESEARCH INSTITUTE (NORTHEASTERN UNIVERSITY).
SOUTHEAST RURAL COMMUNITY ASSISTANCE PROJECT.
SOUTHERN ENVIRONMENTAL LAW CENTER.
SOUTHWINGS.
ST. JOHNS RIVERKEEPER.
STEPS COALITION.
SUNCOAST WATERKEEPER.
SURFRIDER FOUNDATION.
SUSTAIN CHARLOTTE.
SUSTAINABLE AGRICULTURE OF LOUISVILLE.
TENNESSEE RIVERKEEPER.
TERRASCAPES ENVIRONMENTAL.
TESTING FOR PEASE.
THE DOWNSTREAM PROJECT.
THE PEOPLE'S JUSTICE COUNCIL.
THE RISING YOUTH.
THE WATER COLLABORATIVE OF GREATER NEW ORLEANS.
THREE RIVERS WATERKEEPER.
TIP OF THE MITT WATERSHED COUNCIL.
TREE FREDERICKSBURG.
TURTLE ISLAND RESTORATION NETWORK.
TWIN HARBORS WATERKEEPER.
UNION OF CONCERNED SCIENTISTS.
VERDE.
VERMONT CONSERVATION VOTERS.
WATERKEEPER ALLIANCE.
WATERKEEPERS CHESAPEAKE.
WATERWAY ADVOCATES.
WE ACT FOR ENVIRONMENTAL JUSTICE.
WEST VIRGINIA RIVERS COALITION.
WINYAH RIVERS ALLIANCE.
WISCONSIN ECOLATINOS.
WOMEN'S VOICES FOR THE EARTH.
WV CITIZEN ACTION GROUP.
YOUR TURNOUT GEAR AND PFOA.
ZERO WASTE WASHINGTON.

CC: Janet McCabe, Deputy Administrator for the EPA
Radhika Fox, Assistant Administrator for the Office of Water
Brenda Mallory, Chair of the White House Council on Environmental Quality

Statement of Robert C. Ferrante, Chief Engineer and General Manager, Los Angeles County Sanitation Districts, Submitted for the Record by Hon. Grace F. Napolitano

Thank you to Chairman DeFazio, Ranking Member Graves, Chairwoman Napolitano and Ranking Member Rouzer, and all members of the Subcommittee for the opportunity to submit this testimony. As the Chief Engineer and General Manager for the Los Angeles County Sanitation Districts (Sanitation Districts), I submit this testimony today to highlight our concerns about the potential effects of Per- and polyfluoralkyl substances (PFAS) on wastewater agencies such as ours. The Sanitation Districts support the testimony previously provided by Dr. James Pletl on behalf of the National Association of Clean Water Agencies (NACWA) and submit this testimony to highlight our concerns and recommendations.

By way of background, the Sanitation Districts provide wastewater and solid waste management services to approximately 5.6 million people in 78 cities and unincorporated areas of Los Angeles County. We have been supplying recycled water to water agencies in our service area since the early 1960s, and we now supply approximately 100,000 acre-feet annually for groundwater replenishment, agricultural use, industrial use and landscape irrigation use at over 800 sites.

PFAS are a class of thousands of compounds with a wide array of uses, such as non-stick cookware and many types of industrial and consumer products, water repellent products, fire-fighting foams, cosmetics and cleaning products. Manufacturers have been utilizing PFAS in their production for decades, and during this time, scientific understanding of the potential health and environmental impacts has continued to be developed. PFAS compounds are persistent and bioaccumulative, and for these reasons are known as "forever chemicals." PFAS compounds are ubiquitous in the environment and can now be detected in the parts per trillion range.

Drinking water treatment systems and wastewater treatment facilities are not "producers" or manufacturers of PFAS, and these essential public service providers do not utilize or profit from PFAS chemicals. Rather, we are "receivers" of these chemicals, which are used by all types of industries and everyday consumers, and

merely convey and/or manage the traces of PFAS coming into our systems daily through society's ubiquitous use of PFAS in thousands of products.

In southern California, as in other parts of the country, many water supply agencies, pumpers and purveyors have had to take groundwater wells out of service due to PFAS detections and are taking steps to both find (and pay for) alternative short-term water supplies—which is especially challenging yet critical during the current drought conditions—while they develop PFAS remediation programs. These remediation programs are already anticipated to cost hundreds of millions of dollars in Los Angeles and Orange Counties alone, and as more human health protection thresholds are set at very low levels for drinking water and more water quality testing data for PFAS become available, the cost is very likely to grow significantly.

Every day the Sanitation Districts focus on advancing our mission "[t]o protect public health and the environment through innovative and cost-effective wastewater and solid waste management, and in doing so, convert waste into resources such as recycled water, energy, and recycled materials." We do this through maintenance and care of our infrastructure, as well as via forward thinking innovation and use of technologies to ensure protection of public health and the environment today and into the future. Additionally, we seek to maximize resource recovery, and we have been recognized as a "Utility of the Future" for the past five years in large part due to these efforts. As much as anything else, the increasingly widespread detection of PFAS in the environment may threaten the continued viability of these resource recovery programs by undermining public confidence in recycled water and biosolids quality. We believe that now is the time for action and we join others in recommending that Congress take bold action to phase out the use of PFAS compounds in non-essential products and applications. Only by phasing out the use of PFAS in the next few years will we be able to get out in front of this metastasizing problem.

We work hard to ensure that rates are affordable, especially for our customers in disadvantaged areas. The technology options to treat for PFAS in wastewater are limited and costly, and at this time cannot completely remove PFAS from the wastewater. As noted in Dr. Pletl's testimony, there is not currently (nor is there expected to be in the very near future) a cost-effective way of treating for PFAS in wastewater, at least in part due to the sheer volume that would entail. In addition to concerns about the potential human health and environmental impacts of PFAS in wastewater and its byproducts such as biosolids and recycled water, it is also of great concern that without cost-effective treatment technologies and readily available means of managing treatment residuals, the financial burden will lay with our customers. This amounts to the public, who are our customers and your constituents, subsidizing this pollution by manufacturers.

The Sanitation Districts supports the U.S. Environmental Protection Agency's (EPA) scientific evaluation of the effects of PFAS on human health and the environment. Further, the Sanitation Districts support EPA's development of standards for the pretreatment, remediation, and regulation of PFAS to reflect a "polluter pay" approach, one that will ensure that the financial burden will not be shifted to our customers while manufacturers avoid responsibility and still continue to use PFAS in an ever-increasing array of products. An unintended consequence of a traditional designation under CERCLA as a hazardous substance may be that local public agencies could end up subsidizing manufacturers' liability, as public utilities such as the Sanitation Districts and other water and wastewater agencies could be deemed to be responsible parties in the clean-up of PFAS in groundwater. As a provider of over 100,000 acre-feet of recycled water a year, and with significantly more recycled water projects in development, the Sanitation Districts want to ensure that those who rely on that water can continue to receive it. This is an even more urgent priority than in the past, due to the extreme drought conditions gripping the Western United States at this time. We respectfully request that Congress consider all of these intertwined issues as it considers legislation to address the very important, yet multi-faceted, PFAS issue.

Thank you again to Chairman DeFazio, Ranking Member Graves, Chairwoman Napolitano and Ranking Member Rouzer, and all members of the Subcommittee for the opportunity to submit this testimony. The Los Angeles County Sanitation Districts look forward to continuing to work with the Subcommittee and entire House Transportation and Infrastructure Committee on addressing contaminants of emerging concern and PFAS.

Statement of the Water Replenishment District of Southern California, Submitted for the Record by Hon. Grace F. Napolitano

The Water Replenishment District (WRD) is the largest groundwater management agency in California, established in 1959 by a vote of the people. The boundaries of WRD encompass 420-square miles and 43 cities in southern Los Angeles County. There are over four million people in WRD's service area who use about 82 billion gallons of groundwater a year, which accounts for nearly half of the region's water supply.

WRD manages robust water treatment programs to support water providers. WRD's Safe Drinking Water Program (SDWP) supports water providers seeking to acquire funding for water treatment. WRD's Disadvantaged Communities Program (DAC) works with water providers in low-income communities to submit competitive applications for grants to remediate wells affected by contaminants. WRD has secured millions of dollars in grants to remediate groundwater, ensuring continued access to affordable and high-quality groundwater.

WRD is grateful for the Committee's ongoing attention to the important issue of water quality and appreciates the opportunity to work closely with you to address contaminants of emerging concern. As you know, the Environmental Protection Agency (EPA) states exposure to unsafe levels of certain PFAS substances may result in adverse health effects. This is because PFAS are bioaccumulatory; these substances can build up in the human body. While the human body has difficulties breaking down PFAS, these "forever chemicals" are also persistent in the environment. Consequently, it is costly and difficult to eliminate PFAS from water supplies. Federal investments in PFAS remediation are urgently needed to remediate PFAS-affected wells.

WRD's approach to water remediation is to act quickly and treat wells affected by contaminants before it spreads. This is why the WRD Board of Directors voted to approve a $34 million Per- and Polyfluoroalkyl (PFAS) Remediation Program last year. Due to demand for funding the district is now considering expanding the program to provide at least $61 million to affected water providers.

On February 6, 2020, the California Department of Drinking Water announced the response level (RL) of 10 parts per trillion for PFOA and 40 parts per trillion for PFOS based on a running four-quarter average. These levels were released as part of AB 756, a bill signed into law in California that requires provisions related to PFAS levels be released to monitor PFAS and to notify the public about the quality of water being delivered to customers.

Per state directives, PFAS was identified in over 34 wells managed by 13 different water purveyors with PFOS and/or PFOA contaminants above California's regulatory Response Level (RL). Water purveyors with PFAS-affected wells above the RL must notify the public about the well or remove the well out of use. WRD's PFAS Remediation Program provides the institutional support small and/or disadvantaged water purveyors need to treat PFAS-affected wells and maintain an uninterrupted supply of water for their customers.

Although we cannot see them, groundwater aquifers are immense natural reserves that are susceptible to contamination. Water percolates from surface water into these aquifers, where contaminants like PFAS can move throughout groundwater basins. To maintain healthy groundwater levels, WRD deposits water into the Montebello Spreading Grounds where water percolates from the surface into deep groundwater aquifers. PFAS have contaminated water in these aquifers and can migrate to downstream wells. Extracting and remediating PFAS is essential for the protection, health and safety of the groundwater basins.

After successful stakeholder outreach, WRD received applications from cities and water providers to remediate dozens of PFAS-affected wells. WRD's PFAS Remediation Program offers clear benefits to the community. The program:

- Supports water purveyors in extracting and treating groundwater contaminated by PFAS
- Helps ensure an uninterrupted supply of groundwater
- Protects groundwater basins from further harm that could arise from contaminant migration
- Preserves groundwater for four million people and reduces community exposure to PFAS

To ensure PFAS remediation in WRD's service area and beyond is successful, federal investments in treating PFAS are urgently needed. PFAS can be found in manufacturing facilities, landfills, wastewater treatment plants, and animals in areas where PFAS buildup persists over time. These substances comprise a family of approximately 5,000 human-produced chemicals that are used in a variety of products and applications including:

- Non-stick cooking supplies
- Water repellent products
- Fire-fighting foams
- Cleaning products
- Electronics manufacturing
- Certain types of packaging

In the US, manufacturers have phased out select PFAS chemicals. However, PFAS chemicals can still be manufactured internationally, where they are used for various consumer products. This means PFAS may continue to enter our air, water, soil, and environment.

If water providers are solely responsible for the cleanup of PFAS, costs will be passed down to consumers, likely increasing rates and costs of water. WRD's PFAS Remediation Program will only cover a fraction of the costs needed to fully remediate PFAS. Therefore, immediate action and investments are needed to remediate PFAS-affected wells.

WRD would like to thank the Committee for hosting a hearing on this important issue. Please know that WRD is available to serve as a resource to the Committee and we welcome any opportunity to work with you and the Biden Administration on water quality issues.

Letter of May 18, 2021, from Hon. Jenniffer González-Colón, Member of Congress, to EPA Administrator Michael S. Regan, Submitted for the Record by Hon. Jenniffer González-Colón

MAY 18, 2021.

Environmental Protection Agency,
Office of the Administrator,
1200 Pennsylvania Avenue, N.W., Mailing Code 1101A, Washington, DC 20460.

DEAR ADMINISTRATOR REGAN:

Congratulations on your recent nomination to serve our country as the 16th Administrator of the EPA. I am writing you to request that your agency review the water quality drinking standards for perchlorate and issue new standards if appropriate.

As you know, I am the sole representative in Congress for more than 3 million American citizens living in Puerto Rico. Approximately 8,300 of those citizens live on the island of Vieques. In 2007, certain water quality tests demonstrated perchlorate levels of 160µg/l, and more recently in 2014, levels of 94µg/l.

I ask that the EPA review the relevant science and issue a new standard for perchlorate, if necessary. Finally, I would like to inquire into whether the EPA has looked at current or historical groundwater use patterns by citizens during emergencies, such as Hurricane Maria and Irma in 2017. I look forward to continuing to work with the Environmental Protection Agency to issue guidelines that prevent harms arising from contaminated water, soils, and air. Nowhere is this issue more important for me than on the island of Vieques and the broader Atlantic Fleet Weapons Training Area. I look forward to your timely response.

Sincerely,

JENNIFFER GONZÁLEZ-COLÓN,
Member of Congress (PR–AL).

Memo of December 7, 2020, from B.D. Weiss, Commanding Officer, Naval Air Station Jacksonville, Submitted for the Record by Hon. Jenniffer González-Colón

6000,
SERN00/436,
7 DEC 20.

From: Commanding Officer, Naval Air Station Jacksonville
To: Building Occupants

Subj: RELOCATABLE OVER-THE-HORIZON RADAR SITE, VIEQUES ISLAND, PUERTO RICO PERFLUOROALKYL AND POLYFLUOROALKYL SUBSTANCES SAMPLING

1. The safety and health of our personnel at the Relocatable Over-the-Horizon Radar site, Vieques Island, Puerto Rico is our top priority. I am writing to inform you of the results of the drinking water testing conducted in Building 1 on 6 October 2020 in response to the March 2020 Secretary of Defense Policy for Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) sampling in Department of Defense-owned water systems.
2. By this letter, I am informing you that drinking water testing results identified 6 of the 18 PFAS compounds were detected above the method reporting limit (MRL) but that evidence of Perfluoroctanoic Acid and Perfluoroctanoic Sulfate in the building was below the levels set by the U.S. Environmental Protection Agency health advisory
3. In an effort to ensure the safety and health of our military and civilian personnel, Department of Defense policy requires this testing, despite PFAS being considered "emerging contaminants" for which there are no Safe Drinking Water Act regulatory standards. Based on the sampling results, the Navy will conduct one year of quarterly sampling and then bi-annually thereafter until all results are below the MRL.
4. If you have any immediate concerns, please contact Jens Sapin [phone number and email redacted].

B.D. WEISS.

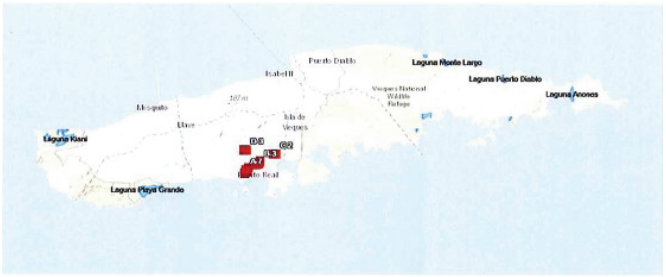
Letter of May 31, 2021, from Doriel Pagán Crespo, Eng., Executive President, Puerto Rico Aqueduct and Sewer Authority, Submitted for the Record by Hon. Jenniffer González-Colón

MAY 31, 2021.

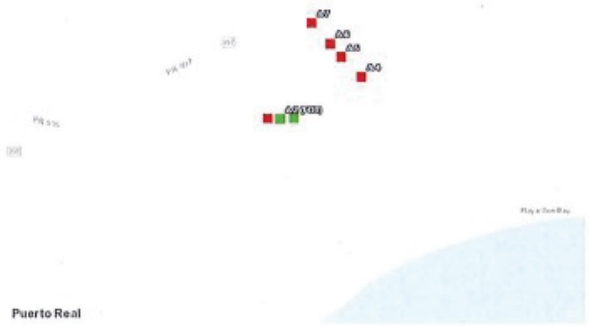
Hon. JENNIFFER GONZÁLEZ,
Resident Commissioner,
Congress of the United States, House of Representatives, Washington, DC 20515–5400.

DEAR RESIDENT COMMISSIONER:

We acknowledge receipt of your request regarding the use of wells in the Municipality of Vieques. The Puerto Rico Aqueduct and Sewer Authority (PRASA) does not currently supply potable water from wells on Vieques. PRASA had nineteen (19) wells in the southern area of the municipality island, they were put out of operation due to saline intrusion and with the construction of the pipeline from the mainland in 1976.



Two (2) of them, in battery A, are kept out of operation temporary and have a meter for electric power service, however at the moment, they cannot distribute drinking water.



Wells A–1 and A–2 that are kept out of operation temporary require important improvements to enter in service including an emergency generator, full laboratory analysis to verify water quality and inspections by regulatory agencies in order to be used as a source of potable water in the Vieques municipality. During an emergency, PRASA provides drinking water through tanker trucks that are brought from the Island.

If you need any additional information, please do not hesitate to contact us.

Sincerely,

DORIEL PAGÁN CRESPO, ENG.,
Executive President, Puerto Rico Aqueduct and Sewer Authority.

APPENDIX

QUESTIONS FROM HON. DAVID ROUZER TO JAMES J. PLETL, PH.D., DIRECTOR, WATER QUALITY DEPARTMENT, HAMPTON ROADS SANITATION DISTRICT, VIRGINIA BEACH, VIRGINIA, ON BEHALF OF THE NATIONAL ASSOCIATION OF CLEAN WATER AGENCIES

Question 1. Please provide your assessment of the Environmental Protection Agency's (EPA's) Effluent Guidelines Program Plan 15? [1]

a. Specifically, where are the research and information gaps?

b. Further, please elaborate on the role of innovation is finalizing the plan.

ANSWER. ELG Plan 15 includes the actions planned by EPA to address PFAS discharges from industries. The Plan identifies the industries for which EPA will develop effluent guidelines and pretreatment standards for reducing PFAS discharges, and the industries which EPA will continue to study to determine if effluent guidelines and pretreatment standards are necessary.

As EPA develops the regulations and continues its studies, the Agency will collect more information about the PFAS discharged by these industries, the control technologies that can be used, and the costs associated with implementing these technologies. Additional research is still needed to determine the environmental and human health risks of the PFAS discharges so that appropriate levels of control can be required. The effectiveness of control technologies also needs further research. But it is impossible to evaluate the risks and controls unless a consistent, reliable analytical test method is used for determining PFAS concentrations in wastewater, biosolids and air. EPA's Method 1633 must therefore be finalized before effluent guidelines and pretreatment standards can be developed and industrial monitoring can begin.

The draft ELG Plan 15 outlines EPA's actions related to effluent guidelines and pretreatment standards, and the finalized Plan will consider public comments and any additional information that EPA obtains while finalizing the Plan. Innovation will therefore not play an important role in the finalization of the Plan, but it will certainly be an important consideration as EPA develops the regulations for PFAS-discharging industries. Innovation is needed for more effective and cost-efficient treatment technologies, and for developing substitutes where appropriate for PFAS that remain in use in some industries.

Question 2. On September 2, 2021, EPA and the Department of Department (DOD) collaboratively announced the approval of a new single-laboratory validated analytical method 1633—to test for Per- and polyfluoroalkyl substances (PFAS) in various environmental media.[2] This method can test for 40 PFAS compounds in wastewater, surface water, groundwater, soil, biosolids, and more.[3] However, the agencies did not publish the corresponding validation study report on the precision, bias, or sensitivity of this method, which is counter to longstanding agency policy and raises concerns since EPA has approved it for use in individual National Pollutant Discharge Elimination System (NPDES) permits. Please elaborate on why ensuring EPA's analytical method development in a fully transparent manner is so key?

ANSWER. A multi-lab validated, Clean Water Act-promulgated analytical method is needed for wastewater utilities to implement ELGs and pretreatment standards. EPA must ensure that utilities can have confidence in its method and the data collected.

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[1] Preliminary Effluent Guidelines Program Plan, EPA, *available at* https://www.epa.gov/eg/preliminary-effluent-guidelines-program-plan.

[2] Press Release, *EPA Announces First Validated Laboratory Method to Test for PFAS in Wastewater, Surface Water, Groundwater, Soils*, EPA, Sept. 2, 2021, *available at* https://www.epa.gov/newsreleases/epa-announces-first-validated-laboratory-method-test-pfas-wastewater-surface-water.

[3] *Id.*

To date, EPA has not released the single-lab validation report for Method 1633, yet as you mention EPA has already given state regulatory authorities the green light to begin to incorporate this analytical method into NPDES permits for monitoring and collecting PFAS data. This is problematic without knowing whether this method passes muster within a single laboratory or between laboratories—especially at such low levels. It will be costly for permittees to incorporate and may not return reliable data. Therefore, EPA needs to release the single-lab validation report for comment and complete and report on the multi-lab study that will follow with its own public comment period, all based on this analytical method, to provide utilities and the public confidence in their testing procedures and that ratepayer dollars are being put to use in the best way possible. If the analytical method needs improvement to provide the most reliable data, we must achieve this confidence first before collecting data that might not be truly representative of PFAS levels.

This is especially important now that EPA has released its PFAS Roadmap—which specifically states it plans to "leverage NPDES permitting to reduce PFAS discharges in waterways" and will propose monitoring requirements for federally-issued wastewater and stormwater permits to better understand where PFAS is expected or suspected to be present in discharges. EPA is further proposing to issue guidance for states that will "recommend the full suite of permitting approaches."

The PFAS Roadmap further indicates that the multi-laboratory validated method will not be available until Fall 2022 and is unclear whether public comment on the method will occur before the Agency initiates a rulemaking to promulgate this method under the Clean Water Act. It is imperative that the Agency is transparent throughout its analytical development process to ensure the process provides the most reliable data and scientific confidence. Clean Water Act and Clean Air Act permittee liability associated with data reported to regulatory agencies demands reliable data.

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