September 28, 2018

Felicia Marcus, Chair
Members of the State Water Resources Control Board
1001 I Street
Sacramento, CA 95812-2815

***Re: Poly- and Perfluorinated Alkyl Substances***

Dear Chair Marcus and Members of the Board:

On behalf of our various organizations and the tens of thousands of Californians we represent, we write to ask the Division of Drinking Water (DDW), under the auspices of the State Water Quality Control Board (State Board), to request that the Office of Environmental Health Hazard Assessment (OEHHA) develop a public health goal (PHG) for *the class* of chemicals known as PFASs or poly- and perfluorinated alkyl substances.

While the State Board took the laudable step of adopting interim state Notification Levels for perfluorooctanoic acid (PFOA), and perfluorooctanesulfonic acid (PFOS) of 14 and 13 parts per trillion respectively, we need to address other PFASs, some of which have been detected in CA drinking water, as well as food, house dust, and other environmental media.[1] Furthermore, the commercial use of

[1] PFHxS and PFHpA, were detected in California drinking water sources through the very limited UCMR3 program, giving a glimpse as to why it is necessary to monitor for additional PFASs. That program was also restricted to the search for 6 PFAS out of the many thousands in existence.

newer alternatives to legacy PFASs, such as PFOA and PFOS, poses the threat of a wider array of toxic fluorinated chemicals in California water supplies. Developing a PHG for PFAS as a class will prevent the state from having to develop an unending cycle of PHGs in the years ahead, at great expense to both OEHHA and the public.

While there is limited toxicity data on many of the newer "short-chain" PFASs replacing PFOA and PFOS in various applications, evidence is growing quickly that they collectively pose similar threats to human health and the environment. As Scheringer, et.al. warned in 2014, "The levels of some fluorinated alternatives or their degradation products, such as perfluorobutane sulfonic acid (PFBS) or perfluorobutanoic acid (PFBA), have been shown to be rising in recent years in the environment and human tissues in Europe."[2] This and concerns with the environmental fate and persistence of short-chain alternative PFASs have led to a call from independent scientists from around the globe to address PFAS as a class both in terms of their impacts and in limiting their uses.[3]

There is precedent for looking at drinking water contaminants as a class, including trihalomethanes, haloacetic acids, and dioxin. While we recognize that the universe of PFAS chemicals is much greater and that there are gaps in toxicity data, this letter outlines why we believe we need to take a class approach to PFAS chemicals.

**Background on PFASs**

PFASs are a family of approximately 4700[4] synthetic chemicals with at least one fully fluorinated carbon atom. All carbons in perfluoroalkyl substances are fully fluorinated, and polyfluoroalkyl substances may contain a mix of fully fluorinated, partially fluorinated, and nonfluorinated carbon atoms. These chemicals are used in a wide range of consumer and industrial products where grease or water proofing is desired, or surfactant action is a benefit. These products include food packaging and non-stick cookware, cosmetics, waterproof and stain-proof textiles and carpet, aqueous film forming foam (AFFF) to fight Class B fires, and as part of metal plating processes. The strength of the carbon-fluorine bond has also won PFAS the sobriquet of "forever chemicals" as they persist and resist degradation in the environment.[5] Certain PFASs also bioaccumulate and most travel easily through the aquatic environment, even being detected in Arctic polar bears.

The most well known and well studied PFASs are PFOA, famously once used to produce Teflon, and PFOS, formerly used in Scotchgard. Both are "long-chain" chemicals, meaning they have six (for perfluoroalkyl sulfonic acids) or seven (for perfluoroalkyl carboxylic acids) or more carbon molecules. Given the decades-worth of data on the harm these chemicals cause to human health, wildlife, and the

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[2] Scheringer M., et. al. (2014). Helsingør Statement on poly- and perfluorinated alkyl substances (PFASs)**. Chemosphere,** v. 114, 337-33.

[3] See the Madrid Statement at http://greensciencepolicy.org/madrid-statement/.

[4] Organization for Economic Co-operation and Development. (2018) Toward a New Comprehensive Global Database of Per-and Polyfluoroalkyl Substances (PFASs): Summary Report on Updating the OECD 2007 List of Per- and Polyfluoroalkyl Substances (PFASs). Series on Risk Management, No. 39. ENV/JM/MONO(2018)7 http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ENV-JM-MONO(2018)7&doclanguage=en

[5] Wang Z., et. al. (2017). A never-ending story of per- and polyfluoroalkyl substances (PFAS). Environ. Sci. Technol., 51 (5), 2508-2518. Russell, M.H., et. al. (2008) Investigation of the biodegradation potential of a fluoroacrylate polymer product in aerobic soils. Environ. Sci. Technol. 42 (3), 800-807. Note that this latter papers was authored by DuPont staff.

environment (see below), PFOA and PFOS are largely being phased out of many consumer products[6], though their legacy remains, and they may still be present in many articles imported into the US.

The replacements to PFOA and PFOS are "short-chain" versions of PFAS chemicals with less than six-seven carbons. Despite chemical industry claims to the contrary, the limited but growing data on these newer chemicals indicates that they are of similar structure, are equally persistent in the environment, and behave in similar fashion in the human body, particularly at the cellular level. In addition, short-chain PFAS are sometimes less effective than the long-chain chemicals they are replacing, which may lead to larger quantities of short-chain PFASs being used in products and emitted to the environment.[7] Their more hydrophilic nature makes them more difficult to remove from drinking water, as they sorb less readily to the activated carbon traditionally effective in removing PFOA and PFOS. This leads to what one paper called "everlasting background concentrations in the environment" so that humans and other organisms are "permanently and poorly reversibly exposed." [8]

**PFAS contamination in California**

*Community Water Systems*

From 2013 to 2015, the Third Unregulated Contaminant Monitoring Rule (UCMR3) led to the national monitoring of six PFAS chemicals[9] in all community water systems and non-transient non-community water systems serving over 10,000 people, plus a representative sampling of 800 smaller systems.

According to an analysis of the UCMR3 collected data, California has the most detections of PFAS in drinking water sources in the United States.[10] Four hundred and fifty-five (455) sources have detections of PFOS, PFOA, or the slightly smaller chain perfluorohexane sulfonic acid (PFHxS) and perfluoroheptanoic acid (PFHpA) (see attached summary of UCMR3 data for the nation and California).

While these data are sobering, they likely provide a significant underestimate of how many drinking water sources are contaminated by PFASs. The UCMR3's overall limitations have been well described:

> *"The [minimum reporting levels] MRLs[11] (10–90 ng/L) in the UCMR3 database are up to 2 orders of magnitude higher than the limit of quantitation in most published studies, and more than 10 times higher than the drinking water limit (1 ng/L) suggested by human and animal studies. Because PFASs are detectable in virtually all parts of the environment, we*

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[6] https://www.epa.gov/assessing-and-managing-chemicals-under-tsca/fact-sheet-20102015-pfoa-stewardship-program#what and EPA Technical Fact Sheet – Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA), p. 2 at https://www.epa.gov/sites/production/files/2017-12/documents/ffrrofactsheet_contaminants _pfos_pfoa_11-20-17_508_0.pdf

[7] Brendel S., et. al. (2018) Short-chain perfluoroalkyl acids: environmental concerns and a regulatory strategy under Reach. Environ Sci Eur, 30(1): 9.

[8] Ibid.

[9] PFOA, PFOS, PFNA, PFHxS, PFHpA, and PFBS. See https://www.epa.gov/dwucmr/third-unregulated-contaminant-monitoring-rule.

[10] Hu X. C., et. al. (2016). Detection of poly- and perfluoroalkyl substances (PFASs) in U.S. Drinking Water Linked to industrial sites, military fire training areas, and wastewater treatment plant. *Environ. Sci. Technolo*. Let. 3, 10, 344-350

[11] As defined by the Agency for Toxic Substances and Disease Registry, an MRL is the "estimate of amount of chemical a person can eat, drink, or breathe each day without detectable risk to health" (excluding cancer) https://www.atsdr.cdc.gov/minimalrisklevels/index.html

*infer that the large fraction of samples below reporting limits is driven in part by high MRLs."*[12]

In fact, the detection limits used by EPA in the UCMR3 (PFOA - 20ppt, PFOS - 40ppt, PFHxS - 30ppt, PFNA - 20ppt, PFHpA - 10ppt, and PFBS - 90ppt) were higher than the detection limits reported by a prominent laboratory that performed roughly one-third of the UCMR3 analyses.[13] The UCMR3 data are further limited by the inclusion of only 0.5 % of the nation's small public water supplies and no testing results for private wells.[14]

*Contaminated Sites*

Ongoing firefighting and training activities can lead to groundwater contamination by uncontained release of PFAS-containing AFFF. The Federal Aviation Administration (FAA) sponsored a report[15] published by the National Academy of Sciences that addressed the use and impact of PFAS-containing AFFF at civilian airports across the United States. The survey was taken by 146 airports in the U. S. in early 2016 and includes several prominent California airports. The results of this survey show that: 97.6% of airports conduct foam tests, and almost all airports test foams between every four months and once a year; and 78.9% of airports discharge AFFF used in trainings onto the ground, left to evaporate dissolve or dissipate, while only 21.1% discharge into a containment system during trainings.

A report to Congress by the Department of Defense (DoD) in October 2017[16], also highlights the extreme risk of water contamination associated with using AFFF. The DoD detected PFOA and PFOS at hundreds of DoD installations and nearby water systems across the U.S. The highly elevated levels of PFOA and PFOS in the California water systems and wells listed in the figure below are well above this EPA's lifetime health advisory for PFOA and PFOS of 70 ppt (individually or, when both present, combined[17] and pose a high risk for those living on military bases and neighboring communities.

| Contamination Site | County | Combined PFOA and PFOS (ng/L) | Water System Affected |
|---|---|---|---|
| Beale AFB | Yuba | 80 - 200,000 | On-base Groundwater Monitoring Well |
| El Toro Marine Corps Air Station | Orange | 81 - 101.5 | Off-base Groundwater Monitoring Well |
| | | 78 - 3,826 | On-base Groundwater Monitoring Well |
| Former Castle AFB | Merced | 281 - 2,502 | On-base Groundwater Monitoring Well |

[12] Ibid.

[13] Eaton, A. (2017) A Further Examination of a Subset Of UCMR 3 PFAS Data Demonstrates Wider Occurrence. http://greensciencepolicy.org/wp-content/uploads/2017/12/Andy_Eaton_UCMR3_PFAS_data.pdf

[14] Ibid.

[15] Airport Cooperative Research Program. (2017) Use and Potential Impacts of AFFF Containing PFASs at Airports. *National Academy of Science* http://nap.edu/24800

[16] U.S. Department of Defense. (2017) Aqueous Film Forming Foam Report to Congress. http://www.oea.gov/resource/aqueous-film-forming-foam-report-congress

[17] https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos and https://www.epa.gov/ground-water-and-drinking-water/supporting-documents-drinking-water-health-advisories-pfoa-and-pfos.

| | | | |
|---|---|---|---|
| Former George AFB | Victorville | 87 - 5,396 | On-base Groundwater Monitoring Well |
| Former March AFB | Riverside | 70 - 168<br>76 - 9,666<br>553 - 3,195 | Off-base Public/Private Drinking Water Well<br>On-base Groundwater Monitoring Well<br>Off-base Groundwater Monitoring Well |
| Former Mather AFB | Sacramento | 193<br>73 - 16,800<br>79 - 672 | Off-base Public/Private Drinking Water Well<br>On-base Groundwater Monitoring Well<br>Off-base Groundwater Monitoring Well |
| Former McClellan AFB | Sacramento | 90 - 348 | On-base Groundwater Monitoring Well |
| Fort Hunter Liggett | Monterey | 120 (PFOS ONLY)* | DoD Purveyor Drinking Water System |
| Fort Ord | Monterey Bay | 120 - 334 | On-base Groundwater Monitoring Well |
| Marine Corps Air Station Tustin | Tustin | 423 - 770,000 | On-base Groundwater Monitoring Well |
| Marine Corps Base Camp Pendleton (South) | San Diego | 77 | DoD Purveyor Drinking Water System |
| Marine Corps Logistics Base Barstow | San Bernardino | 103<br>80 - 138 | Off-Base Public/Private Drinking Water System<br>On-base Groundwater Monitoring Well |
| NAS Alameda | Alameda | 112 - 336,000 | On-base Groundwater Monitoring Well |
| Naval Station Treasure Island | Treasure Island | 160 - 10,750 | On-base Groundwater Monitoring Well |
| Naval Weapons Station Seal Beach - NOSC Moreno | Seal Beach, Orange | 125 - 135 | Non-DoD Purveyor Drinking Water System |
| NAWS China Lake | Kern, San Bernardino & Inyo | 3,800 - 8,000,000 | On-base Groundwater Monitoring Well |
| NCBC Port Hueneme | Port Hueneme | 51,000 - 1,080,000 | On-base Groundwater Monitoring Well |
| NSA Monterey - Naval Radio Transmitter Facility Dixon | Dixon | 260 | DoD Purveyor Drinking Water System |
| Travis AFB | Solano | 89 - 40,000 | On-base Groundwater Monitoring Well |
| Twentynine Palms Strategic Expeditionary Landing Field | Twentynine Palms, San Bernardino | 318 - 440 | On-base Groundwater Monitoring Well |

*Table shows results of DoD testing in 2017, table only include sites in California*

It is important to note that the DoD does not address the hundreds of other PFASs that could be present in AFFF. A recent study[18] discovered an additional 40 subgroups of PFASs, in addition to 17 previously reported subgroups, in AFFF and AFFF-impacted groundwater. The lower affinity of short-chain PFAS for

[18] Barzen-Hanson K. A., et al. (2017) Discovery of 40 classes of per- and polyfluoroalkyl substances in historical aqueous film-forming foams (AFFFs) and AFFF-impacted groundwater. *Environ Sci Technol* 51:2047-2057

particles such as sediment means that if you spray shorter chain firefighting foams on the ground (which are replacing C8 versions), the PFASs would bind less tightly to soil and move more quickly into groundwater. Consequently, the combined effects of PFAS-containing AFFF exposure via military installations and civilian airports poses huge risks for water systems across California.

*Other Sources of PFASs to California waterways*

A study in 2008 by Plumlee et al.[19] detected multiple PFASs in recycled water from California wastewater treatment plants (WWTP), including PFOA, PFOS, PFHxS, PFDS, PFHxA, PFHpA, PFNA, PFDA, 6:2 FtS, FOSA, N-EtFOSAA (10-190 ng/L). PFASs were also found in surface water and groundwaters (20-160 ng/L) and wetlands (100-170 ng/L).

The Regional Monitoring Program for Water Quality in the San Francisco Bay monitors PFASs in San Francisco Bay and has widely detected PFASs in water, fish, bird eggs and harbor seals.[20] The highest concentrations of PFASs were observed in the Lower South Bay. Concentrations of PFOS, PFOA, PFHxA, PFPeA, PFHpA and PFBA at this site were between 44 – 220 ng/L. The source of these higher concentrations is unknown, but the area is highly industrial and includes a steel fabricator, auto salvage yard and a former hazardous waste and solvent recycler.

*Need for Additional Monitoring*

The State Board's action to lower the interim Notification Levels for PFOA and PFOS is in line with that of other states such as New Jersey, as well as with the Agency for Toxic Substances and Disease Registry's recently released draft MRLs.[21] Monitoring for just those two chemicals at California's Notification Levels will likely provide more data on the presence of these two chemicals. However, it will not provide adequate data on other PFASs detected in California supplies, or the potential presence of unknown short-chain PFAS chemicals in commercial or industrial use in the state.

Increased monitoring for compounds other than PFOA and PFOS is critical, as scientists and regulators around the world are expressing increasing concern about the risks posed by so called 'persistent, mobile, and toxic' (PMT) chemicals, such as the short-chain PFASs.[22] Drinking water supplies are particularly vulnerable to short-chain PFAS contamination because the known physicochemical properties of short chain PFASs cause them to be extremely mobile in the aquatic environment. As one study states, "due to this mobility short-chain PFAAs effectively reach water bodies which is of special concern regarding human exposure: Drinking water resources are highly sensitive to contamination with

[19] Plumlee, Megan H., Jeannine Larabee, and Martin Reinhard. "Perfluorochemicals in water reuse." *Chemosphere* 72.10 (2008): 1541-1547.

[20] Sedlak, Margaret D., et al. "Per-and polyfluoroalkyl substances (PFASs) in San Francisco Bay wildlife: Temporal trends, exposure pathways, and notable presence of precursor compounds." *Chemosphere* 185 (2017): 1217-1226.

[21] The New Jersey Dept. of Environmental Protection accepted the state's Drinking Water Quality Institute's recommended drinking water standard of 14 parts per trillion for PFOA and proposed a standard of 13 parts per trillion for another PFAS called perfluorononanoic acid (PFNA). See: https://www.nj.gov/dep/newsrel/2017/17_0104.htm, and https://www.atsdr.cdc.gov/toxprofiles/tp.asp?id=1117&tid=237

[22] Reemtsma, Thorsten, et al. "Mind the Gap: Persistent and Mobile Organic Compounds - Water Contaminants That Slip Through." Environ Sci Technol 50, 19, (2016): 10308-10315.

short-chain PFAAs. Due to the low adsorption potential, short-chain PFAAs will not bind to particles and stay mainly dissolved in the water phase."[23]

The currently approved analytical method (EPA Method 537 v1.1) for monitoring can in fact be used for a total of 14 PFAS chemicals – the 6 included in UCMR3 and 8 additional PFASs[24]. The inclusion of branched PFOA isomers in the quantitation of PFOA would further enable the quantification and reporting of an additional 4 PFAS chemicals.[25] Consequently, even with limited monitoring methodology, the search for PFAS in California waters has not been as comprehensive as it could have been. U.S EPA is developing EPA SW-846, which is anticipated to detect 24 additional PFASs.[26]

The Total Oxidizer Precursor (TOP) Assay is a way to gather information on virtually the entire class of PFAS that may be present in drinking water.[27] The TOP assay is capable of measuring the concentration on non-discrete and difficult to measure PFAS compounds that are not determined by conventional analytical methods, and can help to capture many of the chemicals that are missed by the current and new EPA methods. For this reason, we urge the State Board to use the TOP assay to screen systems in California to more fully assess the extent of the PFAS problem.

As we expand our search under these various methods and as new methodologies are developed, we can anticipate a greater number of these widely used, though currently unknown chemicals to appear in drinking water sources.

This latter point is especially concerning given that unlike the PFOA contamination in Hoosick Falls, New York or the GenX (a short-chain PFAS) in the Cape Fear River Basin of North Carolina, the data available in California suggest that multiple sources may be contributing to contamination with multiple PFASs. While an analysis of UCMR3 detections by Hu, et. al. (2016) made correlations between drinking water sources and their proximity to industrial sites, military fire training areas, and wastewater treatment plants, California's contamination does not appear to stem from a single controllable source and could include diverse sources such as wastewater discharges, airports, military training sites, and smaller industrial discharges. This could also suggest the presence of other, currently unmonitored PFASs in state water systems. In the end, while our state has not experienced the highly publicized contamination from industrial sites such as in NY or NC, the widespread presence of lower levels of these chemicals in many more water sources poses as serious a threat to health and the environment in those communities.

Researchers and available data suggest that the extent of PFAS contamination in California waterways has not yet been fully characterized and the threat posed to drinking water is likely much greater than

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[23] Brendel, et. al., (2018)

[24] EPA Document #: EPA/600/R-08/092 METHOD 537. Determination Of Selected Perfluorinated Alkyl Acids In Drinking Water By Solid Phase Extraction And Liquid Chromatography/Tandem Mass Spectrometry (LC/MS/MS) Version 1.1, September 2009. See p. 537-2.

[25] See https://www.eurofinsus.com/environment-testing/laboratories/eurofins-eaton-analytical/services/pfas-testing-in-water.analytical-method/.

[26] See EPA's Technical Brief: https://www.epa.gov/sites/production/files/2018-04/documents/pfas_methods_tech_brief_02apr18_revison.pdf

[27] See Erika F. Houtz and David L. Sedlak, "Oxidative Conversion as a Means of Detecting Precursors to Perfluoroalkyl Acids in Urban Runoff," Environmental Science and Technology 46, no. 17 (2012): 9342-49. Also https://www.testamericainc.com/services-we-offer/services-we-offer-by-method-group/ultra-trace-level-organics/pfas-total-oxidizable-precursor-top-assay/ and http://www.newmoa.org/events/docs/259_227/HoutzFandT_May2017_final.pdf.

described in the UCMR data. Given the large number of small or private systems, particularly in the certain regions of the state, many of which rely on groundwater, it is critical that additional monitoring be conducted to better identify PFAS contamination that could be threatening public health.[28]

**Health Impacts**

While research on the health impacts of short-chain PFAS is ongoing, their long-chain predecessors have been connected to serious health impacts. These include cancers, liver and kidney malfunction, thyroid diseases, delayed puberty, early menopause in women, reduced immune system responses in children, birth defects, reproductive and developmental toxicity, systemic toxicity, and elevated cholesterol.[29]

According to the U.S. EPA and the ATSDR, drinking water is one of the key contributors of PFAS exposure in humans, along with food contaminated by soil, compost, irrigation water, and/or food packaging.[30] However, when drinking water is highly contaminated, it becomes the main contributor. Reducing overall exposure will reduce the risk of developing adverse health outcomes. Importantly, public drinking water is one source of exposure that we can greatly reduce or even eliminate.

Both the scientific community and general public are justifiably very concerned PFASs are being found in the vast majority of U.S. residents. For instance, scientists from the Centers of Disease Control found PFOA, PFOS, PFHxS and perfluorononanoic acid (PFNA) in the blood serum of nearly all tested people in the U.S.[31] And Biomonitoring California has detected nine different PFASs, including PFOS, PFOA, PFNA, PFDA, PFDoA, PFUA, PFHpA, PFHxS, and PFOSA .

While it has been presumed that short-chain PFASs also have much shorter half lives in the human body, in reality this is an understudied area of research. Emerging evidence is that some short-chain PFASs are not as prolific in blood serum, but are collecting in human organs.[32]

Developing science on short-chain PFAS concentrations in the body indicates "that some fluorinated alternatives have similar or higher toxic potency than their predecessors when correcting for differences in toxicokinetics".[33] The rate a chemical will enter the body and the process of excretion and metabolism in the body may in fact be an inadequate measure of health threats to humans from drinking water given the persistence of short-chain PFAS in the environment. As one paper argues:

> "Considering that the exposure to short-chain PFAAs is unlikely to be stopped shortly, there will be increasing continuous and poorly reversible environmental background concentrations of short-chain PFAAs. Consequently, organisms and humans will be

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[28] Hu, et. al.

[29] Magensen, U, et. al., (2015). Structural equation modeling of immunotoxicity associated with exposure to perfluorinated alkylates. Environmental Health 14:47. See also https://www.atsdr.cdc.gov/toxprofiles/TP.asp?id=1117&tid=237.

[30] See https://www.atsdr.cdc.gov/toxprofiles/tp200.pdf. Also https://www.atsdr.cdc.gov/pfc/docs/pfas_clinician_fact_sheet_508.pdf

[31] See https://www.cdc.gov/biomonitoring/PFAS_FactSheet.html and Fourth National Report on Human Exposure to Environmental Chemicals Updated Tables, March 2018, Volume One at https://www.cdc.gov/exposurereport/pdf/FourthReport_UpdatedTables_Volume1_Mar2018.pdf.

[32] Perez et al. Accumulation of perfluoroalkyl substances in human tissues. Environ. International. (2013) 59. 354-362.

[33] Gomis MI, Vestergren R., Borg, D, Cousins I, (2018). Comparing the toxic potency in vivo of long-chain perfluoroalkyl acids and fluorinated alternatives. Environment International 113, 1–9.

permanently exposed to short-chain PFAAs, resulting in continuous and poorly reversible internal concentrations. The poorly reversible internal concentrations in organisms are caused by the persistence of short-chain PFAAs and their continuous presence in the environment. Therefore, the organismal elimination efficiencies are of secondary relevance."[34]

**Conclusion**

California needs to move forward on regulating PFAS as a class in drinking water, and not to depend on U.S. EPA's process for doing so. We candidly do not trust the current EPA management to issue adequately protective standards, or look beyond PFOA and PFOS. Nor can we wait the 5-10 years that the agency will take. While California's process is deliberative and takes a minimum of 4 years, we believe by acting now to collect data, including the PHG will better serve the public.

We believe that while there are limitations to the toxicological data for the 4700 PFASs in commercial use, the structure of the fluorine-carbon bond and the impacts documented on the studied PFASs already available will provide OEHHA with the foundation by which to extrapolate health impacts for the class. This is supported by the constant exposure to short-chain chemicals, even when they have a relatively short presence in the body, as well as the fact that in many cases the volume of these chemicals may be much higher than their long-chain cousins.

If, after their analysis, OEHHA cannot justify a PHG for the entire class of PFAS chemicals, they should at minimum develop a PHG that encompasses a wide range of known fluorinated chemicals. While focus should be on what water monitoring methodologies - including the TOP Assay -allow, OEHHA should also consider subgroups of chemically similar chemicals.

There is precedent for looking at subgroups. In 2016, the Food and Drug Administration ruled that perfluoroalkyl ethyl containing food-contact substances (FCSs) were no longer authorized for food-contact use because the toxicity of structurally similar compounds, like PFOA, demonstrated there was no longer a reasonable certainty of no harm in their use.[35] The FDA determined that due to similar structure and biopersistence, long-chain perfluorinated compounds could be treated as a class of chemicals. Therefore, in the absence of contradictory data, the toxicology information on one or a subset of the chemicals in the class could be applied to the entire class.

"In the absence of data specific to the three FCSs to address these endpoints, FDA utilized the available data demonstrating reproductive and developmental toxicity for long-chain perfluorocarboxylic acids to assess the safety of the approved food-contact use of the FCSs."

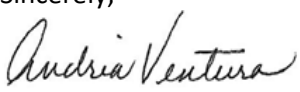
While development of the PHG will take time, we would encourage the Division of Drinking Water to expand monitoring of drinking water for more PFAS in surface and groundwater, including at minimum the 18 PFASs that can be detected using EPA Method 537 1.1 with branched PFOA isomers, the TOP

[34] Brendel, et. al., (2018)

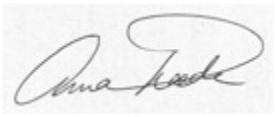
[35] Food and Drug Administration. (2016) Indirect Food Additives: Paper and Paperboard Components. Department of Health and Human Services. Federal Register Vol. 81, No.1

Assay, and the pending EPA SW-846 methodology when it is avail. DDW should also research the potential source of each detection. All such detections in public water systems should be disclosed to the public, as well as probable sources. In addition, we urge the Division to include a significant number of small systems and private wells in their monitoring.

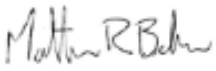
Sincerely,



Andria Ventura
Toxics Program Manager
Clean Water Action



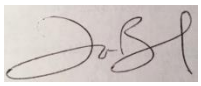
Anna Reade, Ph.D.
Staff Scientist, Healthy People & Thriving Communities Program
Natural Resources Defense Council



Matthew Baker
Policy Director
Planning & Conservation League

Colin Bailey
Executive Director and Managing Attorney
The Environmental Justice Coalition for Water

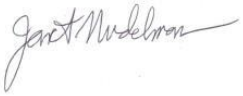
Debi Ores
Attorney
Community Water Center



Tom Bruton, PhD
Science and Policy Fellow
Green Science Policy Institute

Sejal Choksi-Chugh
Executive Director & Baykeeper
San Francisco Baykeeper

Jamie McConnell
Director of Programs and Policy
Women's Voices for the Earth



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Mark S. Rossi, PhD,
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Clean Production Action

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