Congressional Research Service
Informing the legislative debate since 1914

Contaminants of Emerging Concern under the Clean Water Act

November 7, 2019

Congressional Research Service
https://crsreports.congress.gov
R45998

CRS REPORT
Prepared for Members and
Committees of Congress

Congressional Research Service
Informing the legislative debate since 1914

SUMMARY

R45998

November 7, 2019

Laura Gatz
Analyst in Environmental Policy

Contaminants of Emerging Concern under the Clean Water Act

Recent decades have seen increased national attention to the presence of "emerging contaminants" or "contaminants of emerging concern" (CECs) in surface water and groundwater. Although there is no federal statutory or regulatory definition of CECs, generally, the term refers to unregulated substances detected in the environment that may present a risk to human health, aquatic life, or the environment and for which the scientific understanding of potential risks is evolving. CECs can include many different types of manufactured chemicals and substances—such as those in pharmaceuticals, industrial chemicals, agricultural products, and microplastics—as well as naturally occurring substances, such as algal toxins. Data on CECs that would help determine their risk to humans and aquatic life or other aspects of the environment are often limited. Increased monitoring and detections of one particular group of chemicals, per- and polyfluoroalkyl substances (PFAS), has recently heightened public and congressional interest in these CECs and has also prompted a broader discussion about how CECs are identified, detected, and regulated and whether additional actions should be taken to protect human health and the environment. While several statutes provide authorities to the U.S. Environmental Protection Agency (EPA) and states to address CECs, this report examines authorities available under the Clean Water Act (CWA)—which Congress established to restore and protect the quality of the nation's surface waters.

EPA has several CWA authorities it may use to address CECs, although it faces some challenges in doing so. Under the CWA, a primary mechanism to control contaminants in surface waters is through permits. The statute prohibits the discharge of pollutants from any point source (i.e., a discrete conveyance) to waters of the United States without a permit. The CWA authorizes EPA and states to limit or prohibit discharges of pollutants in the National Pollutant Discharge Elimination System (NPDES) permits they issue. These permits incorporate technology-based and water-quality-based requirements.

The CWA authorizes EPA and states to address CECs through technology-based effluent limitations using national Effluent Limitation Guidelines and Standards (ELGs) or by setting technology-based effluent limits in NPDES permits on a case-by-case basis. The CWA requires EPA to publish ELGs, which are the required minimum standards for industrial wastewater discharges. The CWA also requires EPA to annually review all existing ELGs and to publish a biennial plan that includes a schedule for review and revision of promulgated ELGs, identifies categories of sources discharging toxic or nonconventional pollutants that do not have ELGs, and establishes a schedule for promulgating ELGs for any newly identified categories. In cases where EPA has not established an ELG for a particular industrial category or type of facility, or where pollutants or processes were not considered when an ELG was developed, the permitting authority (EPA or states) may still impose technology-based effluent limits on a case-by-case basis. Although EPA and states have these authorities available to address CECs, there are some challenges to doing so, including a lack of data available to support new ELGs or updates to existing ELGs. Agency officials stated that it is difficult for the agency to keep pace with the growth of new chemicals in commerce.

The CWA also authorizes EPA and states to address CECs through water-quality-based requirements. States are required to adopt water quality standards for waters of the United States and review them at least once every three years. The CWA requires EPA to publish, and "from time to time thereafter revise" water quality criteria that reflect the latest scientific knowledge. States use EPA's criteria as guidance in developing their water quality standards. The CWA directs states to adopt criteria to protect their water bodies' designated uses and to also adopt criteria for all pollutants on the Toxic Pollutant List, for which EPA has published criteria. Once a state adopts water quality criteria for a contaminant as part of its water quality standards, several CWA tools are available to the state for achieving them. The primary tool is to establish water-quality-based effluent limitations in NPDES permits. Although EPA and states have authority to address CECs through water-quality-based requirements, they often lack data needed to support development of criteria or water-quality-based effluent limitations.

The CWA also authorizes EPA to designate contaminants as toxic pollutants or as hazardous substances, which may trigger other actions under the CWA and the Comprehensive Environmental Response, Compensation, and Liability Act.

Recent congressional interest in CECs has focused on addressing one particular group of CECs—PFAS—and on addressing them through other statutes. However, in the 116th Congress, H.R. 3616 and H.Amdt. 537, Section 330A, of the House-passed version of the National Defense Authorization Act for FY2020 (H.R. 2500), would direct EPA to add PFAS to the CWA Toxic Pollutant List and publish ELGs that establish effluent limitations and standards for PFAS within specified time frames.

Contents

Introduction 1
Addressing CECs through the Clean Water Act 2
Technology-Based Requirements 3
Effluent Limitation Guidelines and Standards (ELGs) 5
Options to Address CECs through Technology-Based Requirements 7
Challenges to Addressing CECs through Technology-Based Requirements 8
Water-Quality-Based Requirements 10
Water Quality Criteria 11
Options to Address CECs through Water-Quality-Based Requirements 13
Challenges to Addressing CECs through Water-Quality-Based Requirements 13
Designating CECs as Toxic Pollutants or Hazardous Substances 14
Toxic Pollutants—CWA Section 307 15
Hazardous Substances—CWA Section 311 15
Implications of CWA Designations on CERCLA 16
Legislation in the 116th Congress 16
Conclusion 17

Figures

Figure 1. Clean Water Act Technology Levels of Control Required for Non-POTW Dischargers by Pollutant Category 5

Contacts

Author Information 18

Introduction

Over the past couple of decades, national attention to "emerging contaminants" or "contaminants of emerging concern" (CECs) in surface water and groundwater has been increasing. Although there is no federal statutory or regulatory definition of CECs, generally, the term refers to unregulated substances detected in the environment that may present a risk to human health, aquatic life, or the environment. CECs can include many different types of manmade chemicals and substances—such as those in personal care products, pharmaceuticals, industrial chemicals, lawn care and agricultural products, and microplastics—as well as naturally occurring substances such as algal toxins or manganese.

CECs often enter the environment, including ground and surface waters, via municipal and industrial wastewater discharges and urban and agricultural storm runoff. Although municipal and industrial wastewater are both treated prior to discharge into waterways, treatment facilities are often not designed to remove CECs. The availability of data on CECs—such as concentration and pervasiveness in the environment or exposure or toxicity data that would help determine their risk to humans and aquatic life—may be limited.

In some cases, detections of CECs in the environment have triggered a call for action from federal, state, and local government, as well as Congress. Increased monitoring and detections of one particular group of chemicals, per- and polyfluoroalkyl substances (PFAS), has recently heightened public and congressional interest in these CECs and has also prompted a broader discussion about how CECs are identified, detected, and regulated and whether additional actions should be taken to protect human health and the environment.[1]

Several statutes—including the Safe Drinking Water Act;[2] the Toxic Substances Control Act (TSCA);[3] the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA);[4] and the Clean Water Act (CWA)[5]—provide authorities to the U.S. Environmental Protection Agency (EPA) and states to address particular CECs. In the 116th Congress, Members have introduced more than 40 bills to address PFAS through various means. Multiple bills, including House- and Senate-passed National Defense Authorization Act (NDAA) bills for FY2020 (H.R. 2500 and S. 1790, respectively), would direct EPA to take regulatory and other actions to address PFAS under several environmental statutes. Two of these bills (H.R. 2500 and H.R. 3616) would direct EPA to address PFAS using authorities provided to the agency under the CWA, which Congress established to restore and protect the quality of the nation's surface waters.

Global concern about another group of CECs—microplastics—and their potential impacts has also been mounting.[6] Recent studies have found that treated effluents from wastewater treatment

[1] See CRS Report R45793, *PFAS and Drinking Water: Selected EPA and Congressional Actions*, by Elena H. Humphreys and Mary Tiemann, for an overview of EPA's ongoing and proposed actions to address PFAS under Safe Drinking Water Act authorities, with particular focus on the statutory process for evaluating PFAS for potential regulation.

[2] 42 U.S.C. §300f-300j.

[3] 15 U.S.C. §2601 *et seq.*

[4] 42 U.S.C. §9601 *et seq.*

[5] 33 U.S.C. §1251 *et seq.*

[6] While researchers and the government have been working to address plastic pollution for decades, more recently, the accumulation and potential impacts of plastic pollution have become an emerging issue. Recent studies have shown

plants can be key sources of microplastics, as can runoff from agricultural sites where sewage sludge from the wastewater treatment process has been applied as fertilizer.[7] As with many other CECs, wastewater treatment facilities are generally not designed to screen for microplastic debris, such as microbeads, plastic fragments, or plastic fibers from clothing. Congress has shown interest in addressing the impacts of plastic pollution. In 2015, Congress passed legislation to ban plastic microbeads from rinse-off personal care products ("Microbead-Free Waters Act of 2015," P.L. 114-114). More recently, some Members in the 116th Congress announced plans to introduce comprehensive legislation to address plastic waste in fall 2019.[8]

Some stakeholders have asserted that EPA could be more effective in using its existing CWA authorities to address CECs, while others have suggested a need to identify and address potential gaps in CWA authorities through amendments to the statute.[9] This report examines authorities available to address CECs under the CWA.

Addressing CECs through the Clean Water Act

EPA has several CWA authorities it may use to address CECs, although it faces some challenges in doing so. The CWA's stated objective is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."[10] To help achieve this objective, the CWA prohibits the discharge of pollutants from any point source (i.e., a discrete conveyance, such as a pipe, ditch, etc.) to waters of the United States without a permit.[11] Under the CWA, one of the primary mechanisms to protect or improve surface water quality is to limit or prohibit discharges of contaminants, including CECs, in National Pollutant Discharge Elimination System (NPDES) permits.[12] The CWA authorizes EPA and delegated states to set limits or prohibit discharges of pollutants in permits through technology-based effluent (i.e., discharge) limitations and standards and through water-quality-based effluent limitations, which are established through water quality standards and criteria. Technology-based effluent limitations are specific numerical limits (i.e.,

that microplastics (i.e., plastic particles less than 5 millimeters in size in any one dimension) are widespread in marine and freshwater ecosystems and may also have negative ecological impacts. See EPA, *State of the Science White Paper: A Summary of Literature on the Chemical Toxicity of Plastics Pollution to Aquatic Life and Aquatic-Dependent Wildlife*, December 2016, https://www.epa.gov/trash-free-waters/epa-reports#wp. Also see EPA Office of Wetlands, Oceans and Watersheds, *Microplastics Expert Workshop Report*, December 2017, https://www.epa.gov/sites/production/files/2018-03/documents/microplastics_expert_workshop_report_final_12-4-17.pdf.

[7] EPA, *State of the Science White Paper*. See also Paul Kay et al., "Wastewater Treatment Plants as a Source of Microplastics in River Catchments," *Environmental Science and Pollution Research*, vol. 25, no. 20 (July 2018), pp. 20264-20267.

[8] Office of Senator Tom Udall, "Udall, Lowenthal Release Outline of Legislation to Tackle Plastic Waste Pollution Crisis," press release, July 18, 2019, https://www.tomudall.senate.gov/news/press-releases/udall-lowenthal-release-outline-of-legislation-to-tackle-plastic-waste-pollution-crisis.

[9] Association of Clean Water Administrators (ACWA) and Association of State Drinking Water Administrators (ASDWA), *Recommendations Report—Contaminants of Emerging Concern Workgroup*, May 2019, https://www.asdwa.org/wp-content/uploads/2019/05/ASDWA-ACWA-Report-on-Contaminants-of-Emerging-Concern-2019.pdf, p. 9.

[10] CWA §101(a); 33 U.S.C. §1251(a).

[11] CWA §301; 33 U.S.C. §1311. *Point source* is defined at CWA §502(14); 33 U.S.C. §1362(14).

[12] 33 U.S.C. §1342. Under CWA Section 402, states and EPA issue NPDES permits to municipal and nonmunicipal point sources to authorize their discharges. Note that 47 states are authorized to administer their own NPDES permits. EPA administers NPDES permits in Massachusetts, New Hampshire, New Mexico, the District of Columbia, and certain territories and Indian lands. Per CWA Section 502(3) (33 U.S.C. §1362(3)), *state* is defined to include a state, the District of Columbia, or any of the U.S. territories. Per CWA Section 518 (33 U.S.C. §1377), EPA is authorized to treat an Indian tribe as a state for certain sections of the CWA, including the sections pertaining to CWA permitting.

maximum allowable levels of specific pollutants) that represent the minimum level of control that must be established in a permit.[13] In cases where technology-based effluent limitations are not adequate to meet applicable water quality standards, the permits also incorporate water-quality-based effluent limitations.[14] Water-quality-based effluent limitations are specific limits established in a permit that, if not exceeded in the discharge, allow for attainment of water quality standards in the receiving water.[15] Water quality standards—established by states, territories, tribes, and EPA—define the desired condition or level of protection of a water body and what is needed to achieve or protect that condition.[16] In addition, the CWA authorizes EPA to designate contaminants as toxic pollutants (CWA §307) or as hazardous substances (CWA §311), which may trigger other actions under the CWA and CERCLA.[17] This section first identifies the authorities available under the CWA, their applicability to CECs, and potential challenges with EPA use of these authorities.

Technology-Based Requirements

The CWA requires EPA to establish technology-based effluent limitations for various categories of point sources/dischargers.[18] Technology-based requirements consider the performance of specific technologies as well as economic achievability. These limits do not specify what technologies must be employed; rather, they establish the levels of specific pollutants that are allowable in the discharge based on the performance of technologies identified as representing specified levels of control (e.g., best available technology economically achievable, best conventional pollutant control technology). CWA Section 301 prescribes the levels of control required. EPA broadly classifies NPDES permittees as either (1) publicly owned treatment works (POTWs)[19] or (2) non-POTWs, which include all other point sources and are also often called nonmunicipal facilities or industrial facilities.[20]

[13] CWA §301(b); 33 U.S.C. §1311(b); 40 C.F.R. §125.3.

[14] 40 C.F.R. §122.44(d).

[15] 40 C.F.R. §122.44(d). Water-quality-based effluent limitations apply at the point of discharge, such as the end of the outfall pipe discharging into a water body.

[16] 40 C.F.R. §131.3(i)-(j). Water quality standards apply throughout the water body and reflect the maximum levels of specific pollutants that can be present in a water body and still allow that water body to meet its designated use.

[17] 33 U.S.C. §1317; 33 U.S.C. §1321. Such designations also trigger hazardous substance designations (and liability) under CERCLA.

[18] CWA §301(b); 33 U.S.C. §1311(b); CWA §304(b); 33 U.S.C. §1314(b); CWA §306; 33 U.S.C. §1316; CWA §307; 33 U.S.C. §1317.

[19] Per 40 C.F.R. §403.3(q), a POTW is a treatment works as defined by CWA Section 212, which is owned by a state or municipality (as defined by CWA Section 502(4)). The definition includes any devices and systems used in the storage, treatment, recycling, and reclamation of municipal sewage or industrial wastes of a liquid nature. It also includes sewers, pipes, and other conveyances only if they convey wastewater to a POTW. The term also means the municipality that has jurisdiction over the indirect discharges to and the discharges from the treatment works.

[20] Non-POTWs include other point sources, such as industrial and commercial facilities, industrial stormwater, concentrated animal feeding operations, and vessel discharges. Federal facilities fall under the non-POTW source category. EPA, *NPDES Permit Writers' Manual*, 2010, https://www.epa.gov/sites/production/files/2015-09/documents/pwm_2010.pdf.

The CWA requires POTWs to meet secondary treatment standards as determined by EPA.[21] Secondary standards are based on performance data for POTWs that use physical and biological treatment to remove or control conventional pollutants.[22]

As shown in **Figure 1**, the CWA requires non-POTW dischargers to achieve specified levels of control based on (1) whether a discharger directly or indirectly discharges into a water of the United States (an indirect discharger discharges to a POTW for treatment prior to discharge into a water of the United States), (2) whether the discharger is a new or existing source, and (3) the category of pollutant (conventional, toxic,[23] or nonconventional[24]).[25]

[21] CWA §301(b)(1)(B); 33 U.S.C. §1311(b)(1)(B). As directed by CWA Section 304(d)(1), EPA promulgated secondary treatment standards for biochemical oxygen demand, total suspended solids, and pH. See 40 C.F.R. §133 for secondary treatment standards. The CWA and federal regulations allow adjustments to secondary treatment requirements for biochemical oxygen demand and total suspended solids for equivalent to secondary facilities, per 40 C.F.R. §133.105.

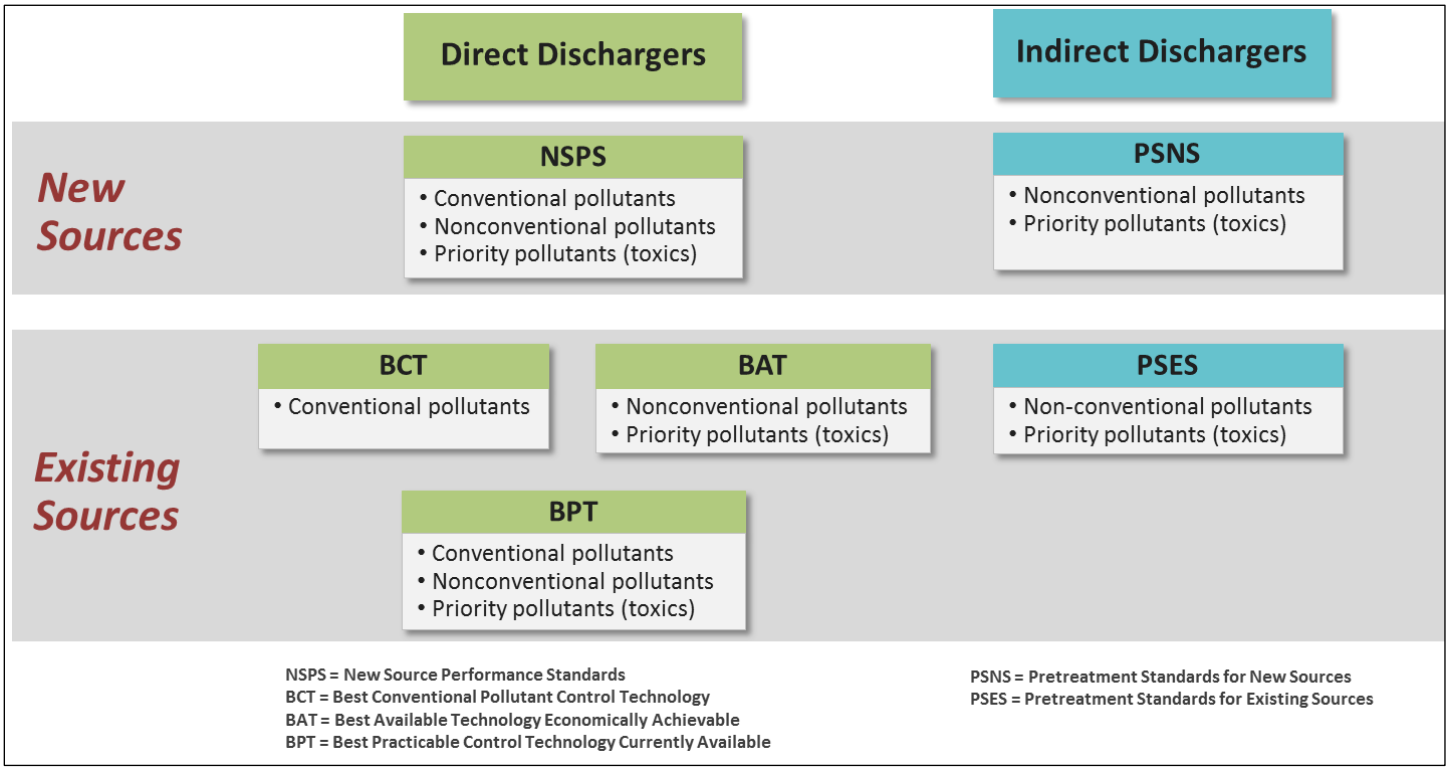
[22] Conventional pollutants include biochemical oxygen demand, total suspended solids, fecal coliform, pH, and oil and grease. CWA Section 304(a)(4) designates biological oxygen demand, suspended solids, fecal coliform, and pH as conventional pollutants. It also authorizes EPA to revise the list of conventional pollutants from time to time. EPA designated oil and grease as an additional conventional pollutant in 1979 (EPA, "Identification of Conventional Pollutants," 44 *Federal Register* 44501, 1979). The list of conventional pollutants is codified at 40 C.F.R. §401.16.

[23] *Toxic pollutant* includes the 65 pollutants and classes of pollutants on EPA's Toxic Pollutant List. Section 307(a)(1) (33 U.S.C. §1317(a)(1)) directed EPA to adopt an initial list of toxic pollutants presented in Committee Print 95-30 of the House Committee on Public Works and Transportation (U.S. Congress, House Committee on Public Works and Transportation, *Data Relating to H.R. 3199 (Clean Water Act of 1977)*, committee print, 95th Cong., November 1977, H.Prt. 95-30 [Washington: GPO, 1977], pp. 3-4). This list included both individual chemicals and categories of chemical compounds. As presented in the legislative history, this initial list was negotiated between EPA and the Natural Resources Defense Council in *Natural Resources Defense Council v Train* (U.S. Congress, House Committee on Public Works and Transportation, Subcommittee on Investigations and Review, *Water Contamination by Toxic Pollutants: An Assessment of Regulation*, committee print, 95th Cong., September 1977, 95-26, p. 6). The Toxic Pollutant List is codified at 40 C.F.R. §401.15. In 1977, EPA developed the Priority Pollutant List to make Toxic Pollutant List implementation more practical for water testing and regulatory purposes. The Priority Pollutant List includes individual chemicals, rather than groups of pollutants, for which EPA has published analytical test methods. Originally, the list included 129 pollutants. In 1981, when three pollutants were removed from the Toxic Pollutant List, they were also removed from the Priority Pollutant List. Accordingly, the Priority Pollutant List, codified at 40 C.F.R. §423, Appendix A, currently contains 126 pollutants.

[24] *Nonconventional pollutant* includes any pollutants other than those identified as conventional or toxic pollutants.

[25] CWA §301(b); 33 U.S.C. §1311(b); CWA §304(b); 33 U.S.C. §1314(b); CWA §306; 33 U.S.C. §1316; CWA §307; 33 U.S.C. §1317.

Figure 1. Clean Water Act Technology Levels of Control Required for Non-POTW Dischargers by Pollutant Category



Source: CRS, based on CWA §§301, 304, 306, and 307.

Notes: EPA regulations define *new source* as "any building, structure, facility, or installation from which there is or may be a 'discharge of pollutants,' the construction of which commenced: (a) after promulgation of standards of performance under CWA section 306 which are applicable to such source, or (b) after proposal of standards of performance in accordance with section 306 of CWA which are applicable to such source, but only if the standards are promulgated in accordance with section 306 within 120 days of their proposal" (40 C.F.R. §122.2).

An *existing source* is any source that is not a new source or a new discharger (40 C.F.R. §122.29 (a)(3)).

Effluent Limitation Guidelines and Standards (ELGs)

The CWA requires EPA to publish national regulations for non-POTW dischargers—called Effluent Limitation Guidelines and Standards (ELGs)—which set minimum standards for specific pollutants in industrial wastewater discharges based on the specified levels of control.[26] Since 1972, EPA has developed ELGs for 59 industrial categories.[27] For direct dischargers, states or EPA incorporate the limits established in ELGs into the NPDES permits they issue. For indirect dischargers, pretreatment standards established in ELGs to prevent pass through and interference at the POTW apply.[28]

[26] CWA §304(b); 33 U.S.C. §1314(b); CWA §306(b); 33 U.S.C. §1316(b); CWA §307(b)-(c); 33 U.S.C. §1317(b)-(c).

[27] 40 C.F.R. Chapter 1, Subchapter N, "Effluent Guidelines and Standards." See also EPA, "Industrial Effluent Guidelines," https://www.epa.gov/eg/industrial-effluent-guidelines.

[28] The national pretreatment program is a component of the NPDES program, which involves federal, state, and local regulatory agencies. Local municipalities are mostly responsible for implementing and enforcing pretreatment requirements. EPA and states authorized to act as the approval authority for POTWs in their states may approve a POTW's pretreatment program. If approved, the POTW is the control authority responsible for ensuring compliance

The CWA requires EPA to annually review all existing ELGs to determine whether revisions are appropriate.[29] In addition, CWA Section 304(m) requires EPA to publish a plan every two years that includes a schedule for review and revision of promulgated ELGs, identifies categories of sources discharging toxic or nonconventional pollutants that do not have ELGs, and establishes a schedule for promulgating ELGs for any newly identified categories.[30]

In its 2002 draft *Strategy for National Clean Water Industrial Regulations*, EPA described a process for identifying existing ELGs that the agency should consider revising as well as industrial categories that may warrant development of new ELGs.[31] As outlined in the strategy, EPA considers four main factors when prioritizing existing ELGs for possible revision: (1) the amount and type of pollutants in an industrial category's discharge and the relative hazard to human health or the environment, (2) the availability of an applicable and demonstrated wastewater treatment technology, process change, or pollution prevention measure that can reduce pollutants in the discharge and the associated risk to human health or the environment; (3) the cost, performance, and affordability or economic achievability of the wastewater treatment technology, process change, or pollution prevention measure; and (4) the opportunity to eliminate inefficiencies or impediments to pollution prevention or technological innovation or promote innovative approaches.[32] EPA considers nearly identical factors in deciding whether to develop new ELGs.[33]

EPA uses a variety of screening-level analyses to address these factors. These analyses evaluate discharge monitoring reports and EPA's Toxic Release Inventory to rank industrial categories according to the total toxicity of their wastewater.[34] In 2012, the Government Accountability Office recommended that the annual review include additional industrial hazard data sources to augment its screening-level reviews.[35] In response, EPA has begun to use additional data sources that provide information about CECs or new pollutant discharges, industrial process changes, and new and more sensitive analytical methods, among other things. For example, EPA has reviewed data from the agency's Office of Pollution Prevention and Toxics to identify potential CECs.[36]

If EPA identifies an industrial discharge category warranting further review, it conducts a more detailed review, which may lead to a new or revised guideline.[37]

---

with pretreatment standards. If a POTW does not have an approved pretreatment program, the control authority is the approved state authorized to act as the approval authority or, in unapproved states, the EPA. See 40 C.F.R. §403, "General Pretreatment Regulations for Existing and New Sources of Pollution."

[29] CWA §304(b); 33 U.S.C. §1314(b); CWA §304(g); 33 U.S.C. §1314(g); CWA §304(m)(1)(A); 33 U.S.C. §1314(m)(1)(A). Also, per CWA Section 301(d) (33 U.S.C. §1311(d)), EPA is required to review effluent limitations required by CWA Section 301(b)(2) at least every five years. EPA issues regulations that simultaneously address both of these.

[30] 33 U.S.C. §1314(m).

[31] EPA, *A Strategy for National Clean Water Industrial Regulations (Draft)*, November 2002.

[32] EPA, *Final 2016 Effluent Guidelines Program Plan*, April 2018, https://www.epa.gov/eg/2016-effluent-guidelines-plan-documents. See also EPA, *A Strategy for National Clean Water Industrial Regulations*, pp. 20-25.

[33] EPA, *A Strategy for National Clean Water Industrial Regulations*, p. 23.

[34] EPA, *Final 2016 Effluent Guidelines Program Plan*, pp. 2-3–2-11.

[35] U.S. Government Accountability Office, Water Pollution: EPA Has Improved Its Review of Effluent Guidelines but Could Benefit from More Information on Treatment Technologies, GAO-12-845, September 2012, https://www.gao.gov/products/GAO-12-845.

[36] EPA, *Final 2016 Effluent Guidelines Program Plan*, p. 2-4.

[37] EPA, *Final 2016 Effluent Guidelines Program Plan*, p. 2-5.

EPA published its most recent effluent guidelines program plan—the *Final 2016 Effluent Guidelines Program Plan*—in April 2018. It identified one new rulemaking to revise the Steam Electric Power Generating Point Source Category ELG but concluded that no other industries warrant new ELGs at this time. In its plan, EPA also announced that it is initiating three new studies: a holistic look at the management of oil and gas extraction wastewater from onshore facilities, an industry-wide study of nutrients, and an industry-wide study of PFAS.[38]

Options to Address CECs through Technology-Based Requirements

Both EPA and states have authority under the CWA to address CECs through technology-based effluent limitations using ELGs or by setting technology-based effluent limits in NPDES permits on a case-by-case basis. In addition, the CWA authorizes EPA to add contaminants to the Toxic Pollutant List.

ELGs

When EPA develops an ELG for a new industrial category or revises an existing ELG, it is for the industrial category—not a specific pollutant. However, as evidenced in the agency's most recent effluent guidelines program plan, EPA may initiate a cross-industry review of particular pollutants (such as the agency is doing with PFAS and nutrients). EPA uses such reviews to prioritize further study of the industrial categories that may be candidates for ELG development or revision to control the discharges of those particular pollutants.[39] If EPA were to determine that new or revised ELGs are warranted to control discharges of those pollutants, and the agency had the necessary data to support the development or revision, the agency could initiate a rulemaking process to do so.

Establishing Technology-Based Effluent Limits in NPDES Permits on a Case-by-Case Basis

The CWA also authorizes EPA and states to impose technology-based effluent limits in NPDES permits on a case-by-case basis when "EPA-promulgated effluent limitations are inapplicable."[40] This includes when EPA has not developed ELGs for the industry or type of facility being permitted or pollutants or processes are present that were not considered when the ELG was developed.[41] This provides a means for the permitting authority to restrict pollutants in a facility's discharge even when an ELG is not available. CWA regulations require best professional judgment to set case-by-case technology-based effluent limits, applying criteria that are similar to the analysis EPA uses to develop ELGs but are performed by the permit writer for a single facility.[42]

Toxic Pollutant List

The CWA also authorizes EPA to designate contaminants as toxic pollutants, which can trigger other actions under the CWA and CERCLA. (For a discussion of the effect of designating a

[38] EPA, *Final 2016 Effluent Guidelines Program Plan*, p. 1-1.

[39] EPA, *Final 2016 Effluent Guidelines Program Plan*, p. 7-1.

[40] CWA §402(a)(1)(B); 33 U.S.C. §1342(a)(1)(B); 40 C.F.R. §125.3(c).

[41] EPA, *NPDES Permit Writers' Manual*, September 2010, pp. 5-45–5-46, https://www.epa.gov/npdes/npdes-permit-writers-manual.

[42] 40 C.F.R. §125.3(d).

contaminant as a toxic pollutant on the treatment of that contaminant under CERCLA, see "Designating CECs as Toxic Pollutants or Hazardous Substances.") CWA Section 307 authorizes EPA to designate toxic pollutants and promulgate ELGs that establish requirements for those toxic pollutants.[43] Section 307(a)(1) directed EPA to publish a specified list of individual toxic pollutants or combination of pollutants and, from time to time, add or remove any pollutant that possesses certain properties.[44] EPA adopted the initial list of 65 toxic pollutants in 1978, as directed by Congress.[45] Since that time, the list of 65 toxic pollutants has generally not changed.[46]

Section 307(a)(1) directs EPA to "take into account the toxicity of the pollutant, its persistence, degradability, the usual or potential presence of the affected organisms in any waters, the importance of the affected organisms, and the nature and extent of the effect of the toxic pollutant on such organisms" when revising the Toxic Pollutant List.[47] Section 307(a)(2) authorizes EPA to develop effluent limitations for any pollutant on the Toxic Pollutant List based on best available technology.[48] Notably, however, EPA has the authority to develop effluent limitations for any pollutant regardless of whether it is on the Toxic Pollutant List.

Adding a pollutant to the Toxic Pollutant List would trigger an additional requirement for states. Section 303(c)(2)(B) of the CWA[49] requires states, whenever reviewing, revising, or adopting water quality standards, to adopt numeric criteria for all toxic pollutants listed pursuant to Section 307, for which EPA has published water quality criteria under Section 304(a).[50] EPA and states use both the ELGs for industrial categories and state water quality standards in establishing pollutant limits in permits under Section 402.[51] (See **Figure 1**.)

Challenges to Addressing CECs through Technology-Based Requirements

EPA and states face a number of challenges in addressing CECs through technology-based effluent limitations. In particular, EPA officials stated that in developing a new ELG or updating

[43] 33 U.S.C. §1317.

[44] 33 U.S.C. §1317(a)(1). Section 307(a)(1) directed EPA to adopt an initial list of 65 toxic pollutants presented in Committee Print 95-30 of the House Committee on Public Works and Transportation. (U.S. Congress, House Committee on Public Works and Transportation, *Data Relating to H.R. 3199 (Clean Water Act of 1977)*, committee print, 95th Cong., November 1977, H.Prt. 95-30 [Washington: GPO, 1977], pp. 3-4.) These pollutants included both individual chemicals and categories of chemical compounds. As presented in the legislative history, this initial list was negotiated among parties to a 1976 settlement agreement between EPA and the Natural Resources Defense Council in the case of *Natural Resources Defense Council v Train* (U.S. Congress, House Committee on Public Works and Transportation, Subcommittee on Investigations and Review, *Water Contamination by Toxic Pollutants: An Assessment of Regulation*, committee print, 95th Cong., September 1977, 95-26, p. 6).

[45] EPA, "Publication of Toxic Pollutant List," 43 *Federal Register* 4108, January 31, 1978.

[46] EPA removed three pollutants from the list in 1981 after determining that the chemical properties of the pollutants are such that they do not pose a risk to human health or the environment by exposure through water. However, delisting these three pollutants did not change the 65 entries on the Toxic Pollutant List because they were specific compounds listed within two broader categories of listed compounds—halomethanes and haloethers. (See EPA, "Removal of Dichlorodifluoromethane and Trichlorofluoromethane from the Toxic Pollutant List Under Section 307(a)(1) of the Clean Water Act," 46 *Federal Register* 2266, January 8, 1981; EPA, "Removal of Bis-(Chloromethyl) Ether (BCME) from the Toxic Pollutant List Under Section 307(a)(1) of the Clean Water Act," 46 *Federal Register* 10723, February 4, 1981.) The Toxic Pollutant List is codified in federal regulation at 40 C.F.R. §401.15.

[47] 33 U.S.C. §1317(a)(1).

[48] 33 U.S.C. §1317(a)(2).

[49] 33 U.S.C. §1313(c)(2)(B).

[50] 33 U.S.C. §1314(a).

[51] 33 U.S.C. §1342.

an existing ELG, the agency needs to gather extensive supporting information.[52] This effort includes identifying the pollutants of concern; evaluating the levels, prevalence, and sources of those pollutants of concern; determining whether the pollutants are in treatable quantities and whether effective treatment technologies are available; and developing economic data to project the cost of treatment, among other things.[53]

Also, EPA and state officials have asserted that it is difficult for the agency and its CWA programs to keep pace with the growth of new chemicals in commerce.[54] Accordingly, the agency is generally reactive rather than proactive in addressing CECs. EPA officials stated that identifying demonstrated treatment technologies and documenting their efficiency is especially challenging.[55] The officials further stated that the most difficult task is showing that any technology selected as the basis for an ELG is economically achievable for the industry.[56]

In addition, EPA and states often lack analytical methods to measure an emerging contaminant.[57] Even where analytical methods are available, there is still often a lack of data on the levels of the contaminant in dischargers' effluent and/or in the receiving surface waters. The two sources of data most readily available to EPA—discharge monitoring report data and toxic release inventory data—are limited to specific contaminants on which industry is required to report.[58] EPA stated that the agency's capacity to collect data—including obtaining clearance to request and collect the data and undertaking the extensive effort to do so—is limited in light of their staffing levels and resources.[59]

Should EPA have enough data to determine that a new or revised ELG is warranted and announce its intent to do so in an effluent guidelines program plan, the time it takes to issue the regulation varies, according to EPA officials. CWA Section 304(m) establishes a three-year time limit for

[52] Personal communication between CRS and EPA staff, August 6, 2019.

[53] Personal communication between CRS and EPA staff, August 6, 2019. See also CWA §304(b); 33 U.S.C. §1314(b); and EPA, *Final 2016 Effluent Guidelines Program Plan*, p. 2-2.

[54] Personal communication between CRS and EPA staff, August 6, 2019. See also ACWA, ASDWA, *Recommendations Report*.

[55] Personal communication between CRS and EPA staff, August 6, 2019.

[56] Personal communication between CRS and EPA staff, August 6, 2019.

[57] For example, in EPA's *PFAS Action Plan*, the agency commits in the short term to developing analytical methods to "detect, identify, and quantify" known PFAS of concern in media, including wastewater and groundwater. EPA also commits to developing analytical methods for new, unknown PFAS in the long term. See EPA, *Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*, February 2019, https://www.epa.gov/sites/production/files/2019-02/documents/pfas_action_plan_021319_508compliant_1.pdf, p. 34. As another example, in 2017, EPA convened a Microplastics Expert Workshop to identify and prioritize the scientific information needed to understand the risks posed by microplastics. In its report summarizing experts' recommendations, EPA concluded that "development of reliable, reproducible, and high-quality methods for microplastics is fundamental and of utmost importance for understanding microplastics risks." See EPA, *Microplastics Expert Workshop Report*. Also, in its *Final 2016 Effluent Guidelines Program Plan*, EPA describes its ongoing investigation looking at engineered nanomaterials and states that it will continue to look for opportunities to inform current data gaps, including development of analytical methods to detect and quantify engineered nanomaterials.

[58] Personal communication between CRS and EPA staff, August 6, 2019. See also EPA, *Final 2016 Effluent Guidelines Program Plan*, pp. 2-4 and 3-5.

[59] Personal communication between CRS and EPA staff, August 6, 2019. Note that under the Paperwork Reduction Act (44 U.S.C. §3501 *et seq.*), EPA can contact—with a survey or questionnaire—up to nine entities without first obtaining approval from the Office of Management and Budget. If EPA decides to contact 10 or more entities, the act requires the agency to prepare an Information Collection Request. In November 2018, EPA's Assistant Administrator for the Office of Water issued a memorandum clarifying its processes for collecting information from nine or fewer individuals or entities under CWA Section 308. The memorandum is available at https://www.epa.gov/sites/production/files/2018-11/documents/policy-use-of-cwa-308-letters.pdf.

new ELGs.[60] For revised ELGs, the EPA officials stated that the time can vary depending upon the availability of data and the level of complexity—some may be very technical and involve many wastestreams.[61] Two of the more recently issued ELGs—revisions of the oil and gas extraction and steam electric power generating categories—took five and six years, respectively.[62]

Water-Quality-Based Requirements

Under the CWA, water quality standards translate the goals of the act (e.g., fishable and swimmable waters, no toxic pollutants in toxic amounts) into measurable objectives to protect or improve water quality.[63] States, territories, and authorized tribes (hereinafter referred to collectively as states) are required to adopt water quality standards for waters of the United States, subject to EPA approval.[64] They may also adopt standards for additional surface waters if their own state laws allow them to do so.[65]

Water quality standards consist of three key required components:[66]

1. *Designated uses* for each water body—for example, recreation (swimming or boating), aquatic life support, fish consumption, public water supply, agriculture;
2. *Criteria*, which describe the conditions in a water body necessary to support the designated uses—expressed as concentrations of pollutants or other quantitative measures or narrative statements; and
3. *An antidegradation policy* for maintaining existing water quality.

States have the primary authority to adopt, review, and revise their water quality standards and implementation procedures. The CWA requires states to review their water quality standards at least once every three years.[67] EPA is required to review the states' water quality standards.[68]

---

[60] 33 U.S.C. §1314(m).

[61] Personal communication between CRS and EPA staff, August 6, 2019.

[62] Note that these time frames include notice-and-comment requirements under the Administrative Procedure Act. EPA announced its intent to revise the Oil and Gas Extraction ELG to develop pretreatment standards for discharges from unconventional oil and gas facilities to POTWs in 2011 (76 *Federal Register* 66286) and published its final rule for the Oil and Gas Extraction ELG in 2016 (81 *Federal Register* 41845). EPA announced its intent to revise the Steam Electric Power Generating ELG in 2009 (74 *Federal Register* 68603) and issued its final rule in 2015 (80 *Federal Register* 67838). Note that on November 4, 2019, EPA announced a proposed rule to revise the Steam Electric Power Generating ELG applicable to two of the six wastestreams covered in the 2015 rule. For more information on the Steam Electric Power Generating ELG, see CRS In Focus IF10778, *Overview and Status of the Steam Electric Power Generating Effluent Limitation Guidelines (ELGs) and Standards*, by Laura Gatz.

[63] Section 101(a) of the CWA (33 U.S.C. §1251(a)) includes the objective and goals of the act. One of the goals—"water quality which provides for the protection and propagation of fish, shellfish, and wildlife and provides for recreation in and on the water"—is often referred to in shorthand as "fishable and swimmable waters."

[64] CWA §303(c); 33 U.S.C. §1313(c). Per Section 502(3) of the CWA (33 U.S.C. §1362(3)), *state* is defined to include a state, the District of Columbia, or any of the U.S. territories. Per Section 518 of the CWA (33 U.S.C. §1377), EPA is authorized to treat an Indian tribe as a state for certain sections of the CWA, including the sections pertaining to water quality standards. EPA regulations at 40 C.F.R. §131.8 lay out the requirements and process by which a tribe may request and be approved to administer its own water quality standards program.

[65] CWA §510; 33 U.S.C. §1370.

[66] See CWA Section 303(c)(2)(A) for designated uses and criteria and CWA Sections 101(a) and 303(d)(4)(B) for antidegradation. Also see EPA's implementing regulations at 40 C.F.R. §131.

[67] CWA §303(c); 33 U.S.C. §1313(c).

[68] If EPA approves the water quality standards, they become effective. If EPA disapproves the water quality standards, the state has 90 days to revise them. If the state does not do so, EPA is required to promulgate standards that meet

Water Quality Criteria

Water quality criteria prescribe limits on specific contaminants or conditions in a water body that protect particular designated uses of the water body. Both the EPA and states have roles in establishing water quality criteria under CWA Section 304(a) and 303(c)(2), respectively.

EPA Role

CWA Section 304(a) requires EPA to develop and publish and "from time to time thereafter revise" criteria for water quality that accurately reflect the latest scientific knowledge.[69] These criteria are recommendations to states for use in developing their own water quality standards. EPA has developed several different types of criteria, including human health criteria, aquatic life criteria, and recreational criteria.[70] EPA has also published guidelines for deriving water quality criteria, which the agency uses to develop new criteria under Section 304(a). These guidelines also serve as guidance to states as they adjust water quality criteria developed under Section 304(a) to reflect local conditions or develop their own scientifically defensible water quality criteria.[71]

EPA most recently updated its human health criteria in 2015, revising 94 of the 122 existing human health criteria.[72] EPA last updated its methodology for deriving human health criteria in 2000,[73] incorporating "significant scientific advances in key areas such as cancer and non-cancer risk assessments, exposure assessments, and bioaccumulation in fish."[74]

EPA's national recommended aquatic life criteria table currently includes 58 criteria.[75] Many of these criteria were published prior to 1990. In the past 10 years, EPA has published two new criteria.[76] EPA has not updated its guidelines for deriving aquatic life criteria since 1985.[77] According to EPA, however, the guidelines allow for best professional judgment, which they have used in more recent criteria development and updates.[78] The agency recognizes that since 1985,

---

CWA requirements. CWA §303(c)(3); 33 U.S.C. §1313(c)(3).

[69] CWA §304(a)(1); 33 U.S.C. §1314(a)(1).

[70] EPA, "Basic Information on Water Quality Criteria," https://www.epa.gov/wqc/basic-information-water-quality-criteria.

[71] EPA, *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*, October 2000, p. iii, https://www.epa.gov/sites/production/files/2018-10/documents/methodology-wqc-protection-hh-2000.pdf; EPA, *Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses*, 1985, pp. 2-3, https://www.epa.gov/sites/production/files/2016-02/documents/guidelines-water-quality-criteria.pdf.

[72] EPA, "Final Updated Ambient Water Quality Criteria for the Protection of Human Health," 80 *Federal Register* 36986, June 29, 2015; EPA, "National Recommended Water Quality Criteria—Human Health Criteria Table," https://www.epa.gov/wqc/national-recommended-water-quality-criteria-human-health-criteria-table.

[73] EPA, *Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health*.

[74] EPA, *Fact Sheet: Methodology for Deriving Ambient Water Quality Criteria for the Protection of Human Health—Revised Methodology*, 2000, https://www.epa.gov/wqc/fact-sheet-methodology-deriving-ambient-water-quality-criteria-protection-human-health-revised#copy.

[75] EPA, "National Recommended Water Quality Criteria—Aquatic Life Criteria Table," https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table.

[76] According to personal communication between CRS and EPA staff on May 29, 2019, in the past 10 years, EPA developed new criteria for two substances: carbaryl and acrolein.

[77] EPA, *Guidelines for Deriving Numerical National Water Quality Criteria*.

[78] Personal communication between CRS and EPA staff, May 29, 2019. Also see EPA, *Guidelines for Deriving Numerical National Water Quality Criteria*, p. 9.

there has been substantial scientific advancement that warrants updating these guidelines.[79] EPA formally initiated the guidelines revision process in 2015. However, according to EPA officials, the agency has shifted its focus from updating the guidelines to determining whether available data and research support development of human health criteria for PFAS.[80] In doing so, EPA officials indicated they plan to use information gathered for the guidelines revision and also noted that they are not tied to the 1985 guidelines due to the best professional judgment clause included therein.[81]

EPA's recreational water quality criteria are national recommendations for all inland and coastal waters that have a primary contact recreation (i.e., swimming) designated use. EPA establishes recreational water quality criteria to help protect against illness caused by organisms—such as viruses, bacteria, and their associated toxins—in water bodies.[82] In 2012, EPA updated its recreational water quality criteria, which it had last issued in 1986.[83] Additionally, in June 2019, EPA published final recreational water quality criteria for two algal toxins, which are commonly present in harmful algal blooms, to supplement the 2012 recreational water quality criteria.[84] In addition, EPA is currently developing recreational water quality criteria for coliphage, a viral indicator of fecal contamination.[85]

State Role

States use EPA's criteria as guidance in developing their own water quality standards. CWA Section 303(c)(2) requires states to adopt criteria to protect the designated uses of their water bodies and to also adopt criteria for all toxic pollutants listed pursuant to Section 307(a)(1), for which EPA has published criteria under Section 304(a). States' water quality criteria must be based on sound scientific rationale, contain sufficient parameters or constituents to protect the designated uses, and support the most sensitive use for water bodies with multiple designated uses.[86] EPA regulations further require that states should establish numeric criteria based on CWA Section 304(a) guidance, CWA Section 304(a) guidance modified to reflect site-specific conditions, or other scientifically defensible methods.[87] Where numeric criteria cannot be established, states are required to establish narrative criteria or criteria based on biomonitoring methods.[88] States may adopt more stringent criteria than what EPA recommends, including for pollutants or parameters for which EPA has not promulgated 304(a) criteria.[89]

---

[79] EPA, "Aquatic Life Criteria and Methods for Toxics," https://www.epa.gov/wqc/aquatic-life-criteria-and-methods-toxics#sab.

[80] EPA anticipates completing the evaluation in 2021. See EPA, *Per- and Polyfluoroalkyl Substances (PFAS) Action Plan*.

[81] Personal communication between CRS and EPA staff, May 29, 2019.

[82] EPA, "Recreational Water Quality Criteria and Methods," https://www.epa.gov/wqc/recreational-water-quality-criteria-and-methods#rec.

[83] EPA, *2012 Recreational Water Quality Criteria*, December 2012, https://www.epa.gov/sites/production/files/2015-10/documents/rec-factsheet-2012.pdf.

[84] EPA, "Recommended Human Health Recreational Ambient Water Quality Criteria or Swimming Advisories for Microcystins and Cylindrospermopsin," 84 *Federal Register* 26413, June 6, 2019.

[85] EPA, "Recreational Water Quality Criteria and Methods," https://www.epa.gov/wqc/recreational-water-quality-criteria-and-methods#rec. See "Development of Recreational Water Quality Criteria for Coliphage" section.

[86] 40 C.F.R. §131.11.

[87] 40 C.F.R. §131.11(b).

[88] 40 C.F.R. §131.11(b).

[89] CWA §510; 33 U.S.C. §1370.

Options to Address CECs through Water-Quality-Based Requirements

EPA and states may establish water quality criteria for CECs. If EPA were to establish criteria under CWA Section 304(a) for a CEC, that action alone would not necessarily require states to adopt criteria for that contaminant. As explained above, the CWA requires that states adopt criteria to protect their designated uses into their water quality standards. EPA's regulations provide that if a state does not adopt new or revised criteria for parameters for which EPA has published new or updated recommendations, then the state shall provide an explanation.[90] States are explicitly required, as explained above, to adopt criteria for a contaminant if EPA designates it as a toxic pollutant under CWA Section 307 and publishes criteria for that contaminant under Section 304(a).[91]

Once a state has adopted water quality criteria for a contaminant as part of its state water quality standards and those standards have been approved, several CWA tools are available for achieving those standards. The primary tool is to limit or prohibit discharges of the contaminant in NPDES permits. In some cases, the technology-based effluent limits may already enable attainment of state water quality standards. In instances where they do not, the permit writer is required to establish water-quality-based effluent limitations.[92] If a water body is not attaining its designated use (i.e., is "impaired" for that use), the Total Maximum Daily Load (TMDL) may also be used.[93] A TMDL, essentially a "pollution diet" for a water body, is the maximum amount of a pollutant that a water body can receive and still meet water quality standards and an allocation of that amount to the pollutant's sources (including a margin of safety).[94] TMDLs consider point sources, which can be addressed through permits, as well as nonpoint (diffuse) sources, which are more often addressed through best management practices and related efforts under CWA Section 319 nonpoint source management programs.[95]

Challenges to Addressing CECs through Water-Quality-Based Requirements

A key challenge is often a lack of data about the occurrence, concentration, and persistence of CECs in the environment, as well as the effects on human health and aquatic life. Detection of a contaminant does not necessarily trigger regulatory measures. Information on the potential for the contaminant to adversely affect human health and aquatic life, potential exposure pathways, and other data would also be needed to inform such decisions.

Developing new water quality criteria or updating existing criteria can often be time intensive, particularly in cases where data are limited. The general process for developing criteria involves a number of steps, including problem formulation and developing an analysis plan; gathering data and analyzing relevant studies; drafting the criteria document; a rigorous review process (e.g., branch level, office level, interagency, and independent external peer review); public notice and comment, and revising and publishing the criteria.[96] According to EPA officials, the time it takes

[90] 40 C.F.R. §131.20(a).

[91] CWA §303(c)(2)(B); 33 U.S.C. §1313(c)(2)(B).

[92] Per 40 C.F.R. §122.44(d)(1)(i), limitations must be established in permits to "control all pollutants or pollutant parameters (either conventional, nonconventional, or toxic pollutants) which the Director determines are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality."

[93] CWA §303(d); 33 U.S.C. §1313(d).

[94] 40 C.F.R. §130.2.

[95] 33 U.S.C. §1329.

[96] Personal communication between CRS and EPA staff, May 29, 2019.

to develop or update criteria is often a function of the data that are available.[97] EPA officials noted that developing criteria can take several years or longer. For example, the 2016 update for the aquatic life water quality criteria for selenium—an effort characterized by EPA as complicated, in part because of the contaminant's bioaccumulative properties—took 10 years to complete.[98] In other cases, such as when a contaminant has an existing EPA Integrated Risk Information System value, developing or updating the human health water quality criteria for that contaminant may take less time, according to EPA officials.[99]

In May 2019, a report from the Contaminants of Emerging Concern Workgroup, convened by the Association of State Drinking Water Administrators and the Association of Clean Water Administrators, provided recommendations from state regulators regarding the ways state and federal agencies could improve the management of CECs.[100] The report stated the following:

> The use of existing authorities and processes under the CWA and [Safe Drinking Water Act] to establish new criteria or standards is onerous, can take decades to implement, and does not meet public expectations for timely identification and prioritization of CECs…. However slow these federal processes are, many state agencies do not have the infrastructure (i.e., sufficient funds and/or staffing levels), regulatory authority, or technical expertise to derive their own criteria or set their own standards for drinking water, surface water, groundwater, and fish tissue.

Among numerous other recommendations provided in the report, the CEC workgroup recommended that EPA work with states to generate a list of priority CECs. To that end, EPA officials stated that they are developing a more formalized prioritization process for determining which contaminants warrant criteria development that will incorporate input from multiple stakeholders (including states), leverage information collected under the Safe Drinking Water Act, and incorporate monitoring and other data (e.g., ambient water concentrations).[101]

Designating CECs as Toxic Pollutants or Hazardous Substances

Two sections of the CWA—Sections 307 and 311—authorize EPA to designate contaminants as toxic pollutants and hazardous substances, respectively. Designating a contaminant under Section 307 or Section 311 of the CWA has implications for how the contaminant is treated under CERCLA. CERCLA defines the term *hazardous substance* to include toxic pollutants designated under CWA Section 307 and hazardous substances designated under CWA Section 311 (as well as substances designated under certain other statutes and other chemicals that EPA may designate as hazardous substances).[102]

---

[97] Personal communication between CRS and EPA staff, May 29, 2019.

[98] Personal communication between CRS and EPA staff, May 29, 2019. See also EPA, *Aquatic Life Ambient Water Quality Criterion for Selenium—Freshwater 2016*, June 2016, pp. 1-3, https://www.epa.gov/sites/production/files/2016-07/documents/aquatic_life_awqc_for_selenium_-_freshwater_2016.pdf.

[99] Personal communication between CRS and EPA staff, May 29, 2019. EPA's Integrated Risk Information System (IRIS) is a human health assessment program that evaluates information on health effects of exposure to environmental contaminants. For more information on the IRIS program, see EPA, "Integrated Risk Information System," https://www.epa.gov/iris. According to EPA officials, because development of IRIS values requires a rigorous review process, EPA does not do a separate peer review in developing criteria using an IRIS value (personal communication between CRS and EPA staff, May 29, 2019).

[100] ACWA, ASDWA, *Recommendations Report*.

[101] Personal communication between CRS and EPA staff, May 29, 2019. EPA staff stated that, in the past, the agency has more informally determined the need for criteria through state and stakeholder input.

[102] Section 101(14) of CERCLA (42 U.S.C. §9601(14)) generally defines the term *hazardous substance* to include

Toxic Pollutants—CWA Section 307

EPA's authority to designate contaminants under CWA Section 307 as toxic pollutants and the CWA-related implications of that designation are discussed above under "Toxic Pollutant List."

Hazardous Substances—CWA Section 311

CWA Section 311(b)(2)(A) authorizes EPA to promulgate a rule designating as a "hazardous substance" any element or compound that, when discharged as specified under the section, would present an imminent and substantial danger to public health or welfare, including but not limited to fish, shellfish, wildlife, shorelines, and beaches.[103] EPA is authorized to revise the list of hazardous substances subject to these criteria as may be appropriate. EPA finalized the initial list of hazardous substances in 1978 and thereafter revised the list in 1979, 1989, and 2011.[104]

Pursuant to Section 311(b)(4), EPA established "harmful" quantities for these substances that are subject to the reporting of discharges prohibited under Section 311(b)(3).[105] Section 311(b)(5) requires a person in charge of a vessel or facility to notify the National Response Center, administered by the U.S. Coast Guard, as soon as that person has knowledge of a discharge.[106] Discharges permitted under other provisions of the CWA or otherwise allowable under certain other federal, state, and local regulations are excluded from reporting under CWA Section 311.[107]

CWA Section 311(c) authorizes federal actions to remove a prohibited discharge of a hazardous substance (or oil).[108] CWA Section 311(f) establishes liability for the recovery of removal costs, including restoration of damaged natural resources.[109] Section 311(e) authorizes enforcement orders to require a responsible party to abate an imminent and substantial threat to public health or welfare from a prohibited discharge, or threat of a harmful discharge, of a hazardous substance (or oil).[110]

---

hazardous substances designated under Section 311(b)(2)(A) of the CWA; toxic pollutants listed under Section 307(a) of the CWA; hazardous waste with characteristics identified or listed under Section 3001 of the Solid Waste Disposal Act (with the exception of wastes excluded from regulation); hazardous air pollutants listed under Section 112 of the Clean Air Act; any imminently hazardous chemical substance or mixture for which EPA has taken action under Section 7 of TSCA; and other elements, compounds, mixtures, solutions, and substances designated pursuant to Section 102 of CERCLA.

[103] 33 U.S.C. §1321(b)(2)(A). CWA Section 311(b)(3) generally prohibits the discharge of a hazardous substance (or oil) in "harmful" quantities into or upon the navigable waters of the United States, adjoining shorelines, or the waters of the contiguous zone or in connection with activities under the Outer Continental Shelf Lands Act or the Deepwater Port Act of 1974 or that may affect natural resources belonging to, appertaining to, or under the exclusive management authority of the United States. However, Section 311(a)(2) of the CWA (33 U.S.C. §1321(a)(2)) defines the term *discharge* to exclude discharges in compliance with a permit issued under CWA Section 402, making such compliant discharges not prohibited.

[104] The list of hazardous substances designated under CWA Section 311 is codified at 40 C.F.R. §116.4. The original list published by EPA in 1978 included 271 hazardous substances. While 28 substances were added the following year, the list has changed slightly since that time and currently includes 296 substances.

[105] 33 U.S.C. §1321(b)(4).

[106] 33 U.S.C. §1321(b)(5).

[107] Quantities of "harmful" discharges of hazardous substances subject to reporting under CWA Section 311 are codified at 40 C.F.R. §117.

[108] 33 U.S.C. §1321(c).

[109] 33 U.S.C. §1321(f).

[110] 33 U.S.C. §1321(e). Such threats may include threats to fish, shellfish, wildlife, public and private property, shorelines, beaches, habitat, and other living and nonliving natural resources under the jurisdiction or control of the

Implications of CWA Designations on CERCLA

If EPA were to designate a CEC, or any contaminant, as a toxic pollutant or hazardous substance under the CWA, that contaminant would, by statutory definition, be defined as a hazardous substance under CERCLA. CERCLA authorizes federal actions to respond to a release, or substantial threat of a release, of a hazardous substance into the environment in coordination with the states. CERCLA similarly authorizes response actions for releases of other pollutants or contaminants that may present an imminent and substantial danger to public health or welfare. CERCLA also establishes liability for response costs and natural resource damages but only for hazardous substances and not for other pollutants or contaminants.

CERCLA response authority is available for releases of pollutants or contaminants but without liability to require a potentially responsible party to perform or pay for response actions. Designating a CEC as a toxic pollutant or hazardous substance under the CWA would have the effect of establishing liability for their release as a hazardous substance under CERCLA. However, releases in compliance with a CWA permit would be exempt from liability under CERCLA as a "federally permitted release" based on the premise that the permit requirements would mitigate potential risks.[111]

CWA Section 311 also establishes liability for releases of hazardous substances, but CERCLA liability and enforcement mechanisms are broader than the CWA. In practice, CERCLA has been the principal federal authority used to respond to discharges of hazardous substances into surface waters and to enforce liability, although the enforcement authorities of CWA Section 311 remain available to EPA. For a broader discussion of CERCLA, see CRS Report R41039, *Comprehensive Environmental Response, Compensation, and Liability Act: A Summary of Superfund Cleanup Authorities and Related Provisions of the Act*, by David M. Bearden.

Legislation in the 116th Congress

Recent congressional interest in CECs has largely focused on addressing one particular group of CECs—PFAS—and addressing them through several statutes, such as the Safe Drinking Water Act.[112] However, legislation in the 116th Congress proposes to address PFAS using CWA authorities. H.R. 3616—the Clean Water Standards for PFAS Act of 2019—and Section 330A of H.R. 2500, the House-passed version of the NDAA for FY2020, would direct EPA to add PFAS to the CWA Toxic Pollutant List and publish ELGs and pretreatment standards for PFAS within specified time frames. In addition, Section 330G of the House-passed version of the NDAA bill, Sections 6731-6736 of S. 1790 (the Senate NDAA bill), H.R. 1976, and S. 950 would direct the U.S. Geological Survey (USGS) to carry out nationwide sampling—in consultation with states and EPA—to determine the concentration of perfluorinated compounds in surface water, groundwater, and soil. These bills would also require USGS to prepare a report for Congress and provide the sampling data to the EPA as well as other federal and state regulatory agencies that request it. Additionally, the bills would require the data to be used to "inform and enhance

United States.

[111] Section 107(j) of CERCLA (42 U.S.C. §9607(j)) exempts federally permitted releases from liability under the statute. Section 101(10) of CERCLA (42 U.S.C. §9601(10)) defines the term *federally permitted release* to include discharges permitted under Sections 402 and 404 of the CWA and releases permitted under various other federal environmental laws.

[112] For a discussion of select PFAS legislation in the 116th Congress, see CRS Report R45986, *Federal Role in Responding to Potential Risks of Per- and Polyfluoroalkyl Substances (PFAS)*, coordinated by David M. Bearden.

assessments of exposure, likely health and environmental impacts, and remediation priorities." Some Members have also introduced legislation to require comprehensive PFAS toxicity testing (H.R. 2608).[113]

In addition to focusing on PFAS, several bills proposed in the 116th Congress look more broadly at how to address CECs. For example, some aim to improve federal coordination and research and support states in addressing emerging contaminants. S. 1507, S. 1251, and Sections 6741-6742 of S. 1790 would direct the White House Office of Science and Technology Policy to establish a National Emerging Contaminant Research Initiative. The bills would also direct EPA to develop a program to provide technical assistance and support to states for testing and analysis of emerging contaminants and establish a database of resources available through the program to assist states with testing for emerging contaminants. While these efforts are more focused on CECs in drinking water, the bill directs the EPA to ensure that the database is available to groups that have interest in emerging contaminants, including wastewater utilities.

Conclusion

While Congress is currently debating how to best address the concerns related to widespread detections of PFAS, attention to other emerging contaminants (e.g., microplastics and algal toxins) has also increased with the availability of new detection methods and increased monitoring. Observers note that in the coming years, other CECs will likely emerge and prompt similar calls for immediate action to protect public health and the environment. Many observers argue that federal actions to address CECs currently tend to be reactive rather than proactive. Many of these observers assert that more focus and attention is needed on assessing the toxicity of chemical substances before they are introduced into commerce. Congress is currently considering legislation to improve federal coordination and responses to CECs.

Specific to the CWA, some observers advocate for oversight to identify and address potential gaps or barriers in CWA authorities and processes that make it difficult for EPA and states to quickly respond when CECs are detected. Other observers assert that EPA could better use its existing authorities to address CECs. For example, EPA has not updated its ELGs for certain industrial categories in decades. Accordingly, some observers assert that various ELGs do not reflect advancements in science or technology that could lead to new effluent limitations for CECs. Similarly, some stakeholders assert that EPA could better prioritize which CECs warrant water quality criteria development. EPA's ability to address these and other recommendations depends on the availability of resources, treatment technologies, and scientific and economic data. Moving forward, Congress may be interested in evaluating EPA appropriations for the CWA programs that support EPA's efforts to address discharges of CECs. Congress may also be interested in overseeing the Administration's implementation of these programs.

[113] H.R. 2608 would amend TSCA to direct EPA, within 60 days of enactment, to require comprehensive toxicity testing of PFAS and to direct EPA, within 60 days of enactment, to require that PFAS manufacturers and processors submit certain records and studies to the agency.

Author Information

Laura Gatz
Analyst in Environmental Policy

Disclaimer

This document was prepared by the Congressional Research Service (CRS). CRS serves as nonpartisan shared staff to congressional committees and Members of Congress. It operates solely at the behest of and under the direction of Congress. Information in a CRS Report should not be relied upon for purposes other than public understanding of information that has been provided by CRS to Members of Congress in connection with CRS's institutional role. CRS Reports, as a work of the United States Government, are not subject to copyright protection in the United States. Any CRS Report may be reproduced and distributed in its entirety without permission from CRS. However, as a CRS Report may include copyrighted images or material from a third party, you may need to obtain the permission of the copyright holder if you wish to copy or otherwise use copyrighted material.