

Questions and Answers on Ocean Acidification and the Clean Water Act 303(d) Program
November 15, 2010

1. What is ocean acidification? What have scientific studies concluded about ocean acidification?

Ocean acidification (OA) refers to the decrease in the pH of the Earth's oceans caused by the uptake of carbon dioxide (CO₂), a greenhouse gas (GHG), from the atmosphere. Ocean acidification, like climate change, is primarily caused by increasing carbon dioxide (CO₂) concentrations in the atmosphere. This is sometimes referred to as "the other CO₂ problem" with reference to climate change. Scientific research over the last 10 years indicates that the implications of OA for ocean and coastal marine ecosystems are potentially very serious since the ocean has a large capacity to absorb CO₂ from the atmosphere, and that the resulting lowered pH levels in ocean waters can have serious cascading effects. In its new 2010 report, "*Ocean Acidification: A National Strategy to Meet the Challenges of a Changing Ocean*," the National Research Council of the National Academies concludes that ocean chemistry is changing at an unprecedented rate and magnitude due to human-made CO₂ emissions, and that there will be "ecological winners and losers." The report also states that "while the ultimate consequences are still unknown, there is a risk of ecosystem changes that threaten coral reefs, fisheries, protected species, and other natural resources of value to society." In addition, the risks of OA were summarized and confirmed in EPA's recent Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the Clean Air Act (CAA).

2. What is Clean Water Act Section 303(d) and its relation to Total Maximum Daily Loads (TMDLs)?

The goal of the Clean Water Act (CWA) is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." Section 303(d) of the CWA and its implementing regulations (40 CFR 130.2 and 130.7) establish the Impaired Waters Listing and Total Maximum Daily Load (TMDL) program. This program is primarily State-led with EPA oversight. States, Territories, and authorized Tribes are required to develop lists of "water-quality limited segments" every two years (e.g. 2010, 2012). These 303(d) lists include segments that will not meet water quality standards for a particular pollutant even after technology-based CWA permit requirements are in place. The CWA also requires States to develop a pollutant "budget," or TMDL, for every water body/pollutant combination on this 303(d) list. EPA approves both the 303(d) lists of impaired waters and the TMDLs. Currently, about 40,000 waters are listed nationwide as impaired, and more than 43,000 TMDLs have been developed.

The TMDL calculates the maximum amount of a pollutant that can enter a waterbody, also known as the loading capacity, so that the waterbody will meet applicable water quality standards. The TMDL allocates that pollutant load to point sources, (Wasteload Allocation or WLA); and nonpoint sources (Load Allocation or LA), which include both anthropogenic and natural background sources of the pollutant. Under the CWA, TMDLs are not self-implementing. EPA relies on other provisions of the CWA (e.g. section 402 permitting authority or section 319) and State law for implementation. EPA encourages (but does not require) States

to develop plans to describe how the pollutant allocations in the TMDL will be implemented. EPA regulations at 122.44(d)(1)(vii)(B) require that approved wasteload allocations for point sources be implemented in applicable National Pollutant Discharge Elimination System (NPDES) permits. Load allocations for nonpoint sources are implemented through a wide variety of State, local, and Federal programs, which are primarily voluntary or incentive-based. For more information on listing impaired waters and establishing TMDLs pursuant to CWA section 303(d) see: <http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/index.cfm>.

3. Why did EPA issue the November 15, 2010, Memorandum on Ocean Acidification and the Clean Water Act Section 303(d) Program?

EPA is issuing this Memorandum to provide information to assist the Regions and States in preparing and reviewing Integrated Reports related to OA impacts under Sections 303(d), 305(b), and 314 of the CWA. EPA settled a lawsuit in which the Center for Biological Diversity (CBD) challenged EPA's approval of Washington State's 2008 CWA 303(d) list, arguing failure to include coastal waters as impaired for marine pH [*CBD v. EPA*, No. 2:09-cv-00670-JCC (W. D. Wash.)]. One of the conditions of the settlement agreement was that EPA would sign a Federal Register (FR) notice requesting comments on how to address OA under the CWA 303(d) program. In addition, EPA agreed to issue this Memorandum by November 15, 2010, describing how EPA will proceed with regard to the interplay between OA and the 303(d) program in light of the responses to the FR notice. The agreement did not require EPA to initiate a rulemaking, take comment on how States can limit pollutants, or regulate pollutants linked to OA.

4. What comments did EPA receive from its Federal Register notice on Ocean Acidification and the Clean Water Act 303(d) program?

EPA published a Federal Register (FR) notice on March 22, 2010, requesting the public to comment on the effects of ocean acidification as it relates to the CWA 303(d) program (Clean Water Act Section 303(d): Notice of Call for Public Comment on 303(d) Program and Ocean Acidification. Federal Register, 75(54), 13537-13540. Available at: <http://www.regulations.gov/search/Regs/home.html#documentDetail?R=0900006480ac472a>) The 60-day comment period resulted in approximately 30,000 responses, the majority of which were form letters expressing general support for EPA to take action regarding OA. About 35 individual responses (from State Agencies, environmental non-governmental organizations, academia, Industry and Representatives from Congress) provided the Agency with detailed comments and recommendations on OA and the 303(d) program. Many commenters indicated their support for EPA taking both short and long-term action to address OA under the Clean Water Act. Several commenters indicated that States need detailed guidance and resources to develop and implement consistent and comprehensive State monitoring and assessment programs for marine pH criteria and other biological endpoints that reflect adverse OA impacts. A number of commenters stated that although evaluating OA impacts are challenging, some monitoring technologies do exist, and are available through other programs and academic institutions. Several commenters indicated that EPA should not address OA at all under the CWA, but defer to the CAA to identify and manage CO₂ emissions that lead to OA. A few commenters stated

that even if waters were listed for OA impairment, it would be difficult to develop CO₂-emission-based TMDLs because of the lack of available methods and data.

5. What does the November 15, 2010, Memorandum on Ocean Acidification and the Clean Water Act Section 303(d) Program say?

This Memorandum recognizes the seriousness of aquatic life impacts associated with OA and describes how States can move forward, where OA information exists, to address OA during the 303(d) 2012 listing cycle using the current 303(d) Integrated Reporting (IR) framework. At the same time, this Memorandum also acknowledges and recognizes that in the case of OA, information is largely absent or limited at this point in time to support the listing of waters for OA in many States. EPA has carefully reviewed and considered information received from public comments, other Federal OA programs, and additional scientific information available on this issue in deciding how to approach OA under the 303(d) program. EPA has concluded that States should list waters not meeting water quality standards, including marine pH WQC, on their 2012 303(d) lists, and should also solicit existing and readily available information on OA using the current 303(d) listing program framework. This Memorandum does not elevate in priority the assessment and listing of waters for OA, but simply recognizes that waters should be listed for OA when data are available. EPA recognizes that information is absent or limited for OA parameters and impacts at this point in time and, therefore, listings for OA may be absent or limited in many States.

EPA will provide additional 303(d) guidance to the States when future OA research efforts provide the basis for improved monitoring and assessment methods, including approaches being developed under two significant Federal efforts that will begin in early 2011 (see Question 6). This future OA guidance may be in the form of stand-alone OA IR guidance, or as part of EPA's routine, biennial IR update. EPA also encourages States to focus their efforts on OA-vulnerable waters (e.g., waters with coral reefs, marine fisheries, shellfish resources) that already are listed for other pollutants (e.g., nutrients) in order to promote ecological restoration. This Memorandum is consistent with previous IR guidance, and the current statutory framework under CWA Sections 303(d), 305(b), and 314. It is not a regulation, does not impose legally binding requirements on EPA or the States, and does not require States to develop any new 303(d) program related to OA.

EPA's actions under the CAA to better understand and address the environmental impacts associated with greenhouse gas, including OA and climate change, currently show the greatest promise in addressing these serious environmental challenges. At the same time, EPA also recognizes that the 303(d) program under the CWA has the potential to complement and aid in these efforts by ensuring that, over time, we continue to identify and track waters that are impaired due to OA. See Questions 8 and 9 for additional information on the relationship between the 303(d) program and the CAA.

6. What other Federal programs are in place to address ocean acidification?

Ocean Acidification has emerged as a top priority within several Federal Agencies. There are two significant Federal efforts that should provide useful information for the 303(d) program in the future, as follows:

(1) The National Ocean Council (NOC): On July 19, 2010, President Obama issued Executive Order (EO) 13547 that establishes the Nation's first comprehensive National Ocean Policy for the stewardship of the ocean, our coasts, and the Great Lakes. The EO created an interagency National Ocean Council with the intent to strengthen ocean governance and provide sustained, high-level focus on the national priority action objectives to advance the National Policy (available at: <http://www.whitehouse.gov/administration/eop/oceans>). The NOC is charged with developing Strategy Action Plans for nine priority objectives, including "Climate Change Adaptation and Ocean Acidification." Upon approval by the NOC, these 2011 action plans will guide Federal government-wide implementation of ocean policy-related activities and budgets, including development of a flexible framework for effective coastal and marine spatial monitoring and planning.

(2) The Interagency Working Group on Ocean Acidification: The Federal Ocean Acidification Research and Monitoring (FOARAM) Act of 2009 directed the Joint Subcommittee on Science and Technology (JSOST) to create an Interagency Working Group on Ocean Acidification (IWG-OA) to coordinate OA activities across Federal agencies. This Interagency Committee, in which EPA participates, is responsible for organizing and expanding research programs with the following goals: to enhance understanding of the role of OA on marine ecosystems, identify marine ecosystem conservation measures, facilitate information exchange on OA methods, and investigate the socioeconomic impacts of OA. The IWG-OA is drafting a strategic research plan for OA, to be completed in 2011.

7. If waters are included on a State's CWA 303(d) list for ocean acidification, will a Total Maximum Daily Load need to be developed?

State 303(d) lists indicate what waters are too polluted to meet the water quality standards and also identify priority rankings for waters on the lists to develop TMDLs. In setting these priority rankings, States are required to take into account the severity of the pollution and the uses to be made of the waters. There is neither a CWA or regulatory deadline for States to develop TMDLs. EPA guidance recommends that jurisdictions develop TMDLs 8-13 years after a waterbody impairment is first included on a 303(d) list. Because a TMDL allocates pollutant loads among sources that contribute to an impairment, both point and nonpoint, a TMDL must address in some fashion the contribution of pollutants transported by atmospheric deposition that contribute to the impairment. EPA and the States have developed some air deposition-related TMDLs for mercury but have no experience modeling and developing TMDLs based on listings related to OA from air deposition of carbon. Currently, EPA believes that not enough information is available to develop OA-related carbon TMDLs, and is deferring development of TMDL guidance related to OA listings until more information becomes available in the future. States may want to take this information into account in setting the priority ranking for TMDL development for any waters identified due to OA. However, States could address OA impacts immediately by evaluating marine waters that are currently listed for other pollutants and that are considered vulnerable to OA (e.g., waters with coral reefs, marine fisheries, shellfish resources).

8. What is the relationship the Nov 15, 2010, Memorandum and the Clean Water Act 303(d) program and air emissions ?

The CWA Section 303(d) program is not a regulatory program. What the program does require is that States must list all waters not meeting water quality standards, regardless of the source. In developing TMDLs, all sources of the pollutant for which the TMDL is developed must be accounted for, which would include contributions from air emissions. TMDLs complement but do not override other Federal and State authorities and programs designed to address air emissions, such as programs to implement the Clean Air Act. States may choose to voluntarily develop an implementation plan outside the TMDL, and can identify specific voluntary programs or State-required reductions in air emissions that could be used to address particular air sources contributing to OA.

9. What other work is EPA doing related to carbon-emission impacts, such as climate change?

EPA's actions under the Clean Air Act (CAA) to better understand and address the environmental impacts associated with greenhouse gas (GHG) emissions, including OA and climate change, currently show the greatest promise in addressing these serious environmental challenges. For example, under the CAA, EPA finalized the Mandatory Reporting of Greenhouse Gases rule, thereby creating a GHG reporting program to collect comprehensive, nationwide emissions data; issued the Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the CAA; and developed several GHG mitigation regulations for light-, medium-, and heavy-duty vehicles and for new and existing industrial facilities that substantially increase GHG emissions. More information is available at: <http://www.epa.gov/climatechange/initiatives/index.html>.