



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460



OFFICE OF
RESEARCH AND DEVELOPMENT

MEMORANDUM

SUBJECT: Office of Research and Development (ORD) Transmittal of Charge to the Science Advisory Board Advisory Panel on EPA's Report on the Environment 2014

FROM: Bob Kavlock /signed by/
Deputy Assistant Administrator for Science

TO: Christopher Zarba
Director, Science Advisory Board Staff Office

Attached is EPA's charge to the Science Advisory Board (SAB) Advisory Panel on EPA's Report on the Environment (ROE) 2014. We look forward to the Panel's meeting and discussions on July 30-31, 2014 and are eager to receive feedback on EPA's draft ROE.

If you have any questions or need further information, please contact Jeff Frithsen from ORD's National Center for Environmental Assessment (NCEA) at 703-347-8623.

cc: Ken Olden
Debra Walsh
Jeff Frithsen

EPA Charge to the SAB Advisory Panel on EPA's Report on the Environment (2014)

INTRODUCTION

In 2001, EPA began work on an Agency-wide “environmental indicators initiative” to gather and develop high quality information into a state of the environment report, thereby creating the Agency’s Report on the Environment (ROE) program. The purpose of the initiative was to compile and maintain indicators on the status and trends for environmental and human health conditions related to the mission of the agency.

The Agency released a draft report in 2003 and in response to comments from the Science Advisory Board (SAB)¹ and others, EPA developed a revised draft in 2007. Following an extensive external peer review of indicators and an SAB review of the entire draft,² the Agency published “EPA’s Report on the Environment” in 2008³ in hard copy and an online format.

Since 2008, EPA has maintained and updated the ROE indicator information online. EPA again consulted the SAB in 2009 to obtain additional advice on continued development of future versions of the ROE⁴. Panel members offered several suggestions to improve the ROE, including the need to:

- Develop an overarching and unifying framework to link and integrate the scientific elements of the ROE
- Incorporate statistical information into future reports
- Develop a powerful and interactive web-based platform for the ROE with links to pertinent web sites for additional information
- Develop a clear mission statement for the ROE, originating from EPA leadership, in order to define the objectives and intended audiences of the report

In response to these suggestions from the SAB, and additional suggestions from the users of the ROE, EPA developed the draft ROE 2014 (www.epa.gov/draftroe). The 2014 ROE site represents the transition to a completely online environment with improved navigation, interactive graphing and mapping, and access to the data, where possible.

The draft ROE 2014 indicators address questions of critical importance to EPA’s mission of protecting human health and the environment. The ROE indicators are numerical values derived from actual measurements of a driver, stressor, state or ambient condition, exposure, or human health or ecological condition over a specified geographic area, whose changes over time represent or draw attention to underlying trends in the condition of the environment. The indicators are based on data collected by the

¹ [SAB Advisory on EPA’s Draft Report on the Environment 2003](#)

² [SAB Advisory on EPA’s Draft Report on the Environment 2007: Science Report](#)

³ [EPA’s Report on the Environment 2008](#)

⁴ [Consultation on Development of EPA’s Report on the Environment \(2009\)](#)

EPA, other federal and state agencies, and non-governmental organizations and meet high standards for data quality, objectivity, and utility.

The ROE 2014 does not, however, analyze or diagnose the reasons for, and the relationships between, trends in stressors and environmental and health outcomes.

In response to evolving Agency priorities, EPA has expanded the scope of the ROE with a new theme on sustainability to complement the existing themes on air, water, land, human exposure and health, and ecological condition. EPA has also adapted a sustainability-based conceptual framework for the ROE in response to comments from previous SAB meetings.

EPA's Office of Research and Development (ORD) requests that the SAB review and comment on the draft ROE web site with particular attention to the new features added since the release of the 2008 report. Specifically, the Agency requests that the SAB comment on: the clarity of the ROE's objectives for EPA and other governmental scientists and policy-makers, educators, and members of the public; the overarching conceptual framework, based on a sustainability theme that integrates issue-specific elements; the addition of statistical information; and the presentation of these features in an online format. Specific charge questions are provided in the following section.

CHARGE QUESTIONS

Charge Question 1. Sustainability as the ROE 2014 Conceptual Framework

One of the SAB's key recommendations from its 2007 and 2009 reviews was that EPA should develop a framework describing the scientific understanding of relationships between the ROE indicators and the basis for including them in the report. The ROE conceptual framework and associated diagrams were created in response to these recommendations.

EPA adapted a sustainability conceptual framework (<http://cfpub.epa.gov/roe/frameworks.cfm>) as an overarching structure for the ROE to show how indicators relate to specific human health or environmental outcomes or conditions that are consistent with the Agency's mission and goals. Sustainability is based on the principle that everything that humans need for survival and well-being depends, either directly or indirectly, on our natural environment. In recent years, EPA has advanced the concepts of sustainability and sustainable development, and ORD has realigned its research programs with a systems thinking approach to develop sustainable solutions to increasingly complex, global, and interconnected environmental problems. Sustainability—commonly defined as the ability to maintain or improve standards of living without damaging or depleting natural resources for present and future generations—offers a framework for addressing such challenges.⁵

⁵ U.S. EPA Office of Research and Development. 2012. Science for a sustainable future: EPA research program overview 2012-2016. June. EPA 601/R-12/002. <http://www.epa.gov/ordntrnt/ORD/docs/strap-overview2012.pdf>

With the sustainability framework as the foundation, EPA developed six examples of condition or outcome-specific diagrams to show how ROE indicators relate to:

- Tropospheric ozone
- Acid deposition
- Nutrient impacts
- Coastal hypoxia
- Wetland loss
- Fish mercury contamination

1. Please comment on the concept of sustainability as an overarching conceptual framework for representing the relationships between indicators. Please also comment on the clarity by which the framework is depicted and discussed in the draft ROE and provide any recommendations to improve its description and intended purpose of representing the relationship between indicators?

Charge Question 2. Sustainability Indicators

Within the Sustainability theme, EPA poses a new question, written in a style consistent with the other ROE questions: [What are the trends in consumption of natural resources?](#) This question focuses on trends of the intensity of natural resource consumption in the U.S. to track progress in reducing environmental pressures due to depletion of these resources.

The ROE presents four indicators to help answer the new resource efficiency question:

- [Energy Use](http://cfpub.epa.gov/roe/indicator.cfm?i=93) (<http://cfpub.epa.gov/roe/indicator.cfm?i=93>)
- [Freshwater Withdrawals](http://cfpub.epa.gov/roe/indicator.cfm?i=94) (<http://cfpub.epa.gov/roe/indicator.cfm?i=94>)
- [Quantity of Municipal Solid Waste \(MSW\) Generated and Managed](http://cfpub.epa.gov/roe/indicator.cfm?i=53) (<http://cfpub.epa.gov/roe/indicator.cfm?i=53>)
- [Quantity of RCRA Hazardous Waste Generated and Managed](http://cfpub.epa.gov/roe/indicator.cfm?i=54) (<http://cfpub.epa.gov/roe/indicator.cfm?i=54>)

Each of these indicators includes an intensity metric that shows trends over time with respect to the U.S. population and the U.S. real (inflation-adjusted) gross domestic product (GDP). For example, the energy indicator shows trends in energy use per capita and energy use per dollar of real GDP. The municipal solid waste (MSW) and RCRA hazardous waste indicators are presented as surrogates for material use. All four indicators are cross-referenced in other ROE themes where appropriate; for example, the MSW and RCRA hazardous waste indicators are also used to help answer the ROE question on wastes within the Land theme.

2(a). Please comment on the adequacy by which sustainability has been incorporated into the ROE. More specifically, please comment on the descriptions and explanations for the sustainability theme, question, and the four associated indicators.

2(b). Please address the utility of the four new sustainability indicators for informing the reader on the intensity of resource consumption and the relevance of these intensity metrics.

2(c). EPA is anticipating expanding the sustainability theme with additional questions and indicators in future ROEs. Please provide any specific recommendations on additional sustainability topics, indicators, and extant data sources that are important to pursue. Please provide your rationale for prioritizing additional topics and indicators.

Charge Question 3. Statistical Information

The 2007 SAB review pointed out that the ROE was limited in its usefulness because it contained no data interpretation and no conclusions supported by statistical analysis. The SAB cited the need for a statistical approach to analyze and present the ROE indicator data to enhance the rigor to the report. The SAB suggested that the results presentation for each indicator:

- Include formal statistical analyses and/or additional information, such as error bars around mean values.
- Report statistical limitations when insufficient data are available for robust quantitative analyses.

EPA determined not to conduct *de novo* statistical analysis at this time, but instead to include extant statistical information, typically analysis performed by the primary researchers or scientists that collected and provided the data. Reflective of the current scope of the ROE, EPA did not provide an interpretation of indicator trends for the draft ROE 2014.

The draft ROE 2014 has 21 indicators with error bars and four have trend data incorporated into the display of the indicator graphics. This web enhancement provides additional information on the uncertainty and variability of the indicators for the reader. Detailed descriptions of the available statistical information can be found in the technical documentation for the individual indicators. Additionally, each ROE exhibit has a footnote clarifying whether any trend testing was done, and if so, whether the analysis was statistically significant or not.

3. Please comment on the approach used to incorporate statistical information into the 2014 ROE. Please provide any recommendations to enhance the presentation, including the clarity in describing uncertainty.

Charge Question 4. ROE 2014 Web-based Product

The SAB noted in its 2009 report that “[i]n developing the ROE, EPA should emphasize producing a powerful and interactive web-based platform with links to pertinent websites containing additional data and information.” The 2014 ROE is an exclusively online presence. Consistent with the SAB recommendation, the goal of this transition to a web-based platform was to make the ROE indicators and graphics easily accessible, while retaining the ROE theme/question structure. In the future this format will facilitate providing users with the most current, real-time information possible, which is not feasible with a print format.

EPA is seeking feedback on the enhancements made to the web site, which include interactive mapping and graphing, streamlined text, and links to related information outside the ROE. Specifically enhancements to the site include:

- Interactive mapping and graphing. Tools allow users to customize graphical displays and view certain indicators in zoomable map form.
- Streamlined text. The language has been edited to be more plain and direct (to the extent possible in a document of a technical nature). Web pages are scannable; in many cases the web pages display topics in an “accordion” format, allowing the user to click on that topic to reveal more detail. Other pages provide main text and additional details available by clicking on “Learn more” options. These changes are designed to maximize the usefulness of the website for a wide range of audiences. The indicator text, which comprises most of the ROE text, was previously peer-reviewed and therefore has not been changed.
- Numerous links have been added throughout the ROE.
 - EPA has created two new sections in the ROE, “[Where You Live](#)” and “[What You Can Do](#),” that provide links to relevant EPA Web pages. These links were identified with input from the ROE Indicators Work Group and others across the Agency.
 - “Related Links” are provided at the bottom of all six theme areas and 24 question pages that link to relevant EPA Web pages and, as appropriate, other federal websites.
 - “For More Information” links, including links to data providers, are provided at the bottom of all indicator pages.

4(a). Please comment on the scientific rigor and clarity of the ROE content with the transition from a printed document to an online presence.

4(b). Please provide suggestions on other factors that could be considered concerning the overall content, format, credibility, user friendliness and navigability of the site.

Charge Question 5. Communication

The audience for the ROE is very diverse. It includes EPA scientists and policy-makers, as well as scientists and policy-makers in other Federal, State, Tribal and local governmental agencies. A broad array of stakeholders, and the general public will be interested in the ROE indicators. The ROE may also be useful to educators and students in a myriad of community settings.

Given the diverse nature of the ROE audience, EPA presented information in the ROE in multiple ways and in increasing levels of detail, i.e., graphical presentations, explanatory narrative, corresponding links to literature citations, and, where possible, information on statistical uncertainty for indicators. The ROE also provides links and citations to underlying datasets so interested readers can get additional information for specific indicators of interest.

5(a). Please provide feedback on the approaches used in the ROE to provide information such that audiences with varying interests can efficiently and reasonably find information concerning the status and trends of environmental conditions. Please provide any recommendations to enhance the access to information.

5(b). Please comment on the accuracy of the ROE's presentations and their effectiveness in communicating complex scientific information to a broad range of technical and non-technical audiences. Please provide recommendations for specific components of the ROE as appropriate.

Charge Question 6. Additional Indicator Recommendations

Although the focus of this SAB review is on enhancements made to the ROE since the 2009 SAB review, the SAB may have further advice on how well existing indicators address the specific questions of interest to the Agency as outlined in the ROE. The SAB may also have suggestions concerning additional indicators that might be considered to more fully address the questions outlined in the ROE. In making recommendations, the SAB should consider information provided in the ROE concerning the definition and selection of indicators, and the exclusion of purely administrative indicators.

6. Please provide suggestions concerning existing or potential future indicators so as to more fully address the questions of interest to the agency outlined in the ROE. Please provide specific recommendations concerning approaches to an integrated understanding of the status and trends for environmental and human health conditions related to the mission of the agency.