EPA's 2007 Report on the Environment: Science Report
Charge to the SAB Panel

Background

The purpose of EPA's *2007 Report on the Environment 2007: Science Report* is to answer, to the extent possible using a suite of peer reviewed indicators, questions that the Agency believes best reflect its mission to protect human health and the environment. In this context, the *2007 Report on the Environment 2007: Science Report* serves to summarize and communicate what we know and don't know about the current status and trends in condition of air, water, land, human health and ecological systems in the nation. The Agency also intends to use this information to inform its strategic planning and decision-making.

In 2003, EPA released its first *Draft Report on the Environment 2003* (DROE03). The DROE03 was reviewed by the SAB and public "listening sessions" were held in four cities to receive stakeholder comments on its utility and how to improve the document in the future. Rather than revising the DROE03, EPA used the advice from the SAB and the comments from these listening sessions to develop an improved and updated draft 2007 (ROE07), which is the subject of the current SAB review. The ROE07 consists of a Science Report that is written for environmental professionals and forms the scientific underpinnings of the project; a Highlights Document written for concerned citizens; and an e-ROE that facilitates electronic access to the materials in the report and their sources. The SAB is asked to review only the Science Report at this time.

The first steps in developing ROE07 were to review and revise the draft ROE03 questions and develop explicit definitions and criteria for indicators that would be used to answer the questions. The questions were developed by a cross-EPA ROE project team and others in the Agency, and reviewed and approved by the ROE Executive Steering Committee. The questions focus not only on EPA's current regulatory and programmatic activities, but also on issues clearly related to EPA's broader mission to protect human health and the environment.

The cross-EPA ROE project team screened the indicators from the DROE03, as well as proposals for new indicators from EPA and its partners, for their relevance and likely ability to pass a peer review based on the indicator definition and criteria (see Attachment 1). In addition to nationwide indicators, some of which are broken down by EPA Region, proposals for regional indicators (indicators that covered one or a few EPA Regions or important parts of the Regions) were solicited from EPA's Regional Offices. A descriptive indicator write-up, graphics, and quality review form, were developed for all indicators that passed the screening process (including review and approval by the Steering Committee). These indicators underwent a public expert peer review by panels of independent, scientific subject matter experts in July, 2005. Based on the reviewer recommendations, indicators were either dropped from further consideration or accordingly revised for inclusion in the ROE07. The report from that review is included as part of the background materials for the current SAB review.

Following finalization of the indicator materials, an introductory chapter, chapter text, and an afterword and glossary were developed and reviewed in accordance with EPA policies. The chapter text provides the scope for each question, a summary of the indicators used to answer the question (including indicators that may appear in other chapters), a summary of what the indicators tell us about answering the question, along with any important limitations, and the important gaps and challenges where no indicators meeting the criteria are currently are available to answer important aspects of the question. The product constitutes the review draft of ROE07.

Review Material

The following materials are included for this peer review:

- Review Draft, *Report on the Environment 2007: Science Report*, the specific document to be reviewed.
- Electronic access to relevant background information documents (not submitted for review themselves)
    - Report on Peer review of ROE07 indicators, including indicator modifications and responses to comments (go to www.epa.gov/roeindicators ; in the blue side bar on the left side of the page, click on "Peer Review")
    - Indicator QA forms (go to www.epa.gov/roeindicators ; click on the chapter, then click on the indicator title, then go to the "Metadata" tab)

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The EPA is requesting SAB review and comment on the draft of the *Report on the Environment 2007: Science Report.* The Agency requests that the SAB comment on: the adequacy of the formulation and scope of the questions; the appropriateness of the indicators in answering the questions; the accuracy of the characterization of gaps and limitations; the degree to which the gaps and limitations of the indicators limit our ability to answer the questions; the appropriateness of regionalization of national indicators; the utility of regional indicators in the report; and the overall quality of the report with respect to technical accuracy, clarity, and appropriateness of the level of communication.

Specific Charge Questions

1. Formulation and scope of the questions

The EPA developed 23 questions intended to elicit information on the important aspects of what we need to know about the changing conditions of air, water, land, human health, and ecological systems. These questions form the conceptual framework for the report, against which the usefulness of the indicators are judged, and are the

reference point for characterizing limitations and gaps in indicators. The questions focus not only on EPA's current regulatory and programmatic activities, but also on issues clearly related to EPA's broader mission to protect human health and the environment. The scope of each question defines what is, and isn't, important in terms of EPA's mission, broadly cast.

Charge Question 1. Please comment on the adequacy of the formulation and scope of the questions in the Chapters of the *Report on the Environment 2007: Science Report.* Does the SAB have any specific recommendations on how to improve or clarify the formulation of the questions? Does the SAB have recommendations on changing the scope of the questions to better reflect EPA's mission?

2. Appropriateness of indicators for answering the questions

Indicators are used in the *Report on the Environment 2007: Science Report* to answer each question to the extent possible. The indicators have been peer reviewed to ensure that they meet the indicator definition and criteria. They have been found by the reviewers to be useful, appropriate, and based on sound science. However, a final determination of their utility and appropriateness depends on the context with which indicators are presented in the chapter text and the extent to which they are important in answering the Report on the Environment questions.

The chapter text presents a narrative in which information from the detailed indicator write-ups is summarized to answer the question. In some cases, an indicator is used to help answer more than one question. It is a convention in the report only to use indicators of specific human health and/or environmental outcomes when trends in those indicators can be linked unambiguously to trends in emissions, ambient concentrations, or exposure indicators employed to answer the same question.

Charge Question 2. Please comment on whether all of the relevant indicators in the report have been used appropriately to answer the questions. Please comment on whether the integrity of the material in the indicator write-up is preserved in the chapter narrative.

3. Presentation of gaps and limitations

Most indicators have limitations in answering the questions, and in no case do we have all of the indicators needed to fully answer any of the questions in the *Report on the Environment 2007: Science Report.* It is of paramount importance to maintaining the objectivity and transparency of the report that indicator gaps and limitations are clearly identified for the reader.

In their review of DROE03, the SAB noted that in some cases, gaps or limitations were so severe that one would question why they were included in the report at all, and in

others, gaps or limitations seemed almost trivial. ROE07 attempted to strike a better balance between these extremes so that the characterization of gaps and limitations adds value to the report.

Charge Question 3. Please comment on the adequacy, objectivity, and transparency of the identification and communication of gaps and limitations of the indicators in answering the Report on the Environment questions.

4. Regionalization of National Indicators

Ultimately, EPA would like to experiment with a fully scaled Report on the Environment that would be useful to a variety of readers, interested in scales ranging from national (and global, where appropriate) down to individual neighborhoods (although such a Report on the Environment would have to be at least in part a web-based product). As a first step, 36 national indicators were broken down by the ten EPA Regions, and several others were broken down by other, similar large regions.

Regionalizing national baseline or trend data involves several considerations. Are the measurements truly comparable among regions? Different regions may have significant differences in the numbers of sites sampled, which may extend to the location of the sites (e.g., EPA Region 1 may have only 3 widely separated ozone trend sites, while EPA Region 9 has almost 50, with multiple sites in some urban areas). It they are to be meaningful, it is important that differences in regional trends represent true differences and not artifacts of sampling or measurements. For human health data, national level data are informative but reflect an average of what is going on across the U.S. National level statistics may obscure important differences in status and trends at the regional, state and local levels.

Charge Question 4. Please comment on the utility, comparability, and objectivity of the regionalization of the national Report on the Environment indicators. Does the use of EPA Regions to scale national data accurately reflect, or does it inappropriately distort, the problem domain?

5. Regional Indicators

In addition to the regionalized national indicators, EPA solicited examples of indicators from the EPA Regional offices. This was intended to be a small set for exploring how indicators could be developed at smaller scales, as well as how to reflect unique conditions that are important to answering a Report on the Environment question, but which may not have national coverage. These included indicators that covered one or a few EPA Regions or important parts of the Regions, and reflected either indicators that might provide exemplars for new national indicators, or draw attention to environmental trends that were unique to a particular region, but of national importance**.**

Other than to ensure that the regional indicators met the indicator definition and criteria, the objective of this activity was to cast a wide net and innovate as much as possible to see what kinds of indicators might be most useful in future versions of the report. One particular issue of concern or interest is scaling – as indicator cover less territory, do their corresponding time scales necessarily decrease? Are the kinds of information they supply relevant to answering the Report on the Environment questions?

Charge Question 5. Please comment on the utility of the regional indicators in *Report on the Environment 2007: Science Report* in answering the questions. Does the SAB have recommendations for whether and how to build on this base in future versions of the report?

6. Overall quality of the *Report on the Environment 2007: Science Report*

The Report *on the Environment 2007: Science Report* represents the Administrator's report to the public about the status and trends in human health and the environment, as they can be characterized using indicators. As such, the Report must be held to the highest possible standard for accuracy and quality of communication. The Report is intended for an audience of environmental professionals who are not necessarily experts in the subject matter of the particular questions. The intention was to include enough background information to enable a water quality expert to understand issues related to air pollution, or an ecologist to understand issues related to human health trends. At the same time, the report tries to ensure through the quality assurance forms and reference links that the interested reader can readily understand the sources and the underpinnings of the indicators.

Charge Question 6. Please comment on the overall quality of the *Report on the Environment 2007: Science Report* with respect to technical accuracy, clarity, and appropriateness of the level of communication.

Attachment 1

Report on the Environment 2007: Science Report Indicator Definition and Criteria

For the *Report on the Environment 2007: Science Report*, an indicator is defined as "a numerical value derived from actual measurements of a pressure, state or ambient condition, exposure, or human health or ecological condition over a specified geographic domain, whose trends over time represent or draw attention to underlying trends in the condition of the environment."

Indicators must meet the following criteria:

- The indicator is useful. It answers (or makes an important contribution to answering) a question in the *Report on the Environment 2007: Science Report*.
- The indicator is objective. It is developed and presented in an accurate, clear, complete, and unbiased manner.
- The underlying data are characterized by sound collection methodologies, data management systems to protect its integrity, and quality assurance procedures.
- Data are available to describe changes or trends and the latest available data are timely.
- The data are comparable across time and space, and representative of the target population. Trends depicted in the indicator accurately represent the underlying trends in the target population.
- The indicator is transparent and reproducible. The specific data used and the specific assumptions, analytic methods, and statistical procedures employed are clearly stated.

The indicator criteria are consistent with EPA's Information Quality Guidelines for information disseminated by the Agency to the public.