U.S. Environmental Protection Agency
Science Advisory Board
Committee on Science Integration for Decision Making
Preliminary Study Plan

In response to an Agency request, the Science Advisory Board (SAB) is undertaking a study to evaluate the extent to which EPA's scientific assessments are integrated to support environmental decision making. To conduct this study, the SAB formed the Committee on Science Integration for Decision Making. The SAB committee held an initial public meeting on June 9-10, 2009 to develop its study plan. Subgroups of the SAB committee held subsequent discussions to develop the study objectives and refine the preliminary study plan.

Study Objectives

Since it is important that there is a common understanding of the definitions of "science integration" and "integrated decision making" and the relationship between them, the SAB committee makes the following distinctions: "science integration" refers to the identification, collection, and application of scientific data, models and concepts from multiple scientific disciplines to support decision-making, while "integrated decision making" refers to the deliberate inclusion of results of different types of assessments in the process of decision making. The SAB committee has adopted the definition as described in the SAB 2000 report *Toward Integrated Environmental Decision-Making*. "Integrated decision-making approaches should draw upon concepts and methods originating in many different scientific, technical, and scholarly fields (e.g., physical and biological sciences, public health, environmental engineering, political science, social science, philosophy, and economics), as appropriate for any given case….Integrated environmental decision-making is not just a series of methodologies, but rather is a way of thinking, in a whole and complete way, about any environmental problem in order to maximize the efficient reduction of aggregate risk to populations or ecological systems."

Based on the SAB charge and this definition of integration, the SAB committee developed the following initial set of objectives for the study. These initial study objectives may need to be refined as information is obtained through the SAB's fact-finding efforts.

- **Evaluate EPA practices for integrating science to support decision making**: The SAB will examine aspects of existing EPA decision-making processes and approaches that are relevant to the role of scientific information and assessments and how these processes might vary between program and regional offices. The SAB members will evaluate what models for integrating science into decision making work well for different types of decisions and why.

- **Evaluate consideration of public, stakeholder, external scientific, and other governmental (i.e., states, tribes, foreign governments, international organizations) input in science assessment for decision making**: The SAB will examine when and how this input occurs when integrating science into decision-making. Differences between program and regional offices on their use of public input will be examined.

- **Evaluate drivers and impediments to implementing past recommendations for science integration:** The SAB will determine to what extent EPA scientists, policy

makers, and decision makers have implemented past recommendations of the EPA SAB and the National Research Council of the National Academies (NRC). The members will examine why and how success was achieved.

- **Evaluate ways EPA receives feedback on how science is used in decision-making:** The SAB will identify ways in which the Agency receives feedback on how science is used in decision-making and where feedback can be used to identify emerging science and opportunities for future policy.

- **Evaluate EPA workforce to support science integration for decision making**: The SAB will determine how EPA adapts its workforce to shifts in priorities, resources and scientific expert need. Also, it will examine how scientists in the Agency stay current in their areas of expertise, or expand their expertise based on current and future scientific needs.

Overall Plan and Timeline:

The first step of the study is for the committee to become familiar with EPA's programs and environmental decisions. The committee will gather information through interviews with Agency personnel to learn more about current science assessment and decision-making practices. Those interviewed will include scientists, policy analysts, and senior managers across EPA (Attachment 1).

The committee will evaluate its fact-finding processes and any data and knowledge gaps to provide the fullest picture possible of the science-integration process throughout the Agency. The committee will clearly document: the interview process, discussions with interviewees, analysis of findings, and the data and knowledge gaps inherent in the study approach.

In addition, the SAB will conduct a public workshop to seek further input from EPA as well as input from interested members of the public, stakeholders, external scientists, and scientists from other governmental entities. Following the workshop, the SAB will hold public meeting(s) to discuss its findings and prepare a draft advisory report. The draft report will be subsequently reviewed and approved at a public meeting of the chartered SAB. EPA and public comments are sought throughout the advisory process.

The SAB will adapt the plan as it gathers and analyzes information. The SAB will explicitly address the strengths, limitations, and uncertainties of the information collected and how they relate to the overall findings and recommendations to be developed in the committee's draft report.

Approximate Study Timeline:

The following timeline contains proposed milestones and dates for completing the study on Science Integration for Decision Making. These key dates may change, if the SAB committee determines a need to adapt its plan.

Date	Milestones
June-September 2009	Develop preliminary study plan
October 2009–January 2010	Fact-finding interviews with EPA offices (see Attachment 1) conducted by committee subgroups
February 10-11, 2010	Committee public meeting to discuss: - Fact-finding lessons learned - Identify external input needed on preliminary lessons learned - Workshop planning - Identification of any additional information needed
May/June 2010	Public workshop to seek EPA and public input on preliminary lessons learned
May–September 2010	Committee meeting(s) to discuss draft advisory report
November 2010	Review of committee draft report by chartered SAB
December 2010	Publication of final report

Attachment 1: Interview Sessions with EPA Offices

The SAB will conduct interviews with EPA Offices and Regions that use science to support decision making (see list of EPA Offices and Regions to be interviewed). Two or more committee members will be involved in each interview. The SAB Staff Office Director or Deputy Director will provide introductions, and the Designated Federal Officer (DFO) for the committee will take notes and assist the SAB committee in consolidating and summarizing information gleaned from the interview sessions. The composition of the fact-finding groups will be based on a SAB member's expertise and interest, as well as their geographical location. The interviews will be held at the designated location of EPA Offices.

The SAB will hold separate interview sessions with decision makers, policy makers, and scientific and technical staff. SAB members will use the following questions as a guide for the interviews. The SAB recognizes that not all questions will be relevant and appropriate for all EPA offices. The interview questions cover topics such as 1) practices for integrating science to support decision making; 2) consideration of public, stakeholder, external scientific, and other governmental input in science assessment for decision making; 3) drivers and impediments to implementing past recommendations* for science integration; 4) ways EPA receives feedback on how science is used in decision-making; and 5) the EPA workforce related to science integration supporting decision making.

The SAB committee asks interviewees to review the questions below before the interviews and describe one or two important and representative examples of science-based decisions specific to their organization. The committee is especially interested in learning what interviewees view as what is and is not working well, and what changes are needed to improve science integration to support environmental decision making. The SAB DFO will provide draft summaries of the interviews to the interviewees for comment.

Questions for Policy and Decision Makers:

1. **Practices for integrating science to support decision making**
   - 1.1. What kinds of decisions does your organization make?
   - 1.2. What is (are) your role(s) in the decision-making process?
   - 1.3. For each type of decision please describe the process by which it is made. What types of assessments do you include to inform your decisions?
   - 1.4. Do the decision-making processes used by your office employ planning and scoping, and problem formulation phases? If yes, how are planning and scoping, and problem formulation conducted? What kinds of preliminary assessments are conducted?
   - 1.5. Has your organization applied any of the processes and approaches recommended by the SAB and NRC for integrating science supporting decision making? Has it used other models and approaches? If so, has it been useful to apply these models/approaches?

*With special consideration of decision-making processes and approaches described in the *Toward Integrated Environmental Decision-Making*. (SAB, 2000) and *Science and Decisions* (NRC, 2009) and recommendations related to public participation in science and environmental protection in *Improved Science-Based Environmental Stakeholder Processes* (SAB, 2001) and *Public Participation in Environmental Assessment and Decision Making* (NRC, 2008).

1.6. As applicable, discuss a particular past recommendation that relates to the example(s) of science-based decisions you have described for the committee. Did the recommendation affect your decision(s)? If it affected the decisions, in what ways did this occur?
1.7. How do you assess the level of analysis needed for a particular science assessment, and when is the analysis judged to be sufficiently completed to allow decision making?
1.8. Is the science assessment and decision-making process altered to accommodate different locations in the United States or different spatial scales? Do science assessment and decision-making processes change to address short-term and long-term needs?
1.9. What scientific data or information do you need to support decisions? Do you have the data/information that you need, when you need it? If not, what do you do? Are you constrained from using all available scientific information in decisions or generating new data and information to support decisions?
1.10 How are different assessments in different disciplines (including social and decision sciences) integrated as part of the science decision-making process?
1.11 How do you like information about the uncertainties in scientific assessments presented? What are some examples of presentation of uncertainties in scientific assessments that have helped you understand the science related to a decision and had an impact on that decision?

2. Consideration of public, stakeholder, external scientific, and other governmental input in science assessment for decision making

2.1. What role do the regulated community; non-governmental organizations; and the general public play in your organization's science assessment process? If involvement occurs, how is it accomplished? At what steps in the process are these groups involved?
2.2. To what degree and how do you coordinate scientific assessments with international organizations, other federal agencies, states and tribes? How does this coordination happen?
2.3. What role does the external scientific community play in integrating science to support decision-making in your organization? How does your organization engage the external scientific community to help your decision makers get the science needed to support decisions?
2.4. Has your organization applied any of the SAB's or NRC's recommendations relating to public participation in science supporting environmental decision-making? Have these reports influenced how public/stakeholder input has been used in your organization's science assessments? If so, has it been useful to apply these models/approaches?

3. Drivers and impediments to implementing past recommendations for science integration

3.1. Are there perceived or actual barriers for developing and/or implementing new or existing decision-making processes or frameworks that integrate the best available science? If yes, what are they?

4. Ways EPA receives feedback on how science is used in decision-making

4.1. How does your organization determine the effectiveness of implemented decisions (whether the decision resulted in reduced risk and improvement to public health and the environment)?
4.2. Does your organization use feedback on decisions to detect emerging science, influence future policy, set priorities? If so, how?

5. **EPA workforce related to science integration supporting decision making**
   5.1. How does your organization's scientific and technical workforce adapt to shifts in priorities and resources?
   5.2. How do scientists stay current in their areas of expertise, or expand their expertise based on current and future scientific needs?
   5.3. What is the current balance between near-term program support research and longer-term research to advance the science?

6. **Are there other questions we should ask that would help us understand how science and scientific assessments are integrated to support your decisions?**

<u>Questions for Scientific and Technical Staff:</u>

1. **Practices for integrating science to support decision making**
   1.1. What kinds of decisions are made in your organization and what is your role(s) in the decision-making process?
   1.2. What types of science assessments are done to support your organization's decisions (e.g., technology, benefits, human health, ecological, behavioral/social/economic, etc.)?
   1.3. Who actually conducts science assessments (e.g., your organization's staff, contractors, other EPA offices/personnel)?
   1.4. How are assessments in different disciplines (including social and decision sciences) integrated as part of the science decision-making process?
   1.5. How do you work within your own office, and with other EPA Offices and Regions to coordinate analyses needed for decision-making? What science data, models, analyses, etc. do you obtain from other units to support decision making in your unit?
   1.6. Do you conduct formal uncertainty analyses? How are analyses matched to the needs of decision makers? How is uncertainty communicated to decision makers, stakeholders and the public?
   1.7. What roles do computational models have in science integration for decision making in your organization. Do you make use of EPA's Council for Regulatory Environmental Modeling or the Models Knowledge Base, and if so, how?
   1.8. What improvements are needed to integrate science assessments to support decision-making processes?
   1.9. What are current interactions among your organization and the Agency's laboratories (e.g., ORD, Regional, Program-specific)?

2. **Consideration of public, stakeholder, external scientific, and other governmental input in science assessment for decision making**
   2.1. To what degree do you coordinate development of your organization's scientific assessments with international organizations, other federal agencies, states and tribes? How does this coordination happen?
   2.2. What role do the regulated community, non-governmental organizations, other international, federal, state or tribal governments and the general public play in your organization's science assessment process? If involvement occurs, how is it accomplished? At what steps in the process are these groups involved?
   2.3. What role does the external scientific community play in integrating science to support your organization's decision-making? How does your organization engage the external scientific community in getting the science needed to support environmental decisions?

3. **Drivers and impediments to implementing past recommendations for science integration**
   3.1. Are there perceived or actual barriers for developing and/or implementing new or existing decision-making processes or frameworks that integrate the best available science? If yes, what are they?

4. **Ways EPA receives feedback on how science is used in decision-making**
   4.1. How does your organization determine the effectiveness of implemented decisions (whether the decision resulted in reduced risk and improvement to public health and the environment)?
   4.2. Does your organization use feedback on decisions to detect emerging science, influence future policy, set priorities? If so, how?

5. **EPA workforce related to science integration supporting decision making**
   5.1. How do you stay current in their areas of expertise, or expand their expertise based on current and future scientific needs?

6. **Are there other questions we should ask that would help us understand how science and scientific assessments are integrated in support of your organization's decisions?**

EPA Offices and Regions to be interviewed:

Office of Air and Radiation
Office of Children's Health Protection
Office of Environmental Information
    Toxics Release Inventory Program
Office of Prevention, Pesticides and Toxic Substances
Office of Solid Waste and Emergency Response
Office of Water
Office of Policy, Economics and Innovation
    National Center for Environmental Economics
Office of Research and Development
Office of the Science Advisor
EPA Regions (1-10)