

Goal 4 Integrate Environmental Science and Technology to Solve Environmental Problems

Goal Statement

ORD will integrate its research across media, disciplines, and institutions to meet the challenges of complex environmental problems and to promote the discovery of holistic, efficient, and effective solutions.

What This Goal Means

Effectively solving environmental problems requires an integrated approach in which the necessary people and skills are brought together in a comprehensive program of research to answer the fundamental scientific questions. Furthermore, it means that the results of our research are assembled, presented, and communicated to Agency customers, key stakeholders, and the general public in a way that facilitates understanding and wise decisions.

Such integrated problem-solving is both a unique capability of, and opportunity for, ORD. Because of our broad mission related to both human health and ecology, close working relationships with the program and regional offices, established ties to universities and other research institutions, and a large, multidisciplinary research staff, we are qualified and positioned to integrate scientific research to understand and solve environmental problems.

To achieve this Goal, we will integrate research across the following:

- *Human and ecological health* by maximizing the degree to which relevant human health and ecological endpoints are addressed, including different health effects, levels of biological organization, and human populations;



- *The risk assessment/risk management paradigm* by ensuring that we evaluate the effectiveness of risk management alternatives based on net risk reduction, not merely pollutant reduction. We will set our risk characterization and assessment research priorities while recognizing the inherent uncertainties in risk assessment and the potential effect these uncertainties may have on decisions to develop prevention or control options;
- *Institutions* by drawing expertise from the appropriate ORD Laboratories and Centers, EPA program and regional offices, other federal agencies, universities, and U.S. and international research organizations;
- *Disciplines* by involving staff from the biological, physical, natural, and social sciences and from engineering; and
- *Media* by recognizing that the conditions of air, water, land, and human health are interrelated and that addressing risks in the context of one medium may alter risks in another.

All levels of ORD will pursue integration. At the individual researcher level, integration will occur across disciplines through coordination, cooperation, and collaboration. At the laboratory or center level, integration will require providing resources and encouragement for work beyond that lab's or center's traditional focus. Our scientists will coordinate with grant project officers and recipients throughout the research process. At the highest levels of ORD, planning, budgeting, and research execution processes and authorities will support integrated projects.

Why This Goal Is Important for ORD

In the past, the problems on which EPA focused, and sometimes the solutions as well, involved a scientific approach that was rather straightforward compared to the challenges that EPA is addressing now. Today's environmental problems are more complex, their causes



less obvious, and their solutions more expensive and/or less certain. Addressing risks associated with a single environmental issue or problem often creates or alters risks elsewhere. Issues such as global climate change, ecological implications of emerging technologies, persistent bioaccumulative toxics, endocrine disrupting chemicals (EDCs), and habitat and biodiversity loss are inherently complex. They involve complicated issues related to fate and transport, exposure, and effects, and the associated human and animal behavioral responses to these risks or effects. Environmental science and engineering also will play an even more important role in the Agency's efforts to harmonize existing regulations and programs under its results-based management approach.

Sound risk-based decisions and environmental stewardship require the integration of the full range of knowledge about an issue. Integration across all relevant dimensions is neither easy nor straightforward, and it requires a broad mix of skills and organizational capabilities, including those outside of ORD. As confirmed in discussions with our stakeholders, we are uniquely positioned to fulfill this role because of our broad expertise and capabilities and the importance of our research to EPA's decision-making process. In addition, our relationships with universities and other research institutions provide the opportunity for new and more far-reaching partnerships to foster integrated research.

The Goal of integrating environmental science and technology to solve environmental problems complements ORD's Goal 1 on supporting the Agency's mission and Goal 3 on leadership. Integration will reinforce a sense of common purpose both among our staff and with EPA programs and regions. Through our research and technology transfer activities, we will provide our customers with integrated packages that solve a problem, constitute a complete tool set, or resolve the status of an emerging issue. We will encourage other environmentally focused organizations to move toward more holistic and comprehensive approaches to assessing and managing risk.



Goal 4 Objectives and Actions

4.1 Use ORD's multi-year planning process to identify priority environmental problems to be addressed by integrated research programs.

4.1.1 – Use the multi-year plans to identify and take action on key environmental problems that require integrated planning and implementation of research.

4.1.2 – Initiate projects that organize, integrate, and synthesize data and theory from multiple disciplines and research institutions to support integrated solutions to complex environmental problems.

4.1.3 – Include cross-laboratory annual performance goals and measures that provide integrative solutions for ORD's GPRA commitments.

4.1.4 – Elevate the priority of cross-organizational research in the annual planning process.

4.2 Improve ORD's research management and communication processes to facilitate and support research that provides integrated solutions to environmental problems.

4.2.1 – Make ORD models and data sets broadly available to researchers across ORD, to program and regional offices, and to the external scientific community.

4.2.2 – Establish communication mechanisms (such as scientist-to-scientist meetings, open houses, or staff orientation programs) to ensure that all staff understand the environmental problems being addressed, the need and opportunities for integrated solutions, and the need for the expertise of others.

4.2.3 – Conduct cross-laboratory program reviews to hold managers (i.e., line managers, associate and assistant directors, program managers, and team leaders) accountable for accomplishing cross-laboratory research goals.

4.2.4 – Modify the award and promotions program to reward cross-disciplinary and cross-laboratory research.

4.2.5 – Identify ways to promote interaction between EPA scientists, grantees, and external research organizations by benchmarking best practices and performance metrics from other multidisciplinary, broadly focused research organizations.

4.3 Dedicate efforts to increase utilization of ORD developed science in the Agency's regulatory programs and by the environmental community at large.

4.3.1 – Actively participate in the Agency regulatory process to communicate ORD research results and ensure such results are considered in the decision-making process.

4.3.2 – Take steps to ensure that ORD scientists and engineers are informed of, and understand, regulatory program needs and requirements.

4.3.3 – Improve communication of ORD's core research program to facilitate better integration across EPA program and regional offices.

Measures of Success

The ultimate measure of success of this Goal is the usefulness of ORD's integrated science and engineering products to Agency decision-makers, key stakeholders, and the public. More interim measures concern the number and type of integrated research and technology transfer activities occurring within ORD, including the following:

- Satisfaction scores on ORD organizational assessment surveys on questions related to the extent to which staff and management
 - are aware of the part their research plays in providing integrated solutions to environmental problems,
 - believe this research is well coordinated and complementary, and
 - are working on, have volunteered to work on, or want to work on integrative projects;
- Percentage of ORD's operating budget and staff devoted to integrated projects;
- Percentage of papers and presentations with authors from multiple disciplines and multiple institutions (other ORD laboratories, other parts of EPA, other agencies, or other organizations);
- Number of ORD staff members leading integrated programs and projects;
- Satisfaction scores on surveys of environmental decision-makers (inside and outside of EPA) regarding the utility of ORD's integrated products; and
- Reviews, scores, and comments by the SAB, NRC committees, and other outside bodies on the value and quality of ORD's integrated scientific solutions to environmental problems.

