Science in Regional Decision Making

Introduction

The importance of science to the mission of the Environmental Protection Agency EPA cannot be overstated. EPA's ability to write and enforce regulations, permit emission and discharge limits, and take actions protective of human and ecosystem health depends upon its understanding of the natural and anthropogenic processes taking place in the environment. To successfully carry out EPA's mission, ORD, Program Offices, and Regions all depend on sound science and rely on one another for its development, communication, and implementation. Additionally, the States, Tribes, local governments and communities rely on EPA, particularly the Regions, to assist them with incorporating sound science in their decisions.

In May, 2003, EPA's current Science Advisor, Paul Gilman,[1] requested the Regions to identify: 1) how science is used in Regional decisions, 2) what obstacles exist to using sound science in Regional decisions, and 3) how can these obstacles be overcome. In response, the Regions initiated this review to examine these questions, under the leadership of Region 4, current Lead Region for the Office of Research and Development, and prepared this Report. While Region 4 received and responded to many thoughtful comments, it would not be accurate to say that all the recommendations reflect a Regional A*consensus*.@ Nevertheless, we believe the Report does reflect widespread agreement by the Regions on obstacles to good Regional science and how these might be addressed.

The purpose of this Report is twofold. First, this Report uses two examples to illustrate how the Regions use science to make routine decisions on a variety activities, including environmental assessment, permit issuance, water quality standards development, compliance and enforcement implementation, and data quality management. Appendix 1 to this Report describes in more detail the ways in which Regions use science in routine decision-making. Second, this Report identifies: 1) obstacles challenging the Regions' ability to improve the quality of science used in their decisions and 2) recommendations for enhancing the role that science plays in Regional decisions. Challenges to using sound science include ensuring Agency scientific competency, accessing appropriate scientific expertise, using quality data, and considering limitations associated with available science and technology.

The use of "scientists" throughout this Report is meant to include all Federal, State, and Tribal professionals involved in scientific and engineering-related disciplines who contribute to the use and development of sound science in Agency decisions.

[1] Paul Gilman is also the Assistant Administrator for the Office of Research and Development.

1. How Regions Use Science to Make Decisions

How the Regions use science in their decisions is illustrated by the following two examples: 1) remediating the Hudson River's polychlorinated biphenyl PCBs)-contaminated sediments and 2) restoring and sustaining the Everglades complex ecosystem in the face of growth, development, and agricultural pressures.

The Hudson River

The Hudson River PCB Superfund Site includes nearly 200 miles of the Hudson River in eastern New York State that have been contaminated by more than 1 million pounds of polychlorinated biphenyls PCBs) discharged from two capacitor manufacturing plants. In 2002, EPA issued an historic cleanup decision to address risks to people and ecological receptors associated with PCBs in the fish, river water, and sediments.

EPA's decision called for targeted dredging and removal of 2.65 million cubic yards of contaminated sediment and an estimated 150,000 pounds of PCBs. This decision reflected 12 years of scientific and engineering studies, including geochemical data evaluation and interpretation, site-specific PCB fate, transport, and bioaccumulation modeling, and human health and ecological risk assessment.

EPA's human-health risk assessment included a risk/hazard point-estimate analysis for all appropriate exposure pathways and a Monte Carlo analysis for fish ingestion. Region 2 consulted with ORD staff for review of its Monte Carlo analysis and to evaluate the implications of using the model results to ensure that short-term non-cancer hazard indices were not underestimated in the model analyses.

Additionally, Region 2 worked with ORD to ensure key toxicological studies were appropriately considered in the risk characterization. Also, to address community concerns regarding PCB volatilization, a provisional PCB Reference Dose for inhalation was developed by ORD-NCEA at Region 2's request.

EPA used both peer input and peer review to ensure that the Agency's decision was based on sound science. Peer input was conducted through internal Agency reviews and reviews by outside agencies and groups. Formal external peer review consisted of five separate peer review panels of independent experts that were convened to review six separate reports.

Region 2 continues to consult with Agency scientists Regional, Superfund, and ORD) during the remedial-design phase of the project. For example, through the technical support program, ORD reviewed Region 2's statistical approaches for developing the Agency's draft performance standards for sediment resuspension during dredging operations and for residual concentrations of PCBs after dredging.

The South Florida Everglades

The South Florida Everglades is a complex ecosystem, defined by the seasonal flow of water, impacted by growth, development, and agricultural pressures. The Everglades challenge is a healthy Everglades Ecosystem and sustainable agriculture and growth. The Everglades' Ecosystem health is dependent upon seasonal wet and dry cycles.

Critical to the Everglades Ecosystem's health is obtaining good water quality in sufficient quantity at the right time and in the right areas. Region 4 worked with ORD's Environmental Monitoring Assessment Program EMAP) and its various federal and state partners to: 1) establish baseline conditions and 2) develop indicators to document wet and dry season water, soil and biota parameters. The focus of the assessment process was on the interactions among stressors, e.g.,

The South Florida Everglades continued

hydropatterns, eutrophication due to excess phosphorous associated with agricultural runoff, habitat alteration, and mercury contamination.

Declines in mercury contamination in water, algae, and fish were monitored in the late 1990's following increased restrictions on local atmospheric releases in the late 1980's. The ecological impacts of excess phosphorus on this oligotrophic ecosystem continue to have profound effects on the methylation of mercury and critical changes in the habitat. The Everglades Ecosystem will continue to require environmental monitoring and assessment of these interacting problems to determine the success of Agency efforts toward meeting the Everglades challenge.

The above two examples illustrate the types of geographic or placed-based issues faced by all Regions. These examples also illustrate how Regions use and develop sound science and incorporate recent scientific advances to solve complex environmental problems. However, these examples do not illustrate the myriad of routine yet complex Regional decisions requiring the use of sound science. Appendix A.1. provides a listing of these routine decisions and identifies the needed science to facilitate scientifically sound actions. Additionally, Appendix A.2. provides additional information on available tools to assist the Regions in generating and communicating sound science for Regional use.

2. Regional Science Obstacles and Recommendations

As the above examples illustrate, Regional decisions routinely result in significant and major impacts to industry, communities, and associated ecosystems. Consequently, Regions require access to the best available science to allow them to implement decisions protective of human and ecosystem health while minimizing impacts to local economies. Regional science needs include access to and best use of scientific expertise, scientific data, analytical methods and protocols, databases containing sufficient pollutant information on chemical, physical, and toxicological properties, models, and statistical approaches. Additionally, science assists the Regions in their planning efforts to move from existing statute-driven approaches toward integrated human health and ecosystem approaches.

Nonetheless, Regional science faces many significant hurdles. What follows is a discussion of obstacles, and recommendations, challenging the Regions' ability to improve the quality of science used in decision making.

2.A. Internal Focus: Communication, Human Resource Management, and Planning Issues

Optimizing the use of science to make decisions is a complex issue. Diverse challenges include: communication, planning, and human resources management. Improved communication mechanisms are necessary to locate expertise and facilitate collaboration between Agency scientists and Regional decision makers. Human resource management needs to be focused on hiring, developing, retaining, and supporting competent scientists/engineers. Additionally, workforce planning is important to strategically obtain needed scientific expertise

and provide the appropriate workforce skill mix reflecting important scientific and technological advances. Specific obstacles and recommendations are identified below.

A.1. Obstacle: Locating Agency scientific expertise and obtaining access to the requisite technical support from the Program Offices, including ORD.

A.1a. Recommendation: Program Offices and ORD should incorporate Regional support activities in personnel position descriptions and performance agreements. Desired support activities include: engaging in scientific collaborations with Regional/State scientists, providing Regions/States technical support services, providing Regions/States updates on the applications of new science, and participating in the Regional-ORD workshop series and other scientist-to-scientist meetings.

A.1.b. Recommendation: The ORD/OSWER Hazardous Substances Technical Liaison Program HSTLP) has been valuable in assisting Regions in incorporating waste-program-related sound science in decision-making activities. The existing HSTLP program should be strengthened and similar programs for the Regions' water i.e., ORD/OW) and air i.e., ORD/OAR) programs should be established. These proposed liaison positions could also serve, on a rotating basis, as the Regional Research Coordination Team RCT) representatives. Consequently, this proposed recommendation could serve address the recommendations identified in D.6.c. and D.6.d.

A.1.c. Recommendation: The Superfund and RCRA Technical Support Centers concept should also be expanded to, or used as a model for, the water, air, and pesticides programs.

A.1.d. Recommendation: ORD, Program Offices, and Regions should actively support and maintain the Biosketch, an ORD tool to locate potential scientific collaborators and specific skills needed for a given research project. Additionally, Biosketch should be expanded to include relevant scientific expertise found in outside federal and state agencies.

A.1.e. Recommendation: ORD, Program Offices, and Regions should actively maintain the Science Inventory, an ORD-managed Agency-wide database for cataloging Agency science activities and peer-review plans. Additionally, the Regions encourage the Science Inventory be made more user friendly to facilitate future updates and information quality.

A.1.f. Recommendation: The new ORD-Regional Science Portal should be expanded to include linkages to the appropriate websites of all federal and state agencies involved in relevant environmental science-related

activities.

A.2. Obstacle: Hiring, developing, retaining, and supporting Regional scientists and engineers to increase Regional knowledge of latest advances in science and technology and their applications.

A.2.a. Recommendation: Each Region should review its technical staff training plans to ensure adequate Regional training funds are available to: 1) keep scientists/engineers trained in their fields and 2) train managers and scientists in collaborative decision-making and communication skills. If as a result of this review, EPA determines that current Regional funding is insufficient, EPA should request additional funding specifically for this purpose.

A.2.b. Recommendation: Regions should work with ORD to encourage participation of scientists in ORD's Regional Research Partnership Program RRPP).

A.2.c. Recommendation: ORD and Program Offices should host course-based training sessions for Regional staff to: 1) keep Regional staff current on science and technology and 2) promote consistency across the Nation in its use. For example, the EPA Athens ORD Lab used to teach water-quality fate and transport modeling courses, which were valuable and structured similar to a college program.

A.2.d. Recommendation: EPA should create a mechanism, or find ways to better utilize existing mechanisms, to access the services of retired scientists and engineers on an Aas-needed@ basis.

A.3. Obstacle: Losing Regional scientific institutional knowledge through insufficient promotional opportunities. In most instances, technical staff in Regional offices must enter the management track, which undermines their value as working scientists, in order to have continuing advancement opportunities.

A.3.a. Recommendation: Regions should develop a "parallel career track" for the advancement of scientists and engineers in non-supervisory positions. ORD's technical qualifications review program could serve as a model to allow Regional scientists to achieve career advancement as designated technical experts.

A.3.b. Recommendation: Regional offices should consider proposing a plan for increasing the number of Regional technical experts in critical areas.

A4. Obstacle: Losing Regional scientific institutional knowledge through retirements and transfers.

A.4.a. Recommendation: Regions and the Program Offices should improve upon existing succession planning efforts by developing and implementing appropriate mechanisms to transfer institutional scientific knowledge within the Regions and across Agency Programs.

A.4.b. Recommendation: Regions should work closely with OARM so that the Regions' Human Capital Planning efforts result in workforce development strategies reflecting this need at a national level, which can be consistently reflected in the Regional-level plans.

2.B. External Focus: Issues Surrounding Data Reliability, Access, and Compatibility

Data used in the Regions for decision making are generated from internal Regional and ORD laboratories) and external States, Tribes, contractors, regulated parties, and academic institutions) sources. The quality and comparability of this data can be problematic whenever field sampling activities and laboratory methodologies do not incorporate the latest scientific advances. Standardized methods enabling Regions to collect data on extremely low pollutant concentrations and emerging contaminants of concern are also important. Regions depend on ORD to provide state-of-the-art science and the Program Offices to incorporate state-of-the-art science into program guidances. It is essential that EPA scientists keep pace with the latest science regarding monitoring and analytical assessment. Additionally, uncertainty associated with environmental models is increased by challenges associated with data reliability. Specific obstacles and recommendations are identified below.

B.1. Obstacle: Accessing and using recent advances in the science/technology/ methodology for data collection, analysis, storage, and retrieval to facilitate sound science in Regional, State and local-level decision making, e.g., the Agency's Draft Report on the Environment 2003.

B.1.a. Recommendation: Program Office and ORD support is needed to increase the use of recent advances in the science/technology/methodology for data collection, analysis, storage, and retrieval in Regional, State, and local-level decision making. ORD is instrumental to the development in the advances in science/technology/methodology. Program Office support is necessary to implement ORD-developed tools, e.g., EMAP and ReVA.

B.1.b. Recommendation: ORD, the Program Offices, and Regions should collaborate on: 1) sponsoring an exposition highlighting recent scientific advances, including data collection and analytical methodology,

and 2) identifying topics for future seminars and workshops to share information on recent scientific advances.

B.1.c. Recommendation: ORD, the Program Offices, and Regions should collaborate on developing a national program to finalize standard methods.

B.2. Obstacle: Accessing sufficient scientific knowledge to develop adequate methods, e.g., monitoring, for the Regions to conduct their work.

B.2.a. Recommendation: Regions need scientific methods, based on sound science, where required methods do not exist. For example, air toxics is an important area where monitoring methods have not been developed for many important air toxics.

B.3. Obstacle: Addressing uncertainty associated with the quality of analytical methods and models.

B.3.a. Recommendation: ORD, Program Offices, and Regions should actively participate in the reinvigorated Council on Regulatory Environmental Models CREM) and the newly created Forum on Environmental Measurements FEM).

B.4. Obstacle: Accessing the best geographic and facility-specific, multimedia environmental data.

B.4.a. Recommendation: EPA, led by the Office of Environmental Information, should continue its efforts to develop a robust information architecture for data storage and retrieval that supports easy access to information and addresses Regional science needs. ORD, OEI, and the Regions need to collaborate more effectively to support this important effort.

B.5. Obstacle: Accessing the best and sufficient pollutant-specific chemical, physical, and toxicological data, including data on mixtures, to facilitate sound science in Regional, State, Tribal, and local-level decision making.

B.5.a. Recommendation: The Agency should provide appropriate support to maintain valuable Agency data bases, e.g., ambient air and water quality data, IRIS, and Ecotox. For example, air toxics is an important area where EPA's ability to characterize health impacts is limited and existing toxicological data do not adequately support health risk characterizations for many pollutants.

B.5.b. Recommendation: ORD needs to enhance its research efforts in understanding the effects of biological and chemical mixtures and provide a mechanism e.g., a database) to share this information. This information should be made available to the Regions through the ORD-Regional Science Portal. Additionally, this recommendation would serve to fill existing gaps in information i.e., toxicological), needed by the Regions to appropriately address pressing and emerging environmental issues.

B.6. Obstacle: Accessing an Agency-wide accepted list of human health and ecological endpoints and benchmarks.

B.6.a. Recommendation: The Agency should establish one reference standard, that should continually reflect the best science, for human health and ecological endpoints and benchmarks to be used by all Program Offices and Regions to establish consistency in the use of science in Regional, State, Tribal, and local-level decision making.

2.C. Peer Review

EPA has made great progress in incorporating peer review into its work. Difficulties remain in the Regions' ability to implement peer review in a complete and efficient manner. Specific obstacles and recommendations are identified below.

C.1. Obstacle: Accessing national-expert peer reviewers without a budget or contractor support is very difficult. Many of the Regions' major science projects are performed in-house with minimal budget.

C.1.a. Recommendation: The Agency should provide funding or contractor support for peer review for in-house projects that otherwise have no budget.

C.2. Obstacle: No Agency requirement exists for externally-generated science products to meet the same level of peer review required of Agency-generated science.

C.2.a. Recommendation: The Agency should promote the use of the assessment factors outlined in the document, *A Summary of General Assessment Factors for Evaluating the Quality of Scientific and Technical Information*. The intent of the assessment factors is to promote the generation of external science products meeting EPA's internal peer-review standards.

C.3. Obstacle: Timing associated with the external peer review process, which can be time and resource intensive, conflicts with the time constraints associated

with Regional decisions.

C.3.a. Recommendation: The Agency should provide a mechanism allowing fast track peer reviews for issues needing immediate attention.

C.4. Obstacle: Identifying the appropriate peer reviewers is difficult, particularly in the areas of emerging science, e.g., genomics, and emerging pollutants, e.g., pharmaceuticals.

C.4.a. Recommendation: The Science Advisory Board should share their list of experts with the Regions through a website or national database linked to the ORD-Region Science Portal.

C.4.b. Recommendation: The Regions should seek ORD's advice on how to identify and implement appropriate peer-review mechanisms.

2.D. Incorporating the Right Science into Regional Decisions

Each Region ultimately assumes the responsibility for accessing and effectively using science in its decisions. To improve upon the Regions' use of science, it is important there be a designated advocate, in the form of a Regional Science Advisor, to systematically promote science within each Region. Regions need to be involved early throughout the Agency action development process, e.g., in the development of policy and guidance, to share Regional expertise and experience in implementing Agency regulations. Additionally, it is important that science be used in Regional planning efforts to effectively target limited resources to achieve the greatest community and ecosystem health benefits. Moreover, the Regions' collective use of science can improve upon their existing ability to influence the Agency's strategic planning and budgeting processes, including ORD's research planning. Specific obstacles and recommendations are identified below.

D.1. Obstacle: Identifying an institutional infrastructure for the Regions to: 1) advocate the scientific process, 2) resolve scientific debates, and 3) ensure sound science, including recent scientific advances, is appropriately incorporated into the Agency decision-making processes.

D.1.a. Recommendation: Regions should consider appointing a senior-level Science Adviser, who possesses an understanding of how decision making can be strengthened by science and weakened by uncertainty. The proposed Adviser would serve as a science advocate to assist in negotiating scientific debates and incorporating sound science, including recent scientific advances into Regional decisions as appropriate.

D.2. Obstacle: Identifying Agency guidance that sufficiently incorporates scientific advances. Where guidance does incorporate the latest scientific advances,

it needs to do so clearly and to provide for unique Regional needs. Otherwise, Regions may use outdated guidances that are more widely understood.

D.2.a. Recommendation: ORD and the Program Offices should ensure early Regional involvement in policy and guidance development. Early Regional involvement will facilitate guidances responsive to Regional needs and will promote consistent implementation across and within Regions and States.

D.2.b. Recommendation: Program Offices should provide training on the use of new guidance, obtain regular feedback from the Regions on guidance effectiveness, assess the need for appropriate guidance updates or revisions, and act on identified needs.

D.2.c. Recommendation: Regions should be encouraged to develop voluntary interregional agreements to more systematically identify, develop, review, and institute more uniform Regional guidance materials.

D.3. Obstacle: Accessing adequate data in comprehensive formats, e.g., multimedia, to adequately characterize communities and ecosystems to facilitate Regional comprehensive community/ecosystem protection planning.

D.3.a. Recommendation: The Agency should provide tools to make relevant environmental data available in a comprehensive format to: 1) identify individual permittee impacts on communities/ ecosystems e.g., identify those A20-percent@ of dischargers causing A80-percent@ of the problem in a given community/ecosystem), 2) identify which communities/ecosystems within a Region need priority attention e.g., facilitate development of a community/ecosystem triage system that would include Environmental Justice-related issues), 3) better understand the interactions among air, water, and land pollutant discharges and habitat alterations in each community/ecosystem, 4) facilitate improved targeting of limited Regional resources, and 5) measure the success of Agency Programs and Regional/State implementation efforts.

D.4. Obstacle: Obtaining sufficient ability and knowledge to: 1) identify and remedy existing science needs, 2) forecast future science needs, and 3) address emerging pollution issues.

D.4.a. Recommendation: The Agency's recent Draft Report on the Environment 2003 discusses the need to develop better indicators to: 1) measure and track the state of the environment and 2) support improved environmental decision-making. Follow up to this Report's recommendations will help the Regions improve their ability to

strategically plan and measure success, forecast future science needs, and better predict and address emerging issues. The requested follow-up should include appropriate support for Regional monitoring and data collection for selected indicators.

D.4.b. Recommendation: The Regions should institutionalize a process to efficiently and effectively increase communication and coordination among the various planning groups and technical work groups, e.g., Regional Science Councils, National Regional Science Council, Research Coordination Teams, Ecological Risk Assessment Forum, Ground Water Forum, Toxic Sediments Team, etc.

D.5. Obstacle: Obtaining sufficient mechanisms to collectively speak as one Regional voice in the Agency planning and budgeting process to address Regional science needs requires improvement.

D.5.a. Recommendation: EPA should establish a National Program Manager NPM) for Science to provide a stable institutional voice. The NPM could be supported by the National Regional Science Council NRSC), which serves as a Regional network. A possible location for this position would be the Office of the Science Advisor.

D.5.b. Recommendation: Regions should implement a more systematic mechanism to collectively identify common, overlapping, and priority Regional science issues to facilitate participation in the Agency's planning and budgeting process. This mechanism would incorporate each Region's strategic planning, State of Region Report findings, and State and Tribal input as appropriate.

D.6. Obstacle: Obtaining sufficient ability to effectively get Regional science needs met in ORD's planning and budgeting process needs improving.

D.6.a. Recommendation: Regional managers should become more knowledgeable of and participate in both ORD and the Agency's planning and budgeting process. Regional managers should encourage and support staff participation in appropriate planning and budgeting activities to facilitate decisions reflecting Regional needs.

D.6.b. Recommendation: Regions need more representatives on some of ORD RCTs to adequately represent Regional research needs and Regions need to be more proactive in identifying and advocating Regional research needs to ORD and the Program Offices.

D.6.c. Recommendation: Regions should consider having the Regional

RCT Representatives serve a longer period than the current two-year lead-region cycle. Note: the implementation of Recommendation A.1.b. could address this obstacle and substitute for this recommendation. The HSTL and other media program equivalents could serve as the Regional RCT representatives.

D.6.d. Recommendation: The Lead Region Coordinator and the Regional RCT representatives need to be selected, in place, and knowledgeable of the ORD planning process prior to the beginning of the relevant fiscal-year ORD planning cycle. The implementation of Recommendation A.1.b. could serve to partially address this obstacle and this recommendation. See above recommendation.

2.E. Regional Science and Technology Labs RS&Ts)

RS&Ts are essential to enabling the use of sound science at the Regional and State levels. RS&T scientists and engineers collect and analyze data for soil, air, water, and biological samples to determine the type, level, and source of contamination. They review scientific literature and databases and obtain data to determine effects on human and animal health. RS&Ts are involved in examining different potential exposure pathways and exposure times, assessing potential health dangers associated with contaminants of concern, and characterizing risk to human and ecosystem health. Moreover, RS&Ts are active in training the regulated sector, State, Tribal, and local governments. Specific obstacles and recommendations are identified below.

E.1. Obstacle: Decreasing or fixed) RS&T Lab budgets and increasing nondiscretionary costs, e.g., security costs and building rental/maintenance fees.

E.1.a. Recommendation: EPA should establish a National Program Manager for Regional Science. At present, the RS&T Lab budget and the Capital Equipment Fund, supporting laboratory equipment, is located in the Office of the Administrator's budget framework where it is somewhat isolated as an operational expense item and vulnerable to budget cuts. A new institutional home for this function such as the Office of the Science Advisor, could be a more robust advocate for these needs.

E.1.b. Recommendation: EPA should create a Regional Applied Science Effort RASE), funded by all the Program Offices, analogous to ORD's Regional Applied Research Effort RARE). The proposed RASE should provide direct resources to the Regions to address unique local-level Regional science-related issues.

E.2. Obstacle: The Regions have difficulty obtaining sufficient capacity to conduct certain cutting-edge testing, e.g., PCB congeners and dioxins/furans, and

lack sufficient extramural funds to hire outside lab support. Additionally, Regions do not have the equipment to analyze extremely low pollutant concentrations, e.g., offsite drift associated with aerial spraying of pesticides.

E.2.a. Recommendation: EPA should increase resources available to support the Regions' ability to conduct cutting-edge testing and to analyze for ultra-low pollutant concentrations.

E.2.b. Recommendation: EPA should consider expanding the Regional Centers of Excellence concept to address unique Regional needs in a cost effective manner.

Conclusions

This 45-day task force study identified obstacles, with associated recommendations, that challenge the use of sound science in Regional decision making. The task force's study results are included in this Report and include obstacles associated with communication, human resources management, technical expertise, planning, data collection, analysis and management, environmental monitoring, peer review, and Regional Science and Technology laboratories.

We recognize the Report's scope is limited and that the recommendations it contains require further discussion and analysis. We hope this Report will initiate this effort and result in the appropriate implementation of some of the proposed recommendations. Defining and implementing solutions represents a difficult and complex challenge, and this Report is just the first step in this process. For example, the National Regional Science Council has expressed an interest in evaluating this Report for direction on future activities. Still, we hope that this review highlights the critical issues which the Agency needs to address to improve on the existing use of sound science in Regional decisions.

The Regions are especially grateful to Paul Gilman for asking the questions that prompted this review and for his continued interest in and support for Regional science. Region 4 wishes to thank all the Regions for assisting with the development of this Report and for all of their constructive and insightful comments.